CASE 36293

FINAL REPORT REVISION DATE: 5/17/13

LONGTITUDE/LATITUDE: 36.781148, -78.549505, height approx: 7000 Ft.

SYNOPSIS: Father and son, while flying on 2/18/2012 at 02:00 PM ET, witnessed a bright orb-like UFO hovering next to their plane. The UFO affected the plane's electronic systems for a few seconds - 15 minutes prior to landing in Richmond.

OBJECT DESCRIPTION: Bright, circular sphere about 30 feet in diameter.

WEATHER INFORMATION: Temp: 62.6°F, humidity 26%, winds speed 9.2 mph from the south, visibility 10.0 miles-clear.

LOCATION: Chase City is a town in Mecklenburg County, Virginia, was incorporated in 1873 and named after Salmon P. Chase. The population was 2,457 at the 2000 census. Tobacco and other crops are grown nearby. It is located 65 miles SW of Richmond.

EVIDENCE/INVESTIGATION: A father and his son, both pilots, were in their Mooney Ovation II, a propeller-driven aircraft flying via IFR (Instrument Flight Rules) at a speed of 188 knots and at an altitude of 7480 feet. The father has a masters in economics and is a successful banker while the son is a manager that served in the military. Shortly after they crossed over the border of Virginia from Charlotte, NC, they were preparing to land in Richmond and while his son was scanning the skies for air traffic, he unexpectedly saw a bright, glowing sphere flying alongside their aircraft. As the UFO begins to soar dangerously close to their right wing, about 50 feet away, the plane lost power; all of the electrical equipment including their computers suddenly turned off. A few seconds later, the plane regained all systems as the UFO swiftly shot away at an incredible speed.

The son: "I've never in my life had seen anything like this happen, it was very unexpected because we did not see the vehicle [UFO] approach…the vehicle was about 30 feet in diameter which glowed and may actually had some solid shape beneath the energy. What I could observe on the surface which seemed to have some circular swirling energy force which surrounded something I believe operated it

from within.”

The son added that the plane’s engine did not fully shut down; it sputtered a little but as the UFO disappeared from view, all equipment became operational again.

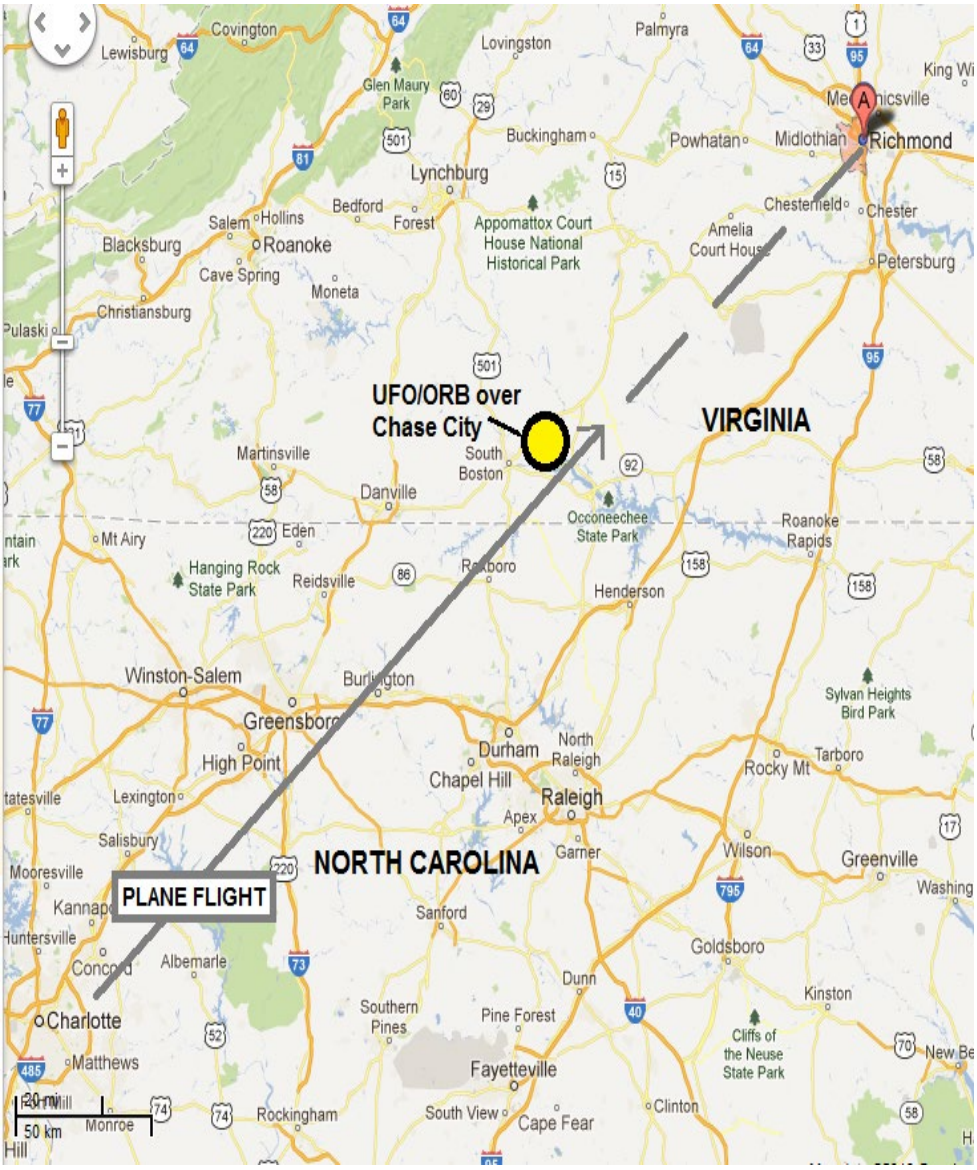
The son: “As far as instruments affected the altimeter, attitude indicator, magnetic compass, course deviation indicators and the electrical functioning of the craft were affected. This was all over a few moments as soon as we recognized we were being paralleled by the object. UFO accelerated to a speed I can't even calculate out of sight to our 12 oclock.”

No formal report was filed but the aircraft was inspected to ensure everything operated properly before they flew back home in North Carolina. His father basically refused to talk about the incident to anyone except immediate family members.

WITNESS CREDIBILITY: The son is a military veteran, served in the Coast Guard and his father is a banker in his mid 50s.

CONCLUSION: I believe these two professional men and pilots did in fact witness a formidable sighting involving an aerial phenomenon. This UFO appears to have affected the plane’s electronic system.


Witness rendition by N. Gagnon MUFON FI 2012


UFO/ORB over
Chase City
VIRGINIA
NORTH CAROLINA
PLANE FLIGHT
Richmond
Petersburg
Chesterfield
Chester
Midlothian
Powhatan
Buckingham
Lynchburg
Bedford
Forest
Appomattox Court
House National
Historical Park
Amelia
Court House
Lovingston
Palmyra
Covington
Lewisburg
Glen Maury
Park
Salem
Hollins
Roanoke
Blacksburg
Cave Spring
Moneta
Christiansburg
Martinsville
South
Boston
Danville
Occoneechee
State Park
Roanoke
Rapids
Mt Airy
Eden
Hanging Rock
State Park
Reidsville
Henderson
Winston-Salem
Burlington
Greensboro
High Point
Durham
North
Raleigh
Chapel Hill
Raleigh
Rocky Mt
Tarboro
Sylvan Heights
Bird Park
Lexington
Salisbury
Apex
Garner
Wilson
Greenville
Mooresville
Kannapolis
Sanford
Goldsboro
Albemarle
Concord
Dunn
Kinston
Charlotte
Southern
Pines
Pine Forest
Cliffs of
the Neuse
State Park
Matthews
Fayetteville
Rockingham
South View
Cape Fear
Clinton
Monroe
20 mi
50 km

MUFON FIELD INVESTIGATOR'S REPORT

MUFON CASE #:	36765		TODAYS DATE:	4/20/2012	
FIELD INVESTIGATOR:	Gary				
DATE REPORTED:	3/26/2012				
DATE/TIME OF EVENT:	3/25/2012; 3:00 AM	DURATION:	5 min		
SUBMITTER:	xxxxxxxxxxxx				
EVENT LOCATION:	xxxxxxxxxx		COORDINATES:	32.7/-97.3	
City & State	Cleburne, TX	COUNTY:	Johnson		
CURRENT ADDRESS:	xxxxxxxxxxx				
City & State	Joshua, TX	COUNTY:	Johnson		
CONTACT NUMBER:	817-933-2372		E-MAIL ADDRESS:		
CASE TYPE:	FB1	CASE CATEGORY:	2	CASE DISPOSITION:	Unknown – UAV

MUFON FIELD INVESTIGATOR'S REPORT

Synopsis: Large triangle over corrections center in Cleburne, TX

Location: Johnson County Correctional Center,

Object Description, Size and Distance First Seen: Large object appeared to the south with dim lights

Object Last Seen: Object sped to the north very fast in level flight

Physical Evidence: Witness furnished a sketch of object via e-mail

Evaluation of Evidence: Triangular object with 5 lights

Disposition of Evidence: Kept in file

Weather Information: Temp 62 degrees F, wind calm, 0 MPH, clear with vis 10 mi

Local Airport or Military Base Joint Naval Base (former Carswell AFB) 30 miles to north, DFW Airport 45 miles to northeast

Trace Evidence include Radiation EM Field: None

Photographs or Video Evidence: None

Evaluation of Photographs or Video Evidence: N/A

Witness Background: Witness is a corporal correctional officer with the Johnson Co Correctional Facility

Witness Interview: Witness was first contacted on 3/26/2012 via e-mail and witness furnished a sketch of the object via e-mail on same day. Witness was interviewed by telephone on 3/26/2012 at 8:00 PM. Witness is a correctional officer for the Johnson County Correctional Facility in Cleburne, TX. Cleburne is approximately 25 miles south of downtown Fort Worth. The witness said he first saw the object to the south and the object flew over him very slowly, appearing to be going only about 5 MPH. (The reason he was looking up was because he was showing another officer satellites in the sky to show his kids.) The witness said as he walked through the parking lot the lights over him turned on. The object then sped up and was gone to the north in a second. He said he was looking right at the object when it sped up. The witness believed the object was around 4,000 to 6,000 feet high. He said he was an amateur astronomer and could judge heights. (A drawing he provided is part of this report.) The witness said the correct date was March 25th, not the 24th, as he worked the night of the 24th and the object appeared on the 25th at 3:00 AM. The witness said there was another correctional officer with him that also saw the object and he would have him call. There was also a Joshua city police officer that came to the facility and said his dispatcher said there were several people who had called in reporting suspicious activity in the skies.

On April 18, 2012 this investigator made arrangements to interview the witness at 8:00 PM and go to the event location. At 7:45 PM while on the way to meet the witness, the second correctional officer that saw the object called and reported on what he saw. The second witness related he saw a

very large object that appeared to be pretty low and going very slow. He was following the first witness in the parking lot at the time. The second witness was not looking at the object when it sped up. He said the next time he looked it was just gone.

At 8:15 PM this investigator met the witness and his 11 year old son at the Starbucks in Burleson, TX. This investigator showed the witness his MUFON identification. The witness showed this investigator his badge as a correctional officer. We discussed the witness sighting. The witness said the lights on the object were white and not bright, but dim and in a series of circles. The object was triangular shaped and the surface was dark. The object made no sound as it moved very slowly in the sky. He described it as slipping through the sky. He said it appeared to jerk as it moved like it was jumping from one location to another as it sped up. At the end it sped up and was gone in a second. He said he was looking directly at it at the time. The object was very large, much larger than an airliner and at arms-length bigger than his hand.

At 9:45 PM this investigator traveled in the witness' vehicle to the Johnson County Correctional Facility in Cleburne, TX. The witness retraced his route through the parking lot and pointed out the object was approximately at a 70 degrees elevation. As we walked through the parking lot the lights went on as the witness had described. The lights were on poles approximately 25 feet high.

The witness appeared to be very credible. The second witness also corroborated his description of the sighting.

Witness Statement: I was walking outside in the parking lot, we were both looking up it was a very nice perfect night no wind around 72 temp no Clouds and no moon . Then seen out of the black still night a triangle shape craft around 75 degrees up appeared not moving fast at all . It was heading north towards ft worth Texas coming from the south. I figure it was around 500ft to 1000ft away and around 4,000ft to 6,000ft up . It had dim rounded lights that could be seen very well one light inside the other starting at the tip and working there way back for a set of 6 lights .As it moved north , I walked with it moving through the parking lot the parking lot lights will light up as you pass under them . So seen from above they are turning on one by one . The craft started to pick up speed so I moved faster then it moved faster untill I was running. Then it just took off flat and level so fast as a blink of the eye. He had seen us running through the parking lot thinking we were chasing some one . Yeah we were chasing somthing I said and told him what we had seen . He was in disbelief at first then frustration like he had just lost the loto winning ticket. He said (We have been getting calls about that all evening) . My guess is comparing its size to the building sizes it was passing over to be around 150ft to 200ft wide and 250ft to 300ft long no smaller than this only larger . And it made no sounds and moved more like it was slipping through the sky than using the sky to keep it up .

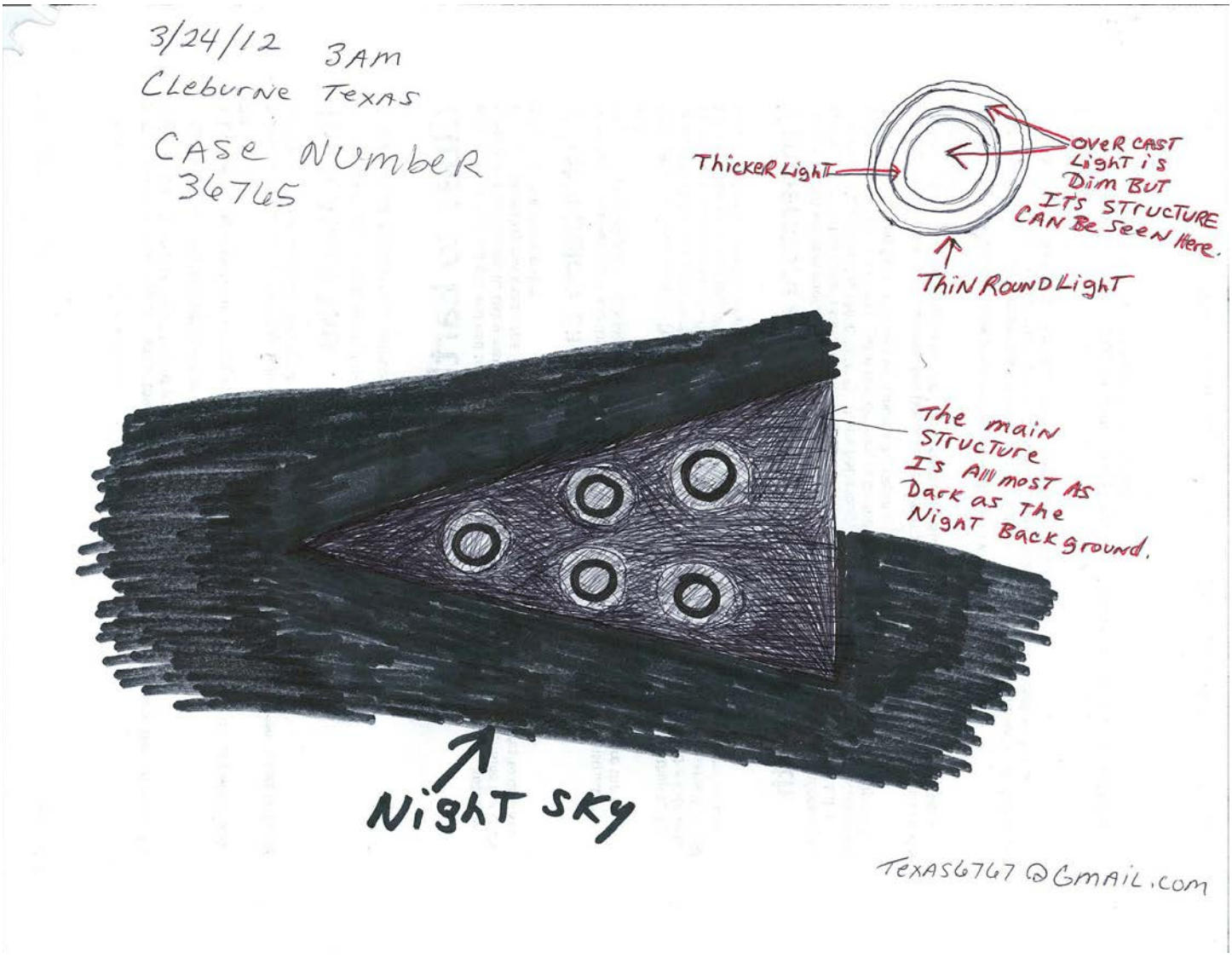
Expert Statement: None

Logistics/Analytical: The archived files for the DFW Airport Air Traffic Control towers east and west were listened to for the period 8:00 to 8:30 GMT (3:00 AM) for March 25, 2012. There was nothing unusual reported.

Summary Conclusion: Recommend classifying this case as an Unknown - UAV

Disposition: Unknown - UAV

MUFON FIELD INVESTIGATOR'S REPORT



MUFON FIELD INVESTIGATOR'S REPORT

Contact Activity:

Date/Time:	Contact Method:	Activity:	Notes:
3/26/12; 11:33 AM	e-mail	Request interview	
3/26/12; 8:00 PM	Telephone	Interview witness	
3/26/12; 9:49 PM	e-mail	Witness sent sketch	
3/29/12; 6:21 AM	e-mail	Witness will try to set up 3 way with other witness	At 8:00 PM tomorrow
3/30/12; 8:00 PM	Telephone	Witness could not reach other one	
3/31/12; 9:00 PM	Telephone	Witness could not reach other officer	
4/6/12; 9:34 PM	Telephone	Witness left message	Witness gave other officers my contact number
4/15/12; 4:03 PM	e-mail	Set up face to face interview	

MUFON FIELD INVESTIGATOR'S REPORT

4/16/12; 12:00 AM	Telephone	Witness response	Meet on 4/18/12
4/18/12; 6:00 PM	Telephone	Witness can meet at 8:00 PM	
4/18/12; 7:45 PM	Telephone	2nd witness called	See above
4/18/12; 8:15 PM	Interview	Face to face	In Burleson, See above
4/18/12; 9:45 PM	Interview	Face to face	At event site, Cleburne, see above

EOR

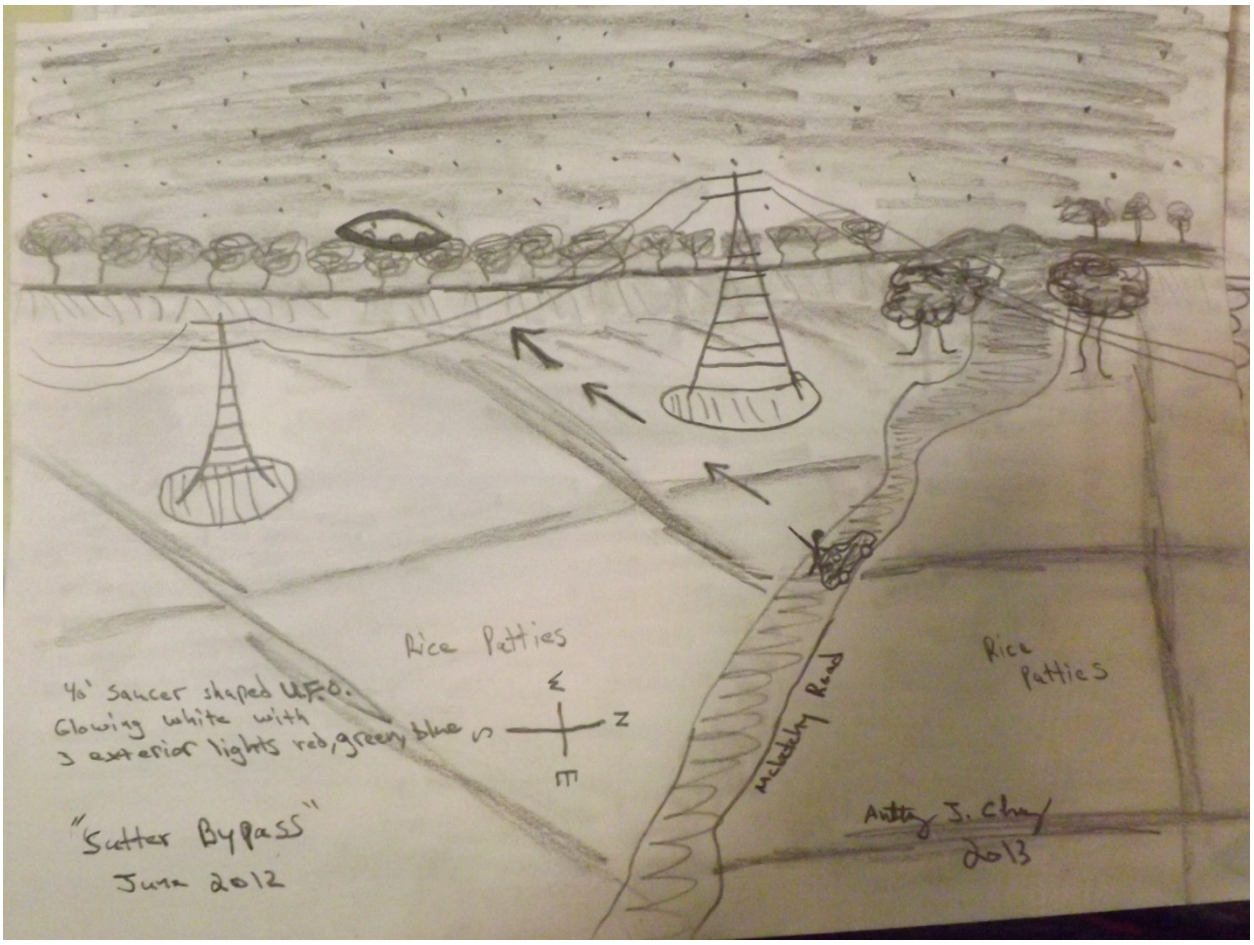
MUFON Case 41298

WITNESS TESTIMONY:

"We had been running protection for this construction company at the fishing pier or fishing ladder on the West side of the levee. We sat on top of the levee off of McClatchy Road. It is just about five, maybe seven miles South of Sutter and couple miles West of Yuba City. Sometime in June as I recall, I was on my way to the site to relieve the other officer. From Franklin Road, I first noticed a glowing white amongst the trees. I was facing about West but noticed it looking Southwest towards the levee (Sutter Bypass). Traveling west bound on Franklin Road; I entered Clements Road south bound. I could still see it and then I came to McClatchy Road facing west. I was still observing the object but now seeing it was really close. I stopped somewhere in the middle of McClatchy Road, then I stepped out of my vehicle with my binoculars and the night vision. This duration was approximately 5 minutes.

My observation was the craft was a few feet above the trees gliding along following the tree line. It was moving slow and at that time it swayed from side to side then hovered, at a complete standstill. Even at a standstill it appeared to be swaying from side to side at times. I believed this craft to be at least 60 feet above the ground with one occasion of it actually touching the ground. It would then move below the trees and back up above the trees. It did this pattern a few times. In my opinion I felt it was searching the area. At one point it looked as if it had possibly landed. Which at this time made me wonder if it was possibly collecting tree and ground samples or looking for something? I had used my thumb to gauge its size. My thumb couldn't cover it but two thumbs could. So somewhere between a thumb and a half, took up the object's size. Then it moved over more and would do this repeatedly. It rose up and started moving out of sight. It was about 40 to 50 feet, a glowing white saucer shaped UFO, with 3 exterior lights that were blue, green, and red and these exterior lights flashed alternately. Even though it was dark, the light from the craft helped to have a visual of it being above the trees. It was that bright. Plus I knew the layout of the land because part of my job was to know my surroundings for tactical positioning in the event/s of criminal activity. At night the land appears further away but going back during the day, I discovered it to be approximately 300-400 yards from where I was. I had bought a few weeks before, a pair of Bushnell 10x50 binoculars and had on hand the companies Owl Nite night vision equipment. I use mostly binoculars for observing criminal activity at night. All the night vision equipment did was just confirm to me a rather large glowing white saucer shaped craft with 3 external lights at the bottom. I did not observe any portholes or windows. I had a cellphone from Straight Talk from Wal-Mart. I did try to take a picture but with a 2 -3 megapixel camera phone, it was relatively too far away. It looked like a dot so to speak. If it had continued on its path, it would have reached my partner on top of the levee. When you stand on the levee off of McClatchy Road looking southward, there is a bend that curves to the right, so he could not see it unless it had continued towards him.

I went in my car and drove up to the top of the levee where my partner was (I was early as usual and there to relieve him). I told him what I had seen and to follow me down the road. As we got down there, it was gone. Observation of the craft while standing outside was approximately another 7 minutes."



Witness drawing

Witness map of sighting location

These pictures were taken by the witness - May 2013

Picture zoomed in

CONCLUSION:

Using all the additional info I received from the witness, we were able to calculate an approximate size of the object based on the information that the witness provided. The Google map below measures the distance from the witness to the unknown: 1900 feet or about 650 yards. This is actually not too far off the witness's estimate of 300-400 yards. His estimate of 1.5 thumbs would be about the same as 3 degrees of space in the sky. As a reference point, the moon takes up 1/2 degree, so this object would have been six times the size of the full moon at 1900 feet distance. If the witness' estimate is correct then the object would have been 100 feet in diameter.

The 35 year old witness served in the army and has had law enforcement training.

Map of distance from witness to object

The approximate latitude of the witness' location shown on the map was 39.102134 and the approximate longitude was -121.753769. Based on the witness' background in the military and security experience he proves to be a very credible witness. This investigator still believes that what this witness saw was nothing conventional and the case will remain as an unknown aerial vehicle.

May 18, 2013

CASE 41289

On July 13, 2012, at 10:15 pm, a mother was standing in her driveway on the north side of her house saying goodnight to her daughter, who was in the drivers seat of her minivan with her 4 year old son in the rear seat. Looking south from the minivan, the daughter could see the front of the house and the sky above, while the mother was facing north with her back to the house. The mother looked past her mom and saw something above the garage roof, stretching from the chimney on the house to a tree about 75 feet away. She stopped mid-sentence and said "Mom, what is that?"

The mother couldn't see the object from where she stood, so the daughter told her to run to the east corner of the house, where she first saw the object. The daughter quickly got out of the van and the two women ran around the east side of the house to the back yard. In that time, the object had moved 200 feet south from the mother's house and yard and could be seen behind a line of 100 feet tall trees moving slowly west to east. Both women described the object as huge, big enough to cover the 150 feet wide property, shaped like a lampshade or a cone with its top lopped off. It had a distinct outline and was brilliant white. The bottom of the object appeared to have a curved convex bulge to it, and there was a row of bright red lights along the lower edge of the object. The daughter saw the red lights "racing" in sequence, while the mother described them as "flashing." Both women described several rows of brilliant white lights ringing the sloping sides of the object, as brilliant as the lights in a stadium.

The craft made no noise as it moved slowly over the neighbors property to the east, then accelerated. By the time the women ran to a space between two trees to see where the object was going, it already seemed to be over Waukesha County. Then suddenly the red and white lights went out and the object disappeared into the night sky. The whole sighting lasted about 25 seconds.

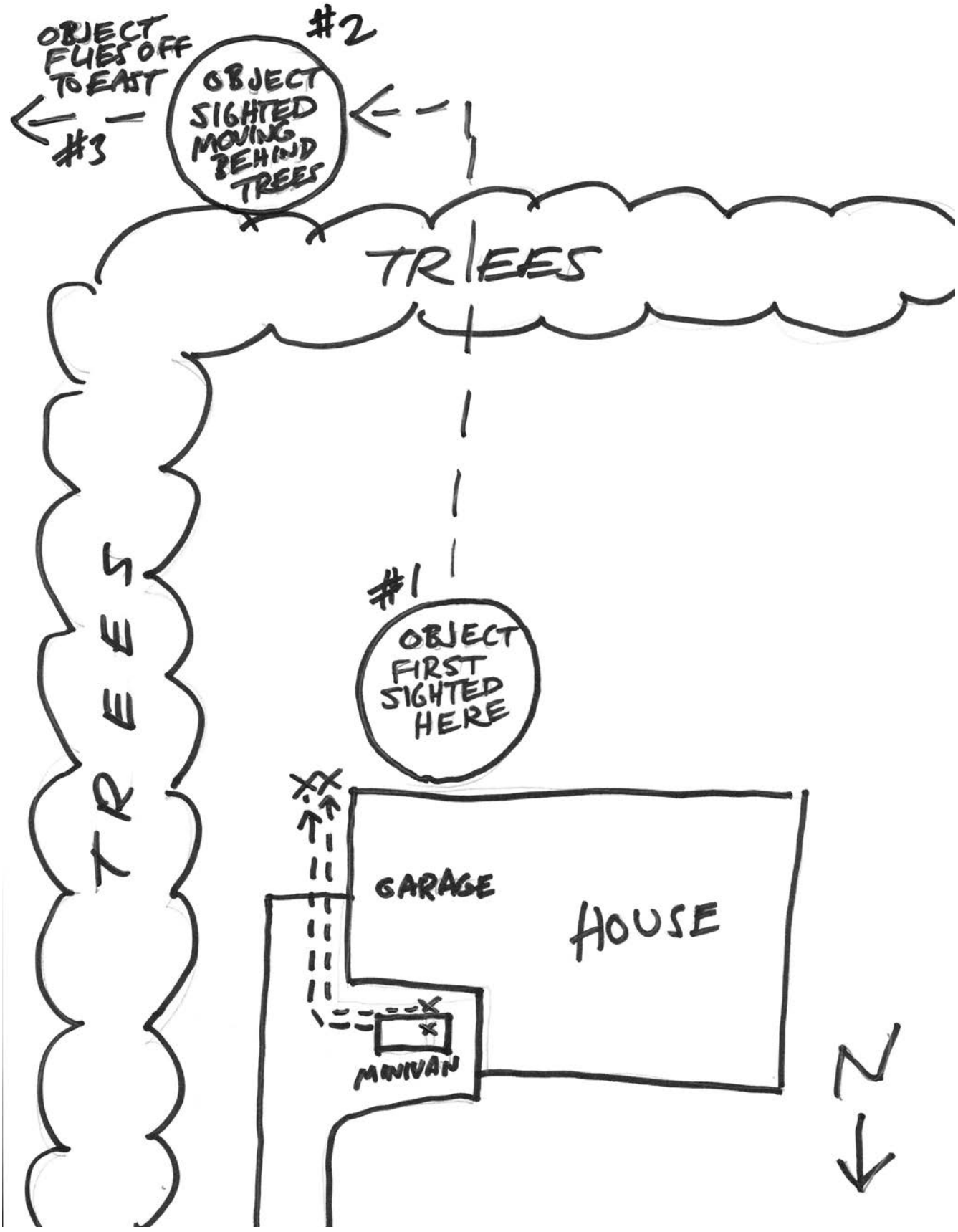
The mother has three neighbors with houses within 500 feet, all well within sight of the object. But the neighbor to the east, whose house the object flew directly over, is elderly and goes to bed early. The house to the south is built into the hillside and doesn't have a single window looking north, so no one inside would have been able to view the object. The house to the west is down a steep, heavily wooded slope, so that neighbor would not have had a clear view of the object. In fact, the mother asked that neighbor if he had seen anything outside his house the night of the 13th, and she says that he said no.

The two women both made sketches of what they saw, and even though the daughter said that the mother's picture was not accurate, the two pictures are in fact nearly identical (see attachments). After the object disappeared, both women panicked, and voiced their fears that one or the other of them could have been "beamed aboard" the object. Both women felt that the object wanted them to see it, but didn't want them to see too much. They both felt that there was conscious control of the object and that it anticipated their thoughts and intentions, which led to the fear that they might be beamed aboard. Meanwhile, the 4 year old boy in the minivan was crying, because his mother was so scared.

There did not seem to be any physical effects to the grass or trees, but magnetic readings around the garage and back yard --where the object had been immediately overhead -- were odd. The needle did waver back and forth by about 30 degrees at times for no apparent reason.

Interestingly, the mother's husband, who was inside but did not see the object, and seemed somewhat skeptical, watches UFO shows on TV and suggested that the mother report the sighing to MUFON, which she did. The daughter did not want to report the sighting at all, but agreed to talk to me after I

had interviewed her mother.



Mississippi INVESTIGATION LOG:

FINAL REPORT DATE: April 22, 2013
FI ID# 109876
CASE#: 46835
BCE: 15.69

LONGITUDE/LATITUDE:

Lat: 30.579406
Long: -89.760017

SYNOPSIS: At approximately 1530 CDT on April 13, 2013, the witness was piloting a Cessna 172 aircraft at 2,500 feet altitude while approaching the Picayune, MS VHF Omni-directional Range (VOR), heading north. Nearing the VOR, the witness glanced out of his right window and saw a small (approx. 33" wide), shiny metallic object just off the right wing. His attention was drawn to the fact that this object momentarily remained stationary with his aircraft, which was traveling north at approximately 140-150 MPH. The object remained stationary long enough (2 seconds) for him to clearly see its shape which resembled an oval shaped object with what appeared to be a small, triangular shaped, dorsal winglet in the center of structure which appeared to be facing towards his plane. After a short (2-3 seconds) time, the object slowly drifted away to the south.

OBJECT DESCRIPTION: Shiny oval-shaped object (33" wide)[1] with a triangular dorsal winglet in the center of the object. The object resembled a mylar balloon but had a defined shape with no visible markings, seams or openings. The body was much thicker, similar to a small deflated, slightly oblong ball. "As I viewed the object, the dorsal like appendage was facing me and in the center of the object." The base of the dorsal like protrusion was not angular but seemed to almost be sunken into the body, giving the base of the fin a rounded, sunken appearance."

INTERVIEW/STATEMENTS :

On 4/19/2013 – **I sent an email to the witness concerning his sighting. I replied providing additional information concerning the case provided above in the synopsis.**

"It is not unusual to have close encounters with birds when flying and these, by comparison, are very fast, brief events where the bird is not much more than a flash as your plane passes. On one flight years ago, I had a shiny metallic object shoot by my airplane. It took a few seconds for my brain to recognize that this was a small mylar balloon. When I first saw this object off my wing, I immediately thought that

this was another mylar balloon. But when the object did not move and remained in a stationary position relative to my wing so that I was able to make out some detail of the object, I realized that this was not some object drifting through the atmosphere. After briefly staying off the wing, the object drifted away as opposed to rapidly disappearing from view. After the object was no longer in view, I was puzzled as to what I had just seen. Since then, I have tried to understand how any object other than another aircraft could keep pace with my airplane and then drift out of view rather than appear as a flash of something near the aircraft. After giving this experience considerable thought, I thought it best to provide some type of written record of my experience. A couple of things I believe I failed to mention in my report was that the day of this flight was a windy day with occasional wind gusts. Also, I was on a local VFR flight and had not filed a flight plan nor was I operating in controlled airspace where I had been assigned a discreet transponder squawk code. The only other air traffic I recall hearing on the radio at this time was a skydiving jump plane over the Slidell, LA airport, about 12 miles away.

I have to tell you that I am simply stumped to explain what I saw last Saturday. For this object to have remained just off my wing long enough for me to see the details of its shape, color, etc. makes no sense. The object resembled a mylar balloon but had a defined shape with no visible markings, seams or openings. As I look back on the event, it seems that this object was pacing my airplane. And when it drifted away, it did so rather slowly. As I indicated in my report, birds which pass off my wing would be a blur as we passed one another. This object, by comparison, moved out of view relatively slowly."

(When asked if he noted any effects to his plane during his flight, he responded.) – " No effects to me or my aircraft."

On 8/8/2013 – I sent him a copy of an illustration provided to me by William Puckett (State Director, Montana) showing potential tracking of his plane. "Your radar track is correct"

"I have attached a very primitive sketch of the UFO that as just a few feet off my right wing. As I indicated previously, I did not see any seams, markings or lights on the object which resembled a shiny football in shape, only a little more rounded. In the center of the object was what appeared to be a small dorsal wing but the wing was 90 degrees to the direction of flight, which made no sense to me as I reviewed in my mind what I had seen that afternoon.

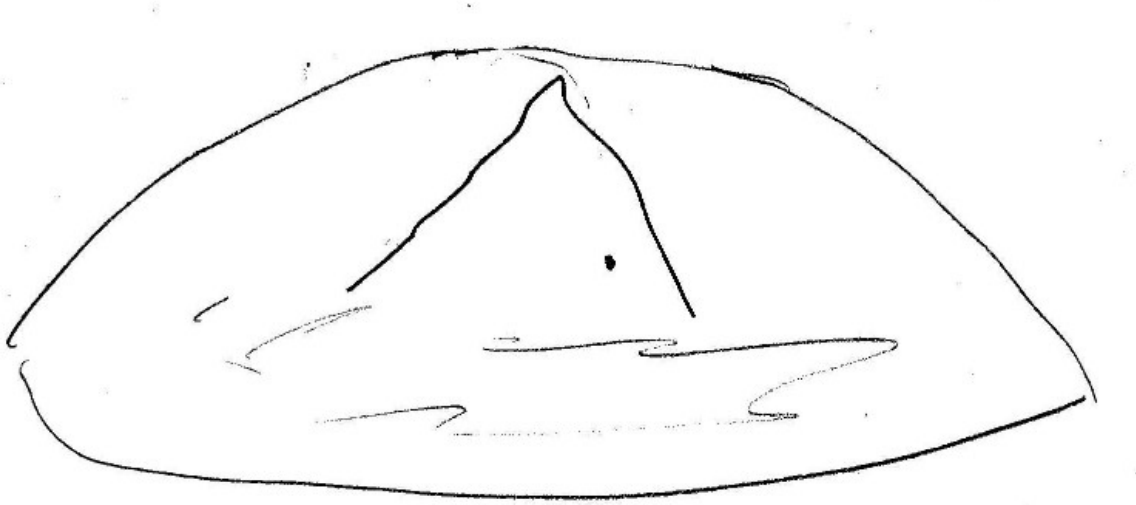
I would guess that the size of the object was 3 - 4 times larger than a regulation football and no more than 8 feet off my wingtip.

I am sure you are aware that just a few miles from the location of my sighting is the John Stennis NASA test facility. The center also houses several Navy operations, including a research center and a training school. A look to the rear and over my right shoulder from the Picayune VOR and you can see easily see the facility on a clear day from a relatively low altitude. While I am not aware of any aerial operations associated with the facility, military Special Operations forces routinely train and test weapons on the facility grounds. The airspace surrounding the facility is Restricted (R4403) and can be seen on a sectional or low altitude aeronautical chart."

1. A regulation NFL football is 11 inches in length. Witness stated it was three of these in width.

This is the attached sketch referred to by witness above.

Figure 1. The pilots drawing of the object with the triangle being a dorsal fin.



On 10/1/2013 – I wrote him seeking more information.

(**I asked him about the angular size and what it would compare with if held at arm's length. His response follows**) – " I am guessing, but I would say between the size of a baseball and a softball. I will go sit in my plane and see if this estimate holds true." He did and stated that it was a baseball.

(I provided him a draft copy of the radar report to see if he could provide any additional details or corrections) "I have not read the whole report but did quickly do a scan. One thing that you might want to amend in the report is the amount of time I viewed the object. I estimate that I had visual contact with the object for 3 - 4 seconds: 2 seconds off my wing and then another 2 or so seconds as I watched it fall behind my plane and disappear. Now, this is not much time, but during the 2 seconds off my wing I clearly saw the details of the object. Part of the reason I was able to discern the details in this short time span is because the object was absolutely stationary in reference to my wingtip. And seeing something that clearly, seemingly close to my wingtip, tends to focus one's attention."

"I have rewound this event countless times in my mind. As I stated previously, the event made no sense. What looked like a mylar balloon did not act like a balloon. Perfectly stable, duplicating my exact speed with what looked to be a small dorsal fin 90 degrees to the direction of flight. The whole thing was very, very puzzling. Now that you have been able to actually detect an object on radar, I can stop questioning if my mind was playing tricks on me. Although the distance from my wing and the relative size of the object were apparently misinterpreted during this brief exposure, I suspect this might be typical when you only have a brief visual contact with an object with the horizon in the background."

NATURAL/MANMADE PHENOMENON:
There are a variety of potential objects that are mylar in color and oval in shape. Typical balloons from many stores are mylar in color, however, none pace aircraft and have the winglets as described. They also do not yield radar returns. A drone was considered and the proximity to Stennis could be considered, however, a movement this close to an aircraft and one in which there are no apparent propulsion vents or openings is conspicuous. The radar track shows the object changing speeds and making greater than 90 degree turns. This possibility was ruled out. The possibility of the object being a blimp was also considered. We could not identify anything that was in the area that day and time. None of the typical advertising balloons are mylar and his description with details suggests this is a much closer and smaller object.

LOCATION:
Witness states he was at 2,500 Feet altitude and approaching the Picayune VOR. He mentions that Slidell is approximately 12 Miles away. He did not file a flight plan and states he was out of controlled airspace. The witness placed this as his position when he first saw the object looking east. (position is the red star).

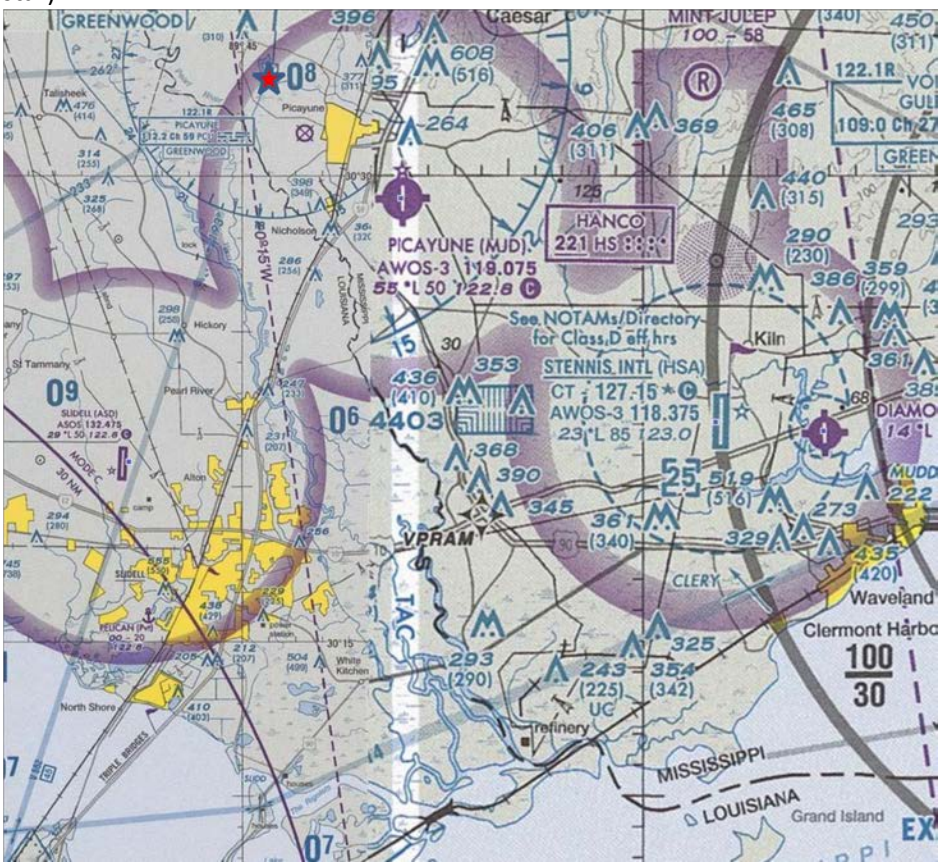


Figure 2. Aeronautical Chart showing position (red star) as indicated by the pilot

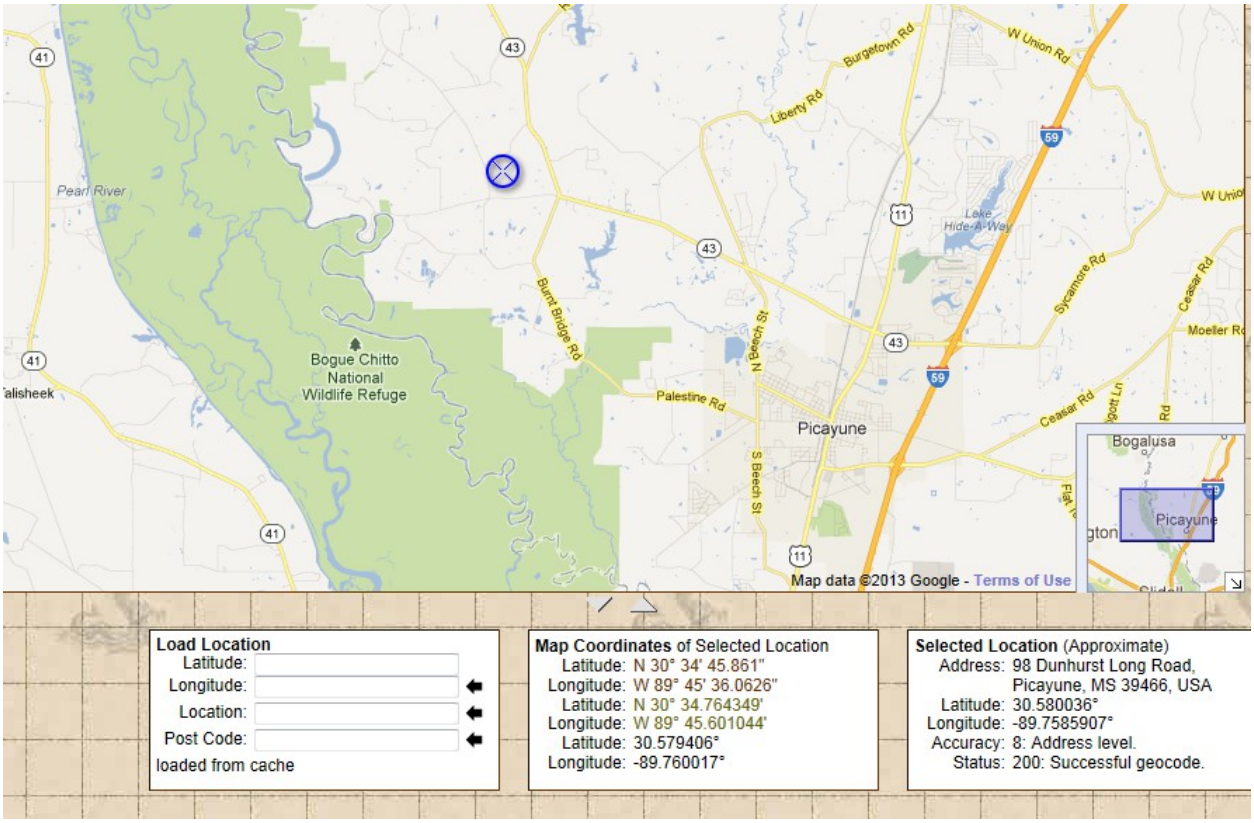


Figure 3. Map showing position of plane as indicated by the pilot.

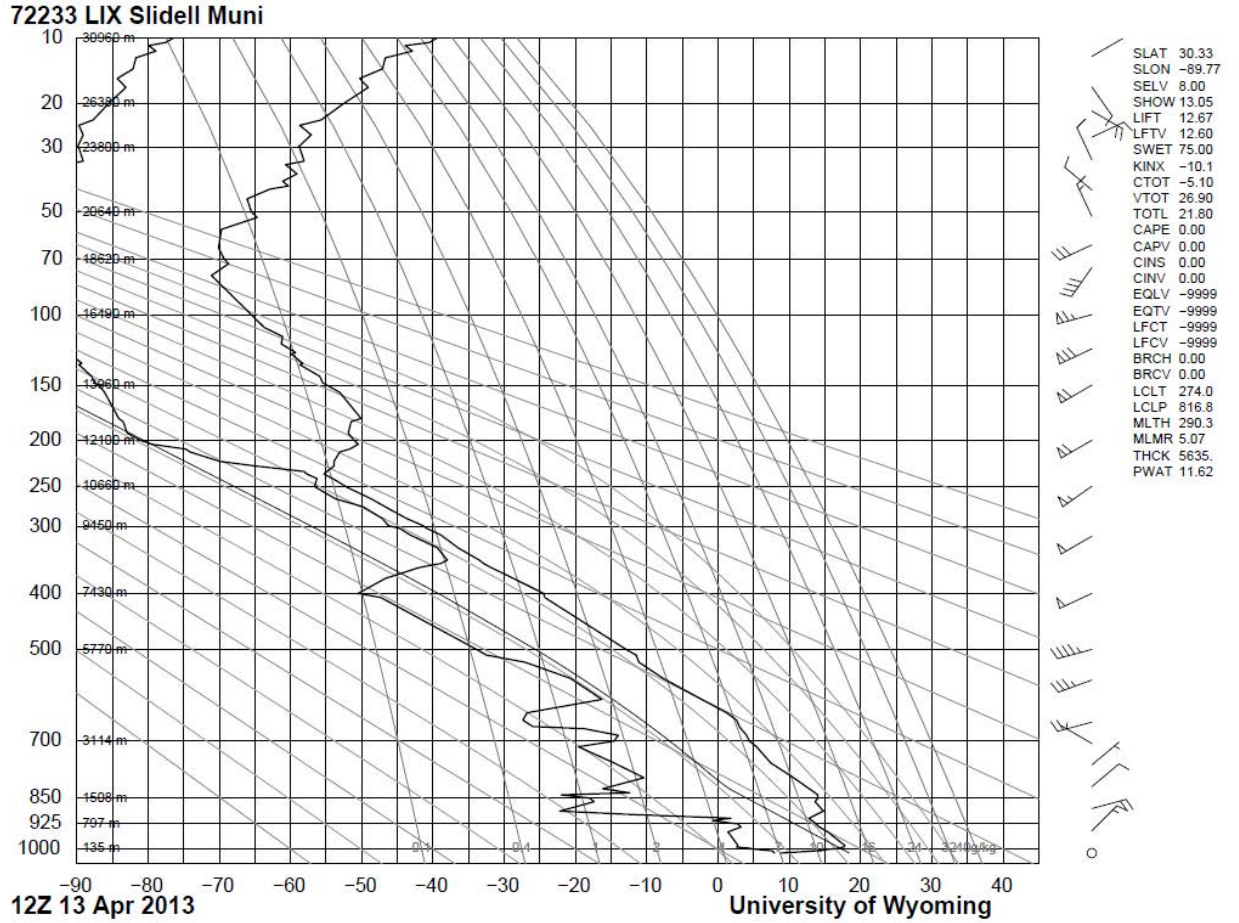
The plane's location was confirmed on radar along with the object located around Highway 11 north of Picayune at 3:26 pm. The area is largely rural and unpopulated around his plane's position. There is a Wildlife refuge called Bogue Chitto off to his west. Picayune has a population of 10,878 according to 2010 census data.

WEATHER INFORMATION:

The witness describes it as being very windy with strong wind gusts at his altitude. The wind speed from Wunderground.com indicates that they would have been SSE ranging from 9-12 mph at ground level. It was a partly cloudy day with 76 degree temperatures again at ground level.

Time (CDT)	Temp.	Dew Point	Humidity	Pressure	Visibility	Wind Dir	Wind Speed	Gust Speed	Precip	Events	Conditions
6:55 AM	53.6 °F	42.8 °F	67%	30.03 in	10.0 mi	Calm	Calm	-	N/A		Clear
METAR KHSA 131155Z 00000KT 10SM CLR 12/06 A3003											
2:53 PM	75.2 °F	48.2 °F	38%	29.96 in	10.0 mi	SSE	9.2 mph	-	N/A		Partly Cloudy
METAR KHSA 131953Z 16008KT 10SM FEW100 24/09 A2996											
3:55 PM	75.2 °F	50.0 °F	41%	29.95 in	10.0 mi	SSE	12.7 mph	-	N/A		Partly Cloudy
METAR KHSA 132055Z 16011KT 10SM FEW110 24/10 A2995											

Soundings data from University of Wyoming for April 13, 2013 from 1200 UTC to April 14, 2013 are shown next for Slidell.



EVIDENCE/INVESTIGATION:

The witness was completely cooperative and provided additional details associated with his observations in numerous emails. His cooperation was very much appreciated and forthcoming. I did note that the size estimates changed over time. (Note: His CMS report shows he checked it was less than a foot wide (under 12") and in later emails it has now become the size of three to four regulation footballs – 33" to 44"). His initial report stated it was 10-12". The initial report showed he checked circle and triangle. Later pictures show more of an oval and the triangle may have been the winglet that may be the triangle to which he was referring to. Witness details will change over time, but after one has an encounter and ponders about things they remember details and gain greater accuracy. Over time, these details fade according to some psychologists.

I provided the witness a picture of a Norwegian concept drone aircraft which was as close as I could come to a match in order to clarify the position and description of the winglet, but he quickly clarified that the dorsal fin was located central to the disc and did not protrude above the object. (Figure 4)

Here is the Norwegian VTOL concept.

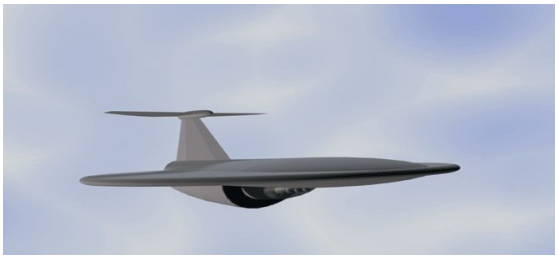


Figure 4. Illustration shared with pilot in order to determine dorsal fin similarity.

The Aircraft

"I was heading north at the time after leaving my home base of Slidell. I fly a modified Cessna 172 that performs on par with a Cessna 182. I had only been in the air about 5 - 6 minutes at the time of the sighting. "

The Cessna 172 Characteristics are as follows.

General characteristics – Data from Cessna 172R

- **Crew:** one
- **Capacity:** three passengers
- **Length:** 27 ft 2 in (8.28 m)
- **Wingspan:** 36 ft 1 in (11.00 m)
- **Height:** 8 ft 11 in (2.72 m)
- **Wing area:** 174 sq ft (16.2 m^2)
- **Aspect ratio:** 7.32
- **Airfoil:** modified NACA 2412
- **Empty weight:** 1,691 lb (767 kg)
- **Gross weight:** 2,450 lb (1,111 kg)
- **Fuel capacity:** 56 US gallons (212 litres)
- **Powerplant:** 1 × Lycoming IO-360-L2A four cylinder, horizontally opposed aircraft engine, 160 hp (120 kW)
- **Propellers:** 2-bladed metal

Performance

- **Cruise speed:** 122 kn (140 mph; 226 km/h)
- **Stall speed:** 47 kn (54 mph; 87 km/h) (power off, flaps down)[64]
- **Never exceed speed:** 163 kn (188 mph; 302 km/h) (IAS)[7]
- **Range:** 696 nmi (801 mi; 1,289 km) with 45 minute reserve, 55% Power, at 12,000 ft
- **Service ceiling:** 13,500 ft (4,100 m)
- **Rate of climb:** 721 ft/min (3.66 m/s)
- **Wing loading:** 14.1 lb/sq ft (68.6 kg/m²)

Avionics

- Optional Garmin G1000 Primary Flight Display

When asked if the pilot noted any effects in his electronics, or navigation while the object was next to him, his response was a definite no. He experienced only increased interest and no effects to his person either. Had he not looked when he did, it was likely that the object could have come and gone and he would not have had this encounter.

Figure 5. A Cessna 172.

The Object

Figure 6. A representation of what his sighting may have looked like.

Emails were sent to both Slidell and Picayune Airports Public Affairs Offices in an attempt to see if anything had been observed. I received no responses on my inquiries.

The area of the flight where the object was seen is largely rural and is not heavily populated. With the small size and the short duration that the object was moving with him, it is likely others would not have noted this encounter, however, according to the radar returns, the UFO was seen moving just north of Picayune and during the mid afternoon. It is curious to note that no other reports were obtained despite the shine this object must have produced in the sky.

The witness reported the object as being to him no more than 8 foot off his wing. A Cessna 172 has a total wingspan of 36 feet 1 in. Half of this is of course 18 feet with an additional 8 feet, places the object in his reference as being a total distance of 26 + or minus a foot to accommodate for his position on one side of the aircraft.

If we assume we are now looking at an object that is 33-44 inches wide at around 27 feet from him, it is still a very close object and certainly dangerous maneuver if one of ours and is controlled.

Figure 7. Illustration of planes direction with object and its direction of apparent motion to his rear.

Size Analysis

We evaluated the size estimates made by the pilot in an effort to clarify whether his estimates could match the objects apparent distance shown in the radar data we obtained.

I had the pilot confirm his estimate by having him revisit his aircraft and hold an object at arm's length in order to determine the angular size. He did so and replied it was between a baseball and a softball in size.

In looking at these measurements here is an analysis we performed on the case.

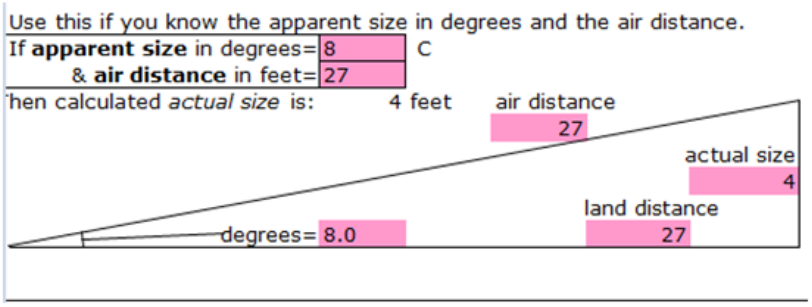
Witness details:

Object size – 3 to 4 regulation footballs – 33-44 inches or 3-4 feet
Distance – No more than 8 feet off my wing.
Apparent angular size was between a baseball and a softball held at arms length.

Analysis:

Wing span of a Cessna 172 is 36 feet
Estimated distance (pilot seat to edge of wing – 19 feet placing object according to witness at around 27 feet)

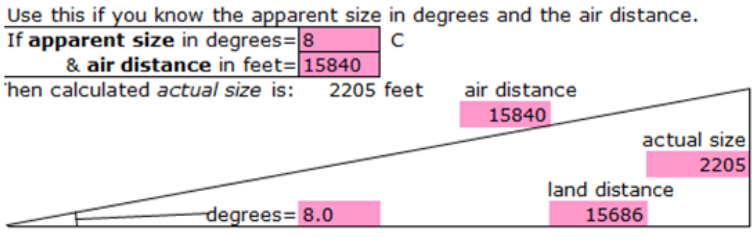
A Baseball is 7.3 cm and is 7.3 degrees assuming arms length of 22.6 inches. If we use 8 degrees at 27 feet, the size matches the description at being around 4 feet in size.



I use Trig7 v 7.2 tool developed by Jim King provided through MUFON

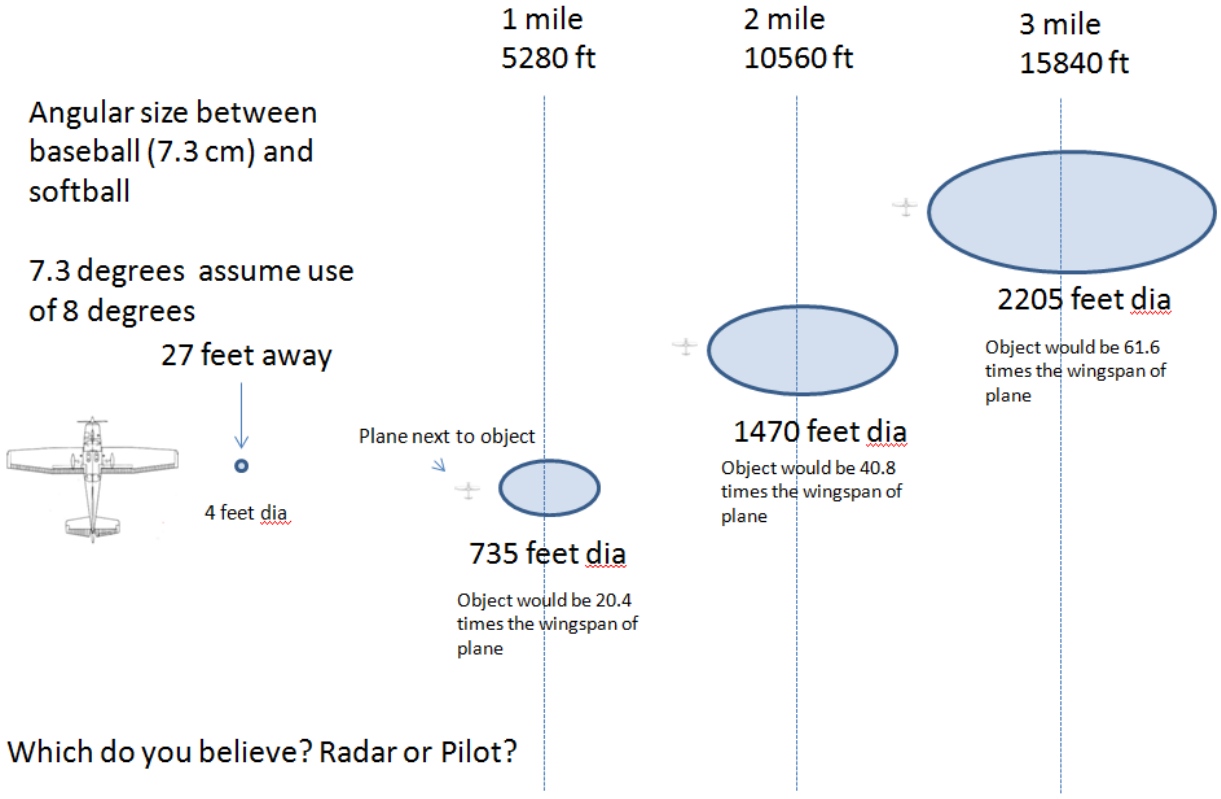
Radar data reflects plane position and object position at 3:26 (see Figure 5). The distance according to the scale shows the object at being at 3 miles away or 15,840 feet with that the apparent size of 8 degrees would make the object around 2,205 feet wide. Certainly an object of that size would be reported.

Additionally, the pilot would not be able to make out the details he did with an object 3 miles away from him.



Key questions emerge…

1. **Why is there a discrepancy between radar and visual?** The pilot sees the object near his wing and pacing him for a few seconds as his speed is consistent at around 140 mph. The radar shows that the only eastern perspective is at around 3:26 and the object is three miles away according to Figure 5.
   - **Possible alternatives**
     - The pilot is correct/incorrect
     - The radar is correct/incorrect
     - The positioning of two radar data sets on a single map may be in error.
     - There are two unknowns and only one is being captured
     - The object moved quickly to the plane and became invisible to the radar and paced it for 2 seconds and reduced speed to only then move somewhere else.



RADAR Data

Radar data has been obtained for this case and an extensive analysis has revealed both the witness aircraft and an unknown object that matches the date and time of the flight and also shows an object off to the east of his aircraft. See Appendix A for the report filed by William Puckett concerning his analysis of the radar.

The radar data received by Mr Puckett was extraordinary; however there are some inconsistencies that have to be further evaluated by other radar professionals that draw questions around the location of the object and the plane's position at the time of the incident.

One set of radar showing the plane's path northward came from the FAA Radar site at Slidell. It saw the plane and no object. The other data set that saw the object, but not the plane, came from the radar site in Citronelle, Alabama. Mr. Puckett took the two radar data sets and mapped them on the same map. The object at the time of the sighting appears to be well over a mile away from the plane where the pilot stated that the object was under or near his wing tip. (Note: I requested the pilot get into his plane and provide me an angular size estimate of the object if holding an object at arm's length. His estimate was the size of a baseball to a softball.) An object with an angular size that large over a mile away would easily be miles in length and I would question his ability to easily discern the unusual dorsal fin at that distance. Not to mention that an object that large would be seen by thousands and picked up on radar.

What is the coincidence that two UFOs appear at around the same time with one appearing under the pilot wing and the other being located on the radar but showing up in the pilot's vicinity? It rare that we get radar data alone, but we now have both radar and air visual but there seems to be a distance issue.

Radar Type and Locations

If you review the information shown on the JSS Wikipedia site, (http://en.wikipedia.org/wiki/Joint_Surveillance_System) there is no Citronelle Alabama site as indicated by Mr. Puckett. However, we were able to locate another site showing the Citronelle site.

The reference for Citronelle is J-12 and shows as being an ARSR-2 radar type (FAA radar) whereas the Slidell site designated as J-13 is a newer ARSR-4 and also shown as a NORAD site. Both have the CARSR radar. It is positioned as being 32.5 miles northeast of New Orleans.

The Alabama Radar (Object Radar) 31.0224, -88.1416

Figure 8. Alabama Radar at Citronelle

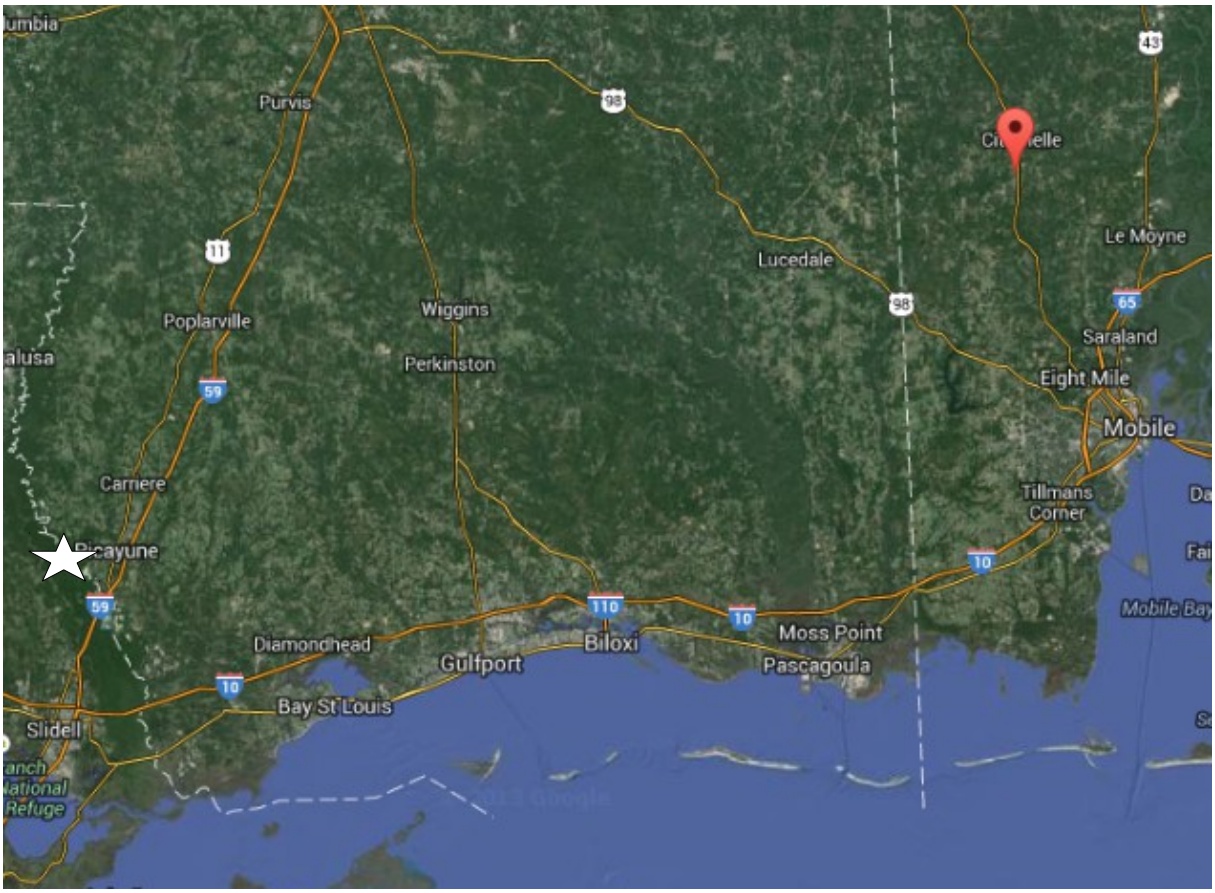


Figure 9. Position of radar in context with sighting location (Star = sighting Red Marker = Radar).

The location of the radar (red with black dot) to the sighting position (Star) is shown on this map. The distance is ~100 miles.

I was able to do another search on this radar station which provided me additional details concerning the radar type showing it has been upgraded to the newer CARSR 6/12/2012 with ARSR-2 with a 7172 antenna.

Air Defense Radar Stations

Information for Citronelle (Grand Bay), AL

Latitude: 31-02-24 N, Longitude: 088-14-16 W

Perm ID	Sage ID	JSS ID	Unit	Location	Early Equip.	Final Equip.	Oper. Date	Inact. Date	Notes
	Z-336	J-12		Citronelle (Grand Bay), AL	1982: ARSR-2	ARSR-2; CARSR w/ 7172 antenna [FAA].	Sep-82		ARSR-2 radar set relocated from JFK IAP, NY. Data-tie only. New FAA/USAF JSS radar site; replaced Dauphin Island AFS, AL (Z-249). Now operates Common Air-Route Surveillance Radar (CARSR) radar as of 6/12/2012.

Current Use: Active radar facilitv.

Figure 10. Additional Information about Alabama Radar.

The Slidell Radar (Aircraft Radar) 30.348056,-89.779444

Figure 11. Slidell Radar

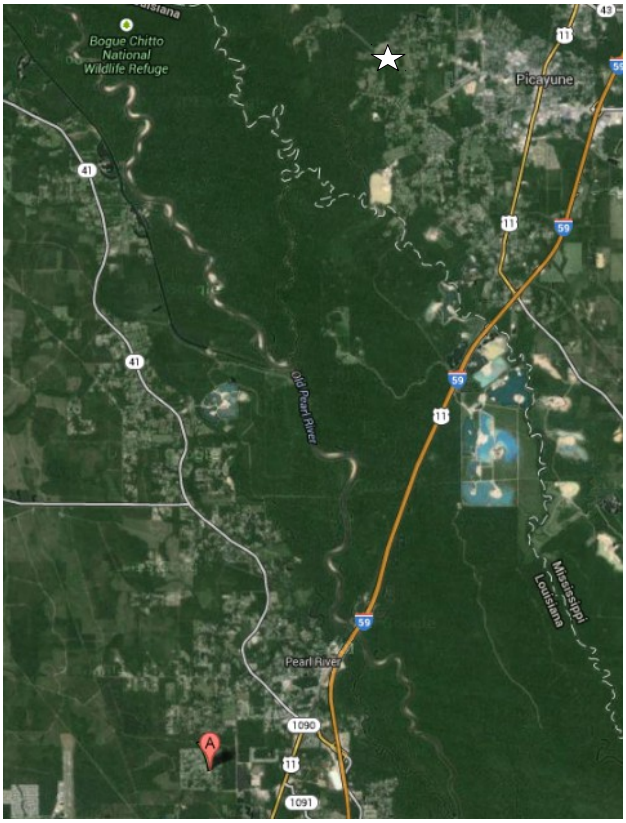


Figure 12. Proximity of radar to pilots plane.

The proximity to aircraft (Star) from Slidell Radar (A) - The distance is ~ 16 miles

I did not find information to know if and when the ARSR-4 information shown in Wikipedia is dated and it too was upgraded to the CARSR radar and any information about its antenna. Perhaps some other analysts can help track down this information and add to this report.

Additional analysis could be done to determine whether the distance to the radar return analysis may have also led to a possible distance error. My hope is that another radar analyst can obtain the radar data from either Mr. Puckett or conduct a FOIA request and conduct an analysis. The more analysis, the better!

(Note: The analysis provided by Mr. Puckett was shared with the pilot. His response indicated he was disappointed that the analysis showed this distance and firmly stands behind his position that the object was right next to him.) (FI Note: I agree with him completely).

WITNESS CREDIBILITY:

The witness credibility is excellent. Besides being a licensed private pilot, the witness has a BA degree in Political Science and currently manages his own internet-based graphics company that produces business cards, Stationery, Rack Cards and much more. He is 63 years of age with good vision. He wishes to remain anonymous.

The witness provided solid details in his account that have been confirmed by our radar analysis and he was very cooperative with this investigation and responsive to any and all questions. I believe he was sincerely puzzled by this encounter and indeed saw something that was an unknown.

CORRELATING CASES: None. I did an extensive search of other non-MUFON databases and newspapers in an effort to see if any other witnesses were available and could not locate any.

CONCLUSION: This is determined to be a UFO- unknown. The case is closed but if additional details emerge, we will update the case record accordingly. RLH

Acknowledgments:

I wish to express my appreciation of William Puckett; the State Director for Montana who was able to obtain numerous JSS radar datasets with one actually confirming an object was present at the same time and roughly close to the position of the pilot on that nice clear day. William dedicated many countless hours analyzing this data and generating this report. Thanks William.

I also wish to thank Robert Powell, our SRB leader, who also helped us by reviewing the radar and other case data and suggesting changes and modifications based on his radar experience. Thanks Robert.

Appendix A

Radar Analysis – Aircraft – UFO Sighting
Near Picayune, MS – April 13, 2013
Author: William Puckett (MT State MUFON Director)

Background: On April 13, 2013 a pilot had just taken off from Slidell, LA Airport with his Cessna 172. He was flying at 2,500 feet and as he approached the Picayune, MS VOR he saw a disk shaped craft to his right for a few seconds. The object drifted off to the south after a few seconds. He was flying north and the sighting occurred at about 3:30 PM CDT.

Analysis: I read the article written by Richard Hoffman in the MUFON Journal and case description in MUFON's Case Management System (CMS). Given my interest in radar and pilot UFO sightings I Immediately requested radar data from Hill AFB (Air Force Base) near Ogden, UT. The radar data is archived by the Air Force and stored for long periods. The Air Force shares several long range radar units with the FAA for the JSS (Joint Surveillance System). I received the data in the first week of August and began work immediately.

Results: Seven radar units were included in the data provided by the Air Force. See map in Figure 1 below for the locations of the radar sites.

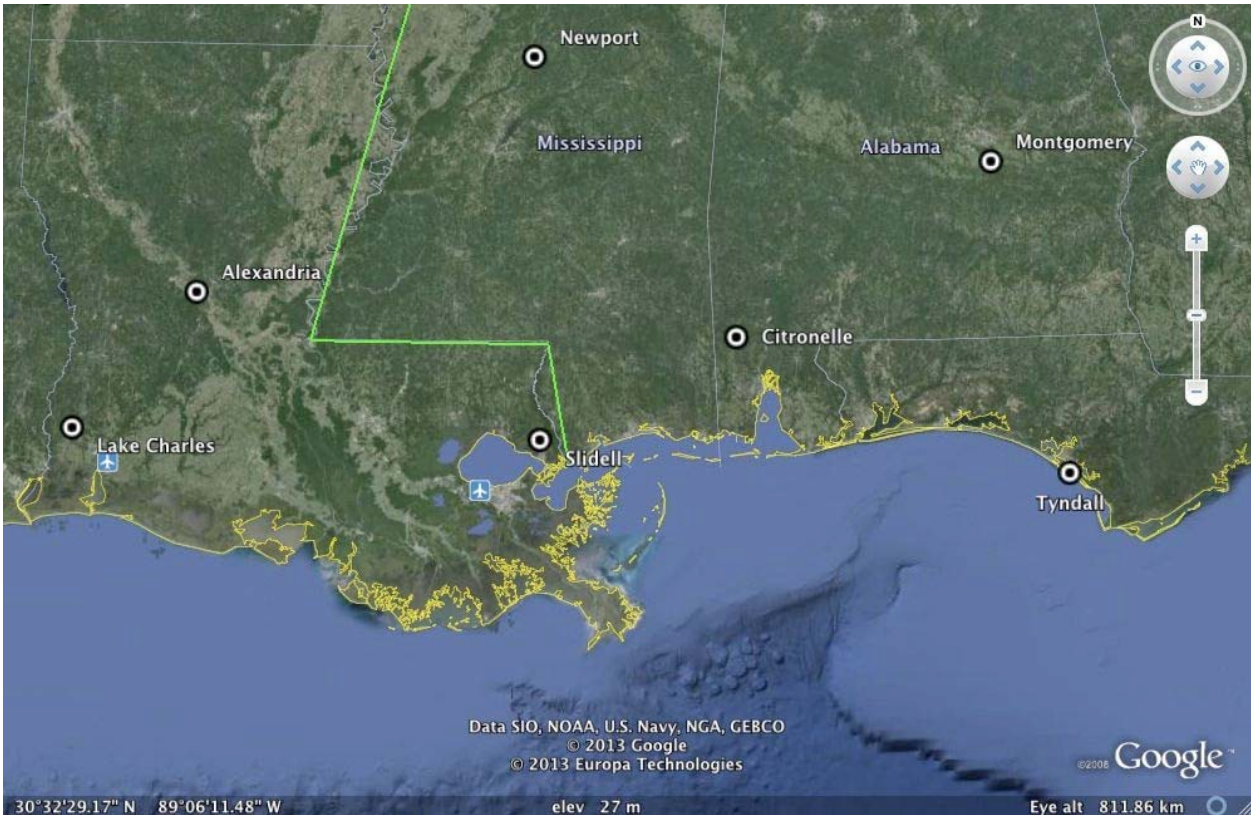


Figure 1

Radar tracked an object (UFO) at about "one minute and as much as two minute" intervals near Picayune, MS from 3:17 PM to 3:26 PM. (See maps in Figures 3, 4 and 5.) The UFO flew at around 190 MPH to the Southeast, then changed direction and flew Northeast at about 60 MPH and continued in a general East-Northeast direction at speeds of 36 to 46 MPH with a few small direction changes. The flight vectors are shown in Figure 6. The aircraft appeared on radar around 3:17 PM. The aircraft moved closer to the UFO and by 3:24 PM the aircraft was about 5 miles due west of the UFO. (See map in Figure 4.) By 3:26 PM the aircraft was slightly north of west from the UFO. (See map in Figure 5.) At this time the UFO may not have been visible "off his right wing." This was near the time (3:30 PM) reported by the witness. However, the witness described his time estimate as "approximate." From this statement one could infer that the time estimate may not have been completely accurate.

The returns displayed on the maps below were from the Citronelle, AL and Slidell, LS radar sites. (See the map in Figure 2.) All of the "primary" (possible UFO) returns were detected by the Citronelle, AL radar site which is about 95 miles East-Northeast of the Picayune, MS VOR as shown by Figure 2 below. The aircraft "transponder returns" were plotted from the Slidell, LS radar.

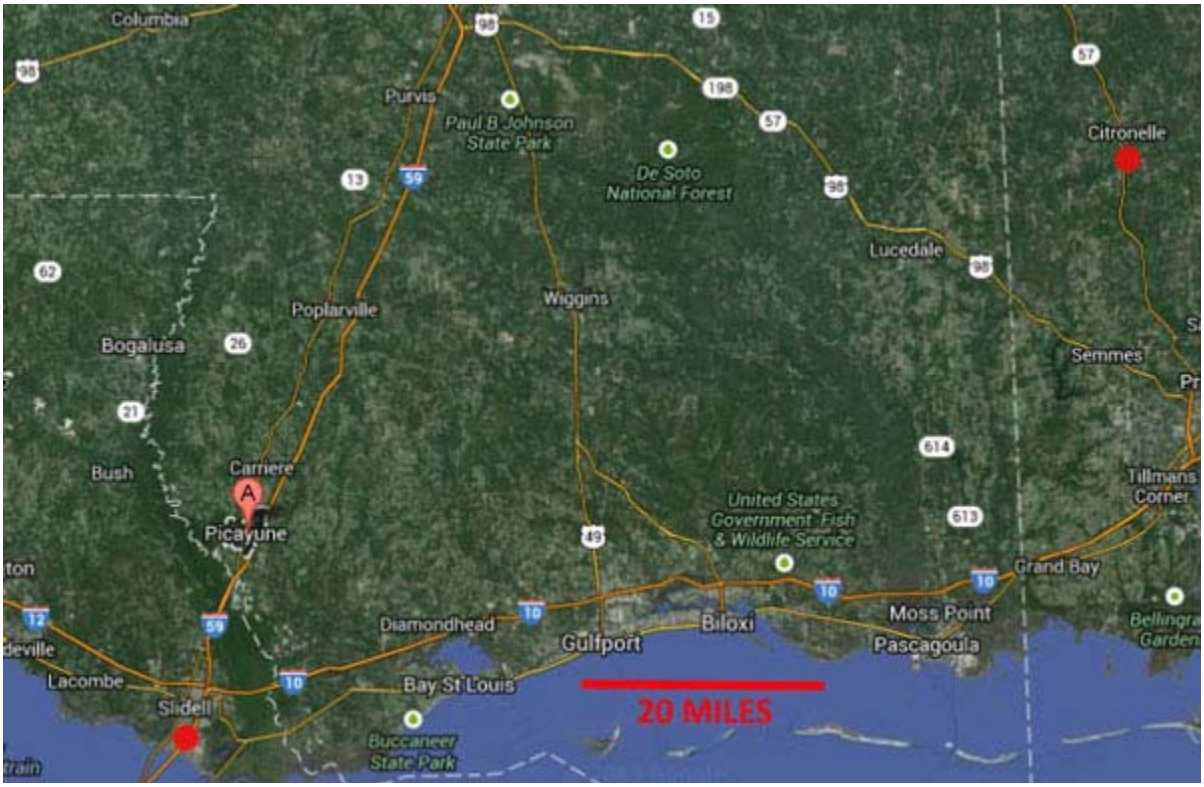


Figure 2

Figures 3, 4 and 5 below show the first part of the flight of the Cessna 172 and the unusual radar returns (red triangles). The blue arrows indicate the direction of movement of the Cessna. (The blue dots are the actual transponder returns.) The possible UFO returns were detected between 3:17 and 3:26 PM CDT. The red arrows indicate the movement of the UFO. The UFO returns initially were several miles to the North-Northeast of the aircraft (one to two o'clock position). The aircraft first was detected by radar at around 3:17 PM as it took off from Slidell Airport. The UFO was moving generally East-Northeast with some minor changes in direction. The first UFO return on the map below was just south of the Picayune, MS airport. The time was 3:17 PM CDT. The closest that the UFO return would have been to the aircraft is at the top of the map (Figure 6) which is about 5 miles. (The aircraft was moving much faster than the UFO.) The UFO was positioned slightly south of east of the aircraft at the top of the map.

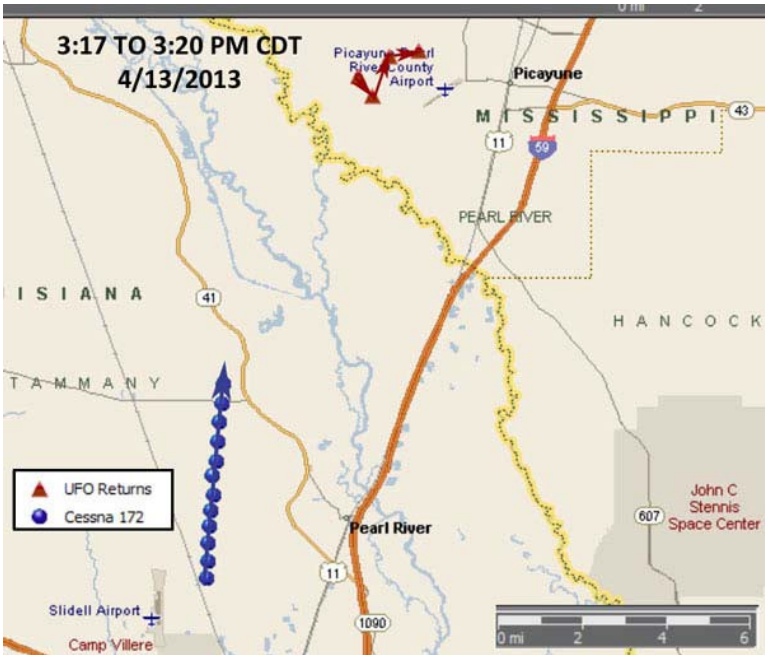


Figure 3

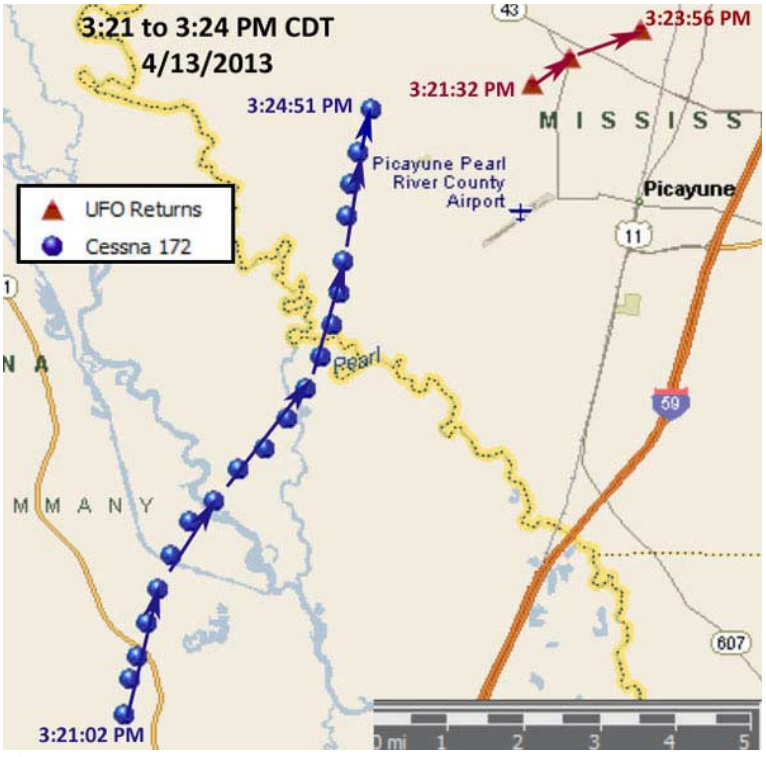


Figure 4

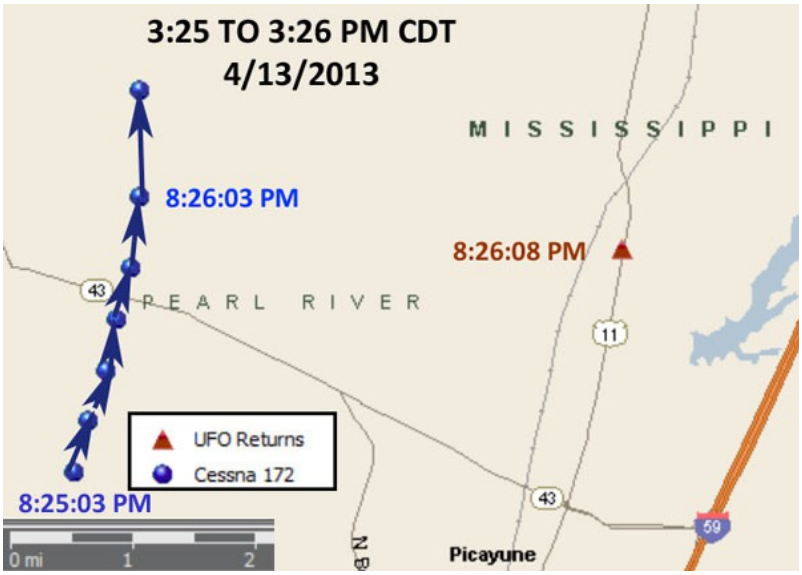


Figure 5

So why could these returns be a UFO? Figure 6 is a "zoom in" showing the position of the UFO at each radar detection. One reason is the abrupt change in direction. (The UFO first streaked to the Southeast at 190 MPH and then changed direction to the North-Northeast at 60 MPH. The object then slowed to 35 to 40 MPH and moved East to Northeast.) The UFO was not detected at each rotation of the radar and sometimes would only be detected at intervals up to 2 minutes. (The radar makes one sweep every 12 seconds or 5 sweeps /minute.) What could be the reason for the "intermittent" detections? Of course perhaps the object could vanish or change position so as to not have sufficient cross sectional area for radar detection. Another possibility is that the object could have been changing altitude and may have been too low for the Citronelle, AL radar to detect. (Given the curvature of the Earth the Citronelle, AL radar would have not detected objects below 570 feet.) Another possibility is that the object could have periodically hovered. In this case the radar may not detect it because of the moving target protocol which means that the radar will only detect objects at a certain minimum speed (say 20 to 30 MPH). This is done so that radars don't detect stationary objects (like bridges, towers, etc.) This type of radar signature is what one expects to see from a strange object. If the object was an aircraft or helicopter, it would have been detected at every revolution of the radar. This was not the case. (This is assuming that the aircraft or helicopter did not have their transponder on.) Of course the returns could have been "radar angels," anomalous propagation or weather phenomena. This is not likely because the object moved progressively at each sweep or in multiple sweeps of the radar in an ascending time progression (12 second intervals or in multiples of 12 seconds). Unfortunately the UFO was not detected by other radars. The radar in Slidell, LS did not detect the UFO. This radar was closer to the aircraft and UFO than the Citronelle, AL radar.

Figure 6

The pilot only saw the object for a few seconds at around 3:30 PM. The radar showed the unusual returns were detected between 3:17 PM and 3:26 PM. At 3:26 PM the aircraft was slightly north of west of the UFO. At this time the UFO was about 5 miles from the aircraft. However, the pilot described the object as quite small and close to his aircraft in a later communication***: I would guess that the size of the object was 3 - 4 times larger than a regulation football and no more than 8 feet off my wingtip.*** If his distance and size estimates are correct, the radar would not have picked up the object. However, perhaps the object was much farther away and therefore larger than the pilot estimated. His observations were only for a few seconds so it would have been more difficult for him to provide a good estimate of the distance before the object was no longer visible? In conclusion the radar shows unusual returns several miles to the northeast of the aircraft when it first took off from Slidell Airport. Several minutes later (at 3:24 PM) the aircraft was located almost due west of the unusual radar return. By 3:26 PM the aircraft was slightly north of west from the UFO. (See maps in Figures 5 and 6.) At this time the UFO may not have been visible off of his right wing. The object was no longer detected by radar after 3:26 PM. The radar is not entirely consistent with what the pilot reported, but it does indicate an unusual return to his right at about 5 miles near Picayune, MS near the time of the sighting (3:24 PM). The aircraft was moving faster to the north than the UFO and therefore the UFO would have visible for a brief time to the pilot's right hand side.

A video has been created which better shows the motion and position of the unusual returns and the aircraft.

INVESTIGATION LOG:

7/19/13, 17:00 – phone contact with witness 2 (Fara), made arrangements for interview
7/20/13, 15:00 – interview with both witnesses at sighting location
7/19/13, 23:30 - received e-mails with updated report (see report)
7/20/13, 15:00 – Interviewed both witnesses at sighting location (710 E. Sunset Dr.), surveyed site and reviewed photos with witness 2
7/21/13 – filed a preliminary report into CMS.
7/29/13 – report filed into CMS

FINAL REPORT DATE: 7/29/13
FI ID# 12070
CASE#: 49005
BGE Results: Total Certainty Index is 18.86%
LONGITUDE/LATITUDE: 48.76976°N / 122.46387°W (Google Earth)

SYNOPSIS: On 7/15/13 at 10pm PDT, in Bellingham, WA at the intersection of I-5 and Sunset Dr., two witnesses, in a car traveling westbound, observed a glowing red rectangular object toward the south, traveling northward. They turned into a nearby parking lot to observe the object more closely, with one witness retrieving a pair of binoculars from the car's trunk. The object slowed and turned eastbound, fading from glowing red to medium gray while dropping on altitude to roughly 100 feet. The witnesses lost sight of the object as it traveled behind the trees lining the local street.

The object was large, palm-width at arm's length, traveling very low (less than 200'), and closely observed with a pair of binoculars. The object was silent with no signs of visual distortion. The object had numerous surface undulations and tumbled slowly about its center axis (roll).

The following day, on 7/16, witness 2 visited a nearby field in the object's path of travel thinking the craft may have landed there and took several photographs of the area. The possible landing site showed no evidence of any disturbance.

OBJECT DESCRIPTION: The object was a roughly rectangular cube, “like a large SUV but not as long (witness 1)”, a palm-width wide at arm's length. When first observed, it was a uniform glowing red in color with no discernible surface features. The witnesses entered a nearby parking lot and, upon exiting the car, saw the object change from a glowing red to a dull gray-black, the glow dissipating from the top downward. Witness 2, with binoculars, described an irregular surface, “like the underside of a car”, with various random 2”-6” surface relief features.

The rate of travel was relatively slow, less than 20mph, with a sense of precision and control. The object executed a smooth turn while dropping in altitude, navigating close to a series of 6-wire high tension lines along James St.

Additional report filed –

Witness 2, the originator of the MUFOM CMS report, has e-mailed an updated report following my initial phone contact on 7/19:

--

At about 10pm on June 15, 2013 I was driving down Sunset Avenue (west) crossing the overpass (over I-5) when I saw a large red glowing spot in the southern sky. I immediately got into the left lane to turn south onto James Street and then turned right into the parking lot at the Light of the World Prayer Center (Hope in Christ shares the property as well, using the building further back.) It's located on the corner of 710 E. Sunset and James Street.

I jumped out and quickly opened my trunk and grabbed the binoculars (Tasco Zip 2008 10 X 50 Fully coated - 288 ft at 1000 yards.) When I spotted the UFO with my binoculars I was standing at the James Street entrance of the parking lot. It was still glowing red but then the light went out and was just a faint glow for a second and then went totally dark. In it's place was a medium gray looking craft moving silently through the air. It descended northward towards me, and then slowed way down as I it rotated around and moved eastward across the street behind the trees. It looked like a textured metal craft with a rounded front and square rear with two exhaust engine holes. The UFO was about the size of a tall large SUV but short length. I didn't see on it any insignia, windows or lights. I got concerned for a second as it was slowing down close to my location. But it moved east away from me and I relaxed.

Maybe it was going into that small field located behind the two houses next to Jern's Funeral and On-Site Crematory and hovered or landed there in the clearing. There is enough room there for a large car sized object to hover or land. The coordinates for the field are Lat. 48.76976 Long. 122.46387. It maneuvered with surgical skill and looked kind of floaty like when rotating around.
--

INTERVIEW-STATEMENTS: I conducted an interview with both witnesses on 7/20 at the place of observation, the parking lot of a local church. Witness 1 is a male, 60, an employee of the postal service. He exhibited a certain reticence concerning his UFO experience but was cooperative and informative during the interview. He observed the object while it performed its banking turn, from southbound to eastbound, and changing color from a glowing red to a dull gray. He gave the best description of its size, palm-width at arm's length, describing the object as “about the size of a large SUV but just a little bit shorter”. He also observed the changing color of the object, starting as a uniform red glow, fading to a mottled dark gray. The fading process was not uniform. It started at the top and faded downward, ending at the base of the object. While the craft had executed its turn, from southward to eastward, it had changed color gray.

Witness 2, 56, female, is Witness 1's wife, working as a housewife, served in the USAF in

intelligence. She is interested in UFOs in general and was very enthusiastic. After they parked their car she retrieved a pair of binoculars from the car trunk and observed the object's features closely. While she was finding her binoculars, the craft had faded from red to medium gray. She has provided the attached drawings of the object. She described the surface of the object as “like the underside of a car”, with numerous channels, islands and other random indentations on the surface. She also described the object as “tumbling” along its center axis, a roll in pitch-yaw-roll terminology. She described the object as “very low”, 60-100 feet, however, she wasn't sure since she was using binoculars.

The observation of the object ended when the witnesses lost sight of the object when it traveled behind some tall (~50') street trees lining James St.

The object was completely silent, Witness 1 mentioned background noise from the local freeway (I-5) while witness 2 noted she heard a helicopter in the distance. There were no smells, drafts or other unusual sensations. The object, as drawn, has two “exhaust ports”, however, no visual distortion was observed surrounding the object.

After losing sight of the craft both witnesses re-entered their car and continued their journey.

The following day, 7/16, Witness 2 returned to the sighting location and walked throughout the local area, talking with local neighbors. She discovered a small field along the object's flight path. The field is covered with tall grasses, roughly 2-3 feet tall, with a small depressed area of fallen grass in one corner. She took several pictures of the area, included in the report.

I surveyed the area on 7/20, the day of our interview. Several areas of the field had fallen grasses, similar to the depressed area indicated by witness 2. There were no signs of any unusual disturbances, no broken grass stems, burn marks or signs of compression by heavy weight. There were no magnetic anomalies detectable by a hand held compass.

NATURAL/MANMADE PHENOMENON: A review of the stellarium satellite database for 7/15/13 from 21:45 and 22:15 pdt revealed only one satellite rising above 30 degrees elevation, ERBS, traveling between bearing 310-200, rising to 45 degrees elevation.

WEATHER INFORMATION: The sighting happened during late twilight, sunset was at 21:08, roughly an hour earlier, civil twilight was at roughly the time of the sighting, 21:48 with nautical twilight at 22:42. There was light in the western horizon, however, colors would not be plainly visible. The red glow may have been due to terminator glow if the craft was at a much higher altitude, however, the sun had set an hour earlier.

The Metar for KBLI, Bellingham Airport (3.75 miles away, bearing 300 degrees), shows clear skies, visibility 10 miles, no wind The viewing conditions were very good. .

Metar for 9:53pm, 7/15/13: (METAR KBLI 160453Z AUTO 00000KT 10SM CLR 17/10 A2992 RMK AO2 SLP138 T01720100)

LOCATION: The sighting area is a mixed area of residential and regional shopping, separated by a 4-lane freeway. There was light pollution, both by lit streetlights along the major thoroughfares (both Sunset Dr. and James. St.)

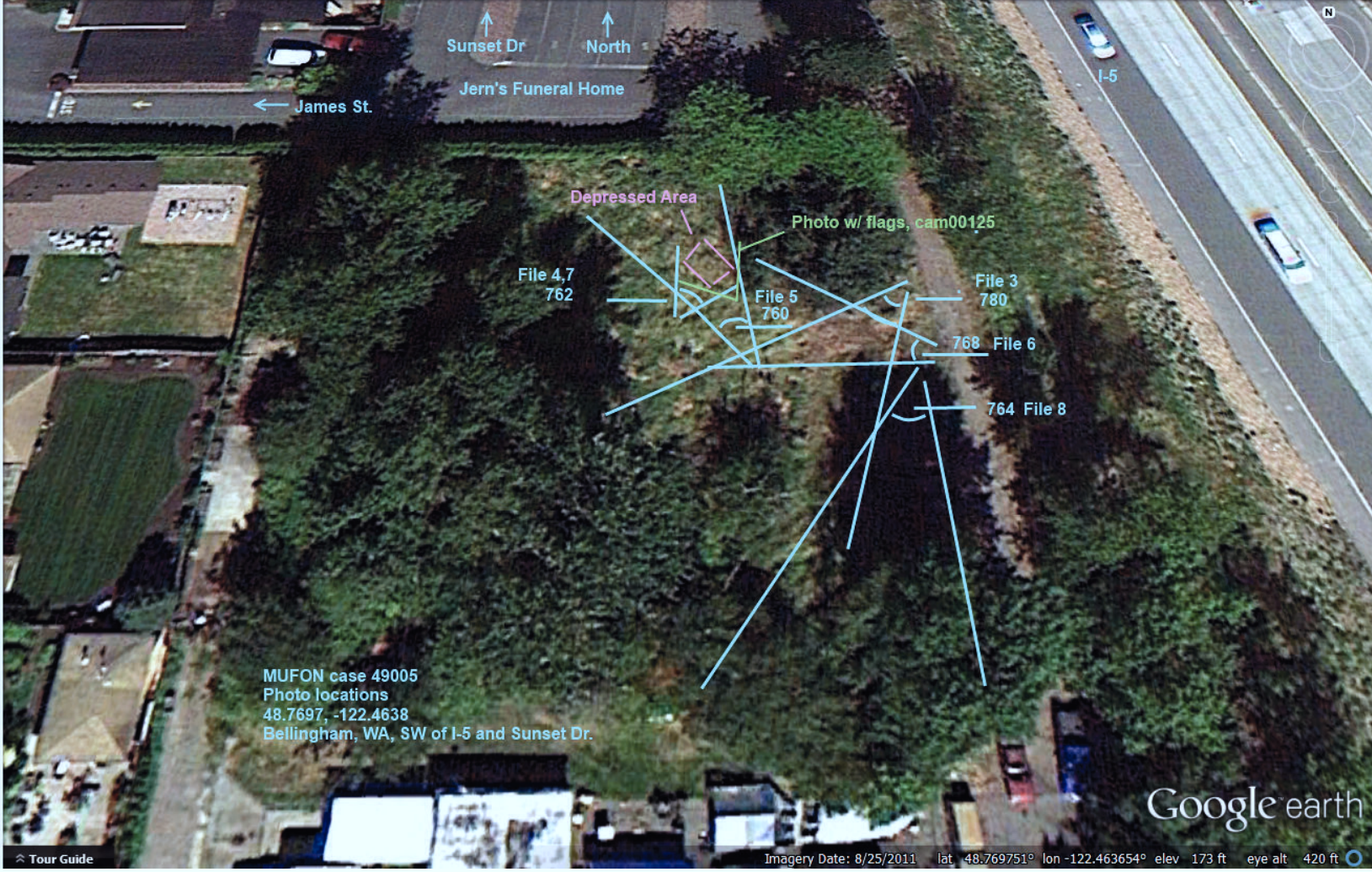
EVIDENCE/INVESTIGATION: Both witnesses gave vivid and detailed accounts of a relatively close sighting. No additional evidence was found at the nearby field, however, no actual landing had been observed. There are no photos of the object.

WITNESS CREDIBILITY: The witnesses were very credible, both are ex-military and maintain responsible occupations. Witness 2 seemed willing to occasionally fit evidence to her beliefs, we discussed the intimate details of fallen grasses, including whorls, lays, and the effect of incidental winds on large areas.

CORRELATING CASES: No check conducted.

CONCLUSION: Based on the witness summary and the subsequent database checks, I have concluded that this object is an unknown.


Object Sighted
Witness Path
I-5
Sunset Dr
Witnesses Park
Possible landing site
Object disappears from view
Object gray
James St.
Object begins fade
Object Path
Object Sighted
© 2013 Google
Google earth
Tour Guide
Imagery Date: 8/25/2011 lat 48.768725° lon -122.460043° elev 181 ft eye alt 1712 ft

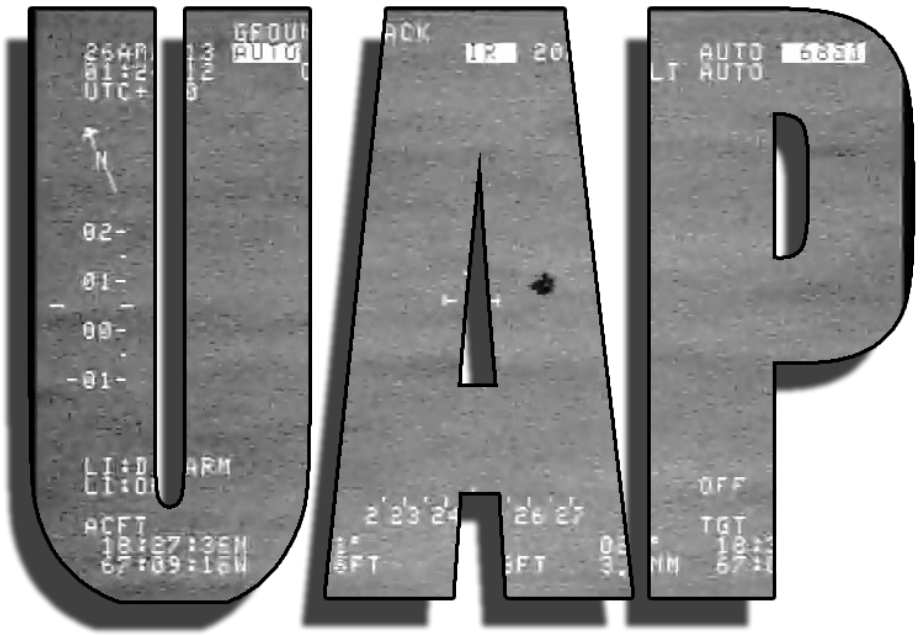

Sunset Dr
North
Jern's Funeral Home
James St.
I-5
Depressed Area
Photo w/ flags, cam00125
File 4,7
762
File 5
760
File 3
780
768 File 6
764 File 8
MUFON case 49005
Photo locations
48.7697, -122.4638
Bellingham, WA, SW of I-5 and Sunset Dr.
Google earth
Tour Guide
Imagery Date: 8/25/2011 lat 48.769751° lon -122.463654° elev 173 ft eye alt 420 ft

ROUNDED
WIDER
END
Length
(Size of a large SUV)
Metallic
GRAY
Textured
NOT SMOOTH
Rear Exhaust
CUBE-ISH but a
LITTLE MORE
RECTANGULAR

height
weight
chunky

10.5281/zenodo.7837470

2013 Aguadilla Puerto Rico



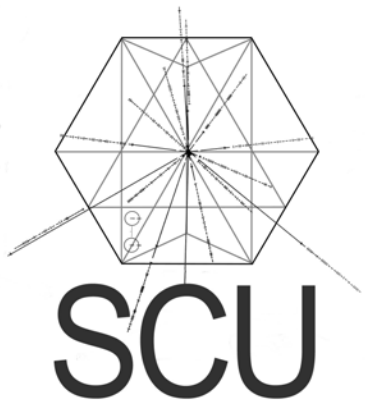
The detailed analysis of an Unidentified Anomalous Phenomenon captured by the Department of Homeland Security.

Originally published August 2015, updated April 2023*

This report is a detailed analysis of a Homeland Security thermal video taken from an aircraft as it tracked an unidentified object. What you will see in the infra-red is an object that seems capable of traveling at night without lights, at times below tree-top altitude, at speeds approaching 100 mph, and apparently without risk of impacting objects as it passes by.

The report was written under the auspices of the Scientific Coalition of UAP Studies (SCU). The SCU is a think tank of scientists and researchers stretching across organizations, governments and industries to scientifically and publicly explore unknown anomalous phenomena known around the world as Unidentified Flying Objects (UFOs), Unidentified Aerial Phenomenon (UAPs), the French, Spanish, and Italian equivalent to UFOs (OVNIs), and Unidentified Submersed Objects (USOs).

Scientific Coalition for UAP Studies is open to all scientific based analyses of this report and are willing to provide all the information that we have on this phenomenon to any other serious researchers.



*Errata

The radar sweep on page 9 was changed from ten seconds to twelve seconds.
Appendix L (page 153 to 159) failed to account for camera lock on the background and has been removed.

TABLE OF CONTENTS

Executive Summary

On April 25, 2013, at about 9:20 pm local time, an unknown object at low altitude flew directly across the Rafael Hernandez airport runway at Aguadilla, Puerto Rico, causing a delayed departure of a commercial aircraft. There was no squawking transponder signal to alert the aircraft tower, nor was there any communication with the tower to prevent a dangerous situation with departing and arriving aircraft. Fortunately an airborne U.S. Customs and Border Protection aircraft captured the object on infrared video. This report is an analytical evaluation of that video as well as witness statements and radar data of the area.

An original copy of a thermal video was obtained from an official source on October 20th of 2013. The source of this video evidence was vetted and identified. The source wishes to remain completely anonymous to ensure no issues arise with the source's employers. The individual's occupation, address, and background history were verified by the authors of this report as legitimate. Extensive efforts were made to ensure that this video did not contain any classified information and none was found. The three minute video detailed the flight of an unknown object that crossed into northwestern Puerto Rico from the Atlantic Ocean, traversed the Rafael Hernandez airport airspace two times, and returned into the Atlantic Ocean where it appeared to repetitively submerge.

The thermal video imaging system is a standard reconnaissance video system typically used in military, law enforcement and civilian applications. The thermal video was taken from a De Havilland Canada (DHC)-8 DHC-8 Turboprop aircraft that was controlled by the U.S. Customs and Border Protection (CBP). The authenticity of the video used in this report was corroborated using radar data obtained from the U.S. Air Force (USAF) 84th RADar Evaluation Squadron (RADES) group. The radar data displayed the tracking aircraft that took the thermal video. All times and locations of the tracking aircraft were consistent with the thermal imaging video on screen data and the USAF 84th RADES group radar information. Details are available on pages 10-12 of this report.

DHC-8 Turboprop.Courtesy of Homeland Security

An in-person interview with the source indicated that the pilots of the DHC-8 Turboprop took off on a routine mission and as they veered to the northwest saw a pinkish to reddish light over the ocean that was in their vicinity and approaching toward the south. Concerned that the control tower had not alerted them to incoming traffic they contacted the tower. The tower confirmed that they had a visual sighting of the light but did not know its identity. According to the source, once the object came close to shore, the light on the object went out. At about that same time the thermal imaging system was engaged to follow the object.

Thermal Imaging Video

Analysis of the thermal imaging video revealed irregular characteristics of an unknown object not similar to any known natural or man-made objects. The video was split into 7027 individual frames so that careful analysis could be made. Evaluation of the video frame by frame enabled detailed characterizations of the object. The object's size, speed, location, infrared (IR) emissions, directional movement, and other properties were compared against all known possible explanations including state-of-the-art drone capabilities as well as the possibility of a hoax.

Radar Data

In order to support the validity of the thermal video and to look for unknown targets in the area, a Freedom of Information Act (FOIA) request was made to the USAF 84th RADES group to obtain all FAA originated radar in the area during the time frame in question. This request was granted. A second FOIA request for radar data from military radar sources in the area was denied. Using the radar data that was provided, it was possible to validate that the times and locations displayed on the thermal imaging equipment of the CBP aircraft matched a government aircraft that was detected by radar. Additionally, unknown target(s) over the ocean and two to three miles to the north and northwest of the Rafael Hernandez airport were detected. None of these targets had transponders. This information supports the witness's claim that the Border Protection aircraft and the control tower sighted an unknown aircraft moving from the ocean to the south.

Size, Speed, and Location

The size and speed of the object were determined at points in the video when the locations of the object could be accurately determined. This allowed for an exact calculation of distance and angular size of the object. With that information, basic trigonometry was used to calculate the object's size. The object was between three to five feet in length and its speed varied between approximately 40 mph to 120 mph. Its median speed was roughly 80 mph. One of the object's flight characteristics the authors found to be significant was the object's speed through the water which did not vary as it impacted the water. Its speed through the water reached a high of 95 mph and averaged 82.8 mph. Details as to how these parameters were calculated are on pages 16-24.

Interaction with Water

There was very limited interaction with the water, visible within the infrared video, when the object impacted the ocean. Its speed immediately prior to impact was 109.7 mph. Frame by frame analysis indicated that there might be a slight wave or movement of the water as the object entered the ocean. It is unknown at the time of this report if the U.S. or another nation has developed the ability to diminish water displacement caused on impact. It is more difficult to explain the lack of **significant**[1] deceleration as it entered the water despite the absence of an identifiable power supply. See pages 25-30 for additional information.

[1] Significant deceleration as an unpowered object, such as bullet, striking the water.

Splitting Into Two Parts

As can be seen in the video, the object splits into two parts shortly after entering the ocean and then briefly re-emerging. Frame by frame analysis ruled out the possibility of a reflection or of a second object emerging from the water. The object's thermal image actually grew in size momentarily before it split into two parts. Both parts moved through the air and water at the same speed as the original object. There exists no aircraft, projectiles, or other technology known to the authors of this report to have these characteristics or capabilities. The authors discuss this unusual characteristic in detail on pages 31 to 39 of this paper.

Power Source

The unknown in the video displayed qualities that require some type of power source. Over the course of more than four miles the object reached speeds of almost 120 mph, made multiple changes in direction, reduced and increased its speed, entered and exited the ocean at speeds of over 100 mph, and finally split into two parts. In this thermal video, black represents the hotter objects in a given frame and white the cooler objects. The unknown in the video emits more heat than the ambient air and even after submerging in the ocean it continues to emit heat after it exits. However the heat generated is generally less than what is seen from jet engines and automobiles in the video. There is no exhaust plume or any other indication of an aircraft. This is not characteristic of objects with ordinary power sources. The object's speed, maintenance of momentum, directional changes, and its ability to sustain high velocities in water eliminates all aircraft, blimps, balloons, wind-blown objects, any species of bird, mammal, or other natural/man-made phenomena. See pages 40 to 41.

Maneuverability

The object's ability to maneuver at speeds of 80-100 miles per hour (mph) though residential and commercial at low altitude is of interest. A notable characteristic of the object is its apparent tumbling[2] as it moves through the air, which gives it a very non-aerodynamic appearance. This tumbling action ends prior to the object's entry into the water and as it moves through the water. The object also apparently accelerated while underwater. At 01:23:37 hours in the video the object can be seen to disappear behind a tree momentarily, which places its altitude at below 40 feet. The ability to fly at that altitude at night and between trees requires precise control of movement and a highly responsive propulsion system particularly given the lack of control by aerodynamic devices (like wings). In terms of our technology, advanced sensors or GPS satellites in communications with an on board microprocessor might partially explain such maneuvers. Even more difficult to explain would be the willingness of any government or organization to advertise this capability through a residential area where malfunctions during flight could result in harm to the civilian population and expose an advanced military technology.

The Authors

The six authors of this report all have scientific backgrounds including degrees in chemistry, physics, mathematics, and environmental science. Their work backgrounds are also scientific with experience in the air defense industries, semiconductors–as well as various patents.

[2] The exact nature of the IR emissions from the unknown object is unknown. Tumbling could be an appearance due to the variable nature of the IR emission from that object.

Together they have 86 years combined experience studying the UFO phenomenon. A copy of their backgrounds is listed in Appendix A.

A minimum of 1000 man hours were spent in the analysis of this video over the course of one and a half years. Every effort was made to objectively evaluate the data obtained and ensure the protection of the source's identity, according to his wishes. Non-Disclosure Agreements were signed by all parties which stipulated details would remain secure.

Conclusion

The object witnessed by CBP and tower personnel and recorded on the CBP DHC-8 aircraft's thermal imaging system is of unknown origin. There is no explanation for an object capable of traveling under water at over 90 mph with minimal impact as it enters the water, through the air at 120 mph at low altitude through a residential area without navigational lights, and finally to be capable of splitting into two separate objects. No bird, no balloon, no aircraft, and no known drones have that capability.

The authors are open to any reasonable explanation that addresses the various characteristics displayed by this object. The full analysis and associated appendices can be read for the detailed analysis that contributed to the above summary conclusions.

I. PURPOSE

The purpose of this report is to analyze the characteristics of an unknown flying object, recorded by a thermal camera system, in an effort to determine if the object in the video can be explained.

II. BACKGROUND

Thermal Imaging Video A special investigator known to the authors of this report received information from a personal contact about a sighting of an unknown aerial object by a pilot who was employed with the U.S. Customs and Border Protection (CBP), a branch of the Department of Homeland Security (DHS), in Aguadilla, Puerto Rico. The special investigator's contact was not a direct witness but rather an acquaintance of the direct witness(s). The source is considered the secondary witness. The pilot and crew of the DHC-8 Turboprop aircraft are considered the primary witness(s). On October 21, 2013, the secondary witness provided the special investigator an original copy of the AVI[3] video file depicting the unknown object over Aguadilla, Puerto Rico. According to the secondary witness, the encounter occurred when the pilot was beginning a routine mission and saw a pinkish to reddish light approach from the ocean towards the south. The local time of this event was 9:20 pm on April 25, 2013. The object was visually detected and then tracked using the plane's on board thermal imaging video system. The secondary witness indicated that the pilot could not discern a defined shape of the object but the object did possess a reddish/pink colored light source. The light source turned off as the object entered the Rafael

[3] AVI is Audio Video Interleave; a multimedia format introduced by Microsoft in 1992.

Hernandez airport airspace. From this point the object was exclusively observed through the thermal imaging system of the DHC-8 Turboprop aircraft until the object entered the water and was observed to split into two equal parts and gradually disappear under the water. There were a total of four witnesses to the event on the aircraft and an unknown number of airfield and Federal Aviation Authority (FAA) tower personnel.

Forward Looking InfraRed Systems, Inc. (FLIR) was initially contacted to determine if the thermal imaging system was manufactured by their company. A photo obtained of the thermal camera system was shown to a FLIR representative. The FLIR employee indicated that it was not their thermal system but it belonged to L-3 WESCAM, a Canadian company. WESCAM Inc. is a subsidiary of L-3 Communications Holdings, Inc. A WESCAM representative confirmed that it was their state of the art WESCAM MX-15D thermal imaging system. This system uses a InSb sensor with sensitivity in the 3-5 micron range.[4] A specification manual of that system is included in the Appendix B. The capabilities of the system and its output parameters can be seen on a WESCAMvideo located on YouTube[5].

The camera's video output parameters include the latitude/longitude coordinates of the aircraft, date, time, azimuth heading of the aircraft, azimuth bearing to the target, and the altitude above sea level of the tracking aircraft. The imaging system also provides the latitude/longitude of any object within the cross-hair reticle of the camera, the altitude above sea level, and the distance in nautical miles.

The video of the unknown consists of 3 minutes and 54 seconds of video imagery of which 2 minutes and 56 seconds displays the object arriving from over the ocean, traversing land, and then disappearing back into the ocean. The entire video was broken into individual frames for analysis of the unknown object. There were a total of 7027 frames with each frame equating to approximately 1/30 of a second exposure. Breaking the video into individual frames allowed for detailed evaluation of the object's characteristics. Each individual frame is comprised of a set of 345,600 (720 x 480) picture elements (pixels) whose individual values can range from 0 to 255. A given pixel value corresponds to some relative intensity of infrared radiation which formed the image of the object. Low pixel values reflect warmer temperatures (shown in black) while high pixel values correspond to cooler temperatures (shown in white). It is important to understand that the image formed via these wavelengths of infrared is not visible to the human eye but this does not mean the object could not have been seen within visible wavelengths. It does mean, however, all the video image provides as evidence can only be found within the infrared wavelengths given.

Radar Data Radar data was requested through the Freedom of Information Act (FOIA) in November of 2013 from the U.S. Air Force's 84 RADES group as a means to both verify the validity of the thermal imaging video and to look for any unknown targets in the area of operation of the CBP aircraft. Radar data was obtained from three FAA sites in the area of Puerto Rico. The primary radar site was QJQ, which is a long range radar located at 3417 feet elevation. Its coordinates are 18º16'07"N and 65º45'31"W. Radar data was also obtained from SJU located near San Juan, Puerto Rico. This radar site only receives secondary radar,

[4] "NATIBO Collaborative Point Paper on Border Surveillance Technology," December 2007, p.14

[5] https://www.youtube.com/watch?v=eZcFUYMAWBY

also known as transponder signals. It was only useful in verifying the location of the CBP aircraft. The third radar site information was obtained from radar on St. Thomas Island. It is 120 miles to the east of Puerto Rico and was too distant to provide meaningful information. A copy of the FOIA request and the Air Force reply is included in Appendix C along with an example of the data received from the Air Force. The entire file consists of 20 columns by 33,113 rows and is in a Microsoft Excel format.

The radar data from the QJQ site provided both primary and secondary radar (transponder code of the aircraft and its altitude), date, time, latitude/longitude coordinates of the target, distance to the target and the azimuth bearing of the target from the radar site. The radar revolution rate was one sweep every twelve seconds.

There is also a military radar installation located on the premises of Rafael Hernandez airport. It is on the west end of the runway and is known as the Punta Borinquen radar site. A FOIA request was made in May of 2014, again to the USAF 84 RADES group. This radar site is the closest to the unknown object in the thermal video and would have been very useful information. Unfortunately, the Air Force denied the request for that information. A copy of the Air Force response is in Appendix C.

Control Tower Logs A FOIA request was made in March of 2014 for the airport's control tower logs, known as the Daily Record of Facility Operation, on the night of April 25, 2013. The tower at the Rafael Hernandez airport is known as the Aguadilla Tower. The FAA responded that their logs are maintained by a private company, Robinson Aviation, which is not required to respond to FOIA requests. A copy of the FOIA request and the denial from the FAA is in Appendix C. Robinson Aviation was contacted for information regarding the control tower logs and did not reply to requests. According to the conversation between an investigator and the Aguadilla Tower manager, the records (logs and recordings) from the tower were destroyed 90 days from the date of any event. The tower manager also indicated they were aware of the events of April 25, 2013, and were not willing to participate further in the investigation.

Weather and Astronomical Conditions At 9:50 pm the surface temperature was 79ºF, the humidity was 74%, barometric pressure at 30.05", scattered clouds, visibility of 10 miles, and the wind was out of the east at 8-13 mph.[6] Upper wind speeds were measured out of San Juan, which is 50 miles to the east of Aguadilla. At 8 pm local time the upper wind speeds from 400 feet to 3200 feet were similar and were out of the east northeast at 12 to 18 mph.[7]

Sunset was at 6:48 pm and astronomical twilight was at 8:04 pm. There was a full moon that night that rose at 6:53 pm. By 9:20 pm the moon was ESE at an elevation of 30 degrees.

Geography and Geology The area geology near the event location is that of Tertiary limestone making up the majority of the nearby coast lines and visible topography. The object traversed areas of steep and gradual inclines from the Atlantic Ocean. Much of the

[6] http://www.wunderground.com/about/data.asp

[7] University of Wyoming, Department of Atmospheric Science. http://weather.uwyo.edu/upperair/sounding.html

coastline in this specific area consists of a combination of erosional beaches and steep cliff faces. The regional geologic structure is considered karst as well as the topography characteristics. Puerto Rico sits near the strike-slip fault of the North American Plate a Caribbean plate which is located sub parallel to the Puerto Rico trench. This area off the coast where the unknown object entered the ocean consists of many geologic transition areas, fault system and deep trench passageways.[8]

Limitations There were various factors that limited either the amount of information for analysis or the quality of that information. Those limitations are listed as follows:

1. A FOIA request was sent to the Air Force but they would not provide radar data from the military radar station that is located at the west end of the runway.

2. The FAA replied negative to a FOIA request for the airport control tower logs because they had turned over maintenance to a private company, Robinson Aviation. The private company, exempt from FOIA regulations, would not respond to requests for information.

3. Although a basic overview of the WESCAM MX-15D video system is available, a detailed manual that describes specifics of the system was not available to the public.

4. The readout of the WESCAM system's latitude and longitude coordinates is rounded to the nearest second. This rounding can produce a maximum potential error of 60 feet in the location of the aircraft or its sited ground coordinates. This potential error was taken into consideration in all calculations.

5. There is a consistent one second delay between latitude/longitude values displayed on the WESCAM video and the latitude/longitude values as reflected by the true coordinates of the objects shown in the video. Due to its consistent variation, this shift is believed to be due to an inherent system delay that does not affect the system's operational capabilities and was taken into account in all calculations.

III. ANALYSIS AND CHARACTERIZATION

Witness Testimony The witness testimony was from a secondary witness whose direct testimony cannot be discussed in this report due to a request of anonymity. Additionally, it was the secondary witness who contacted this team's investigator labeled as special investigator and provided the original video. The primary witness is referred to in the remainder of the report as *Witness A*. Similarly, the secondary witness is *Witness B*.

Witnesses A is an officer and pilot employed by the CBP division of Homeland Security. *Witness A* was the pilot of the aircraft and one of four crew members that witnessed the event from the aircraft. *Witness B*, who asked not to be identified, was the only means of contact with *Witness A* who was not willing to talk to us at the time of the initial investigation of this report. Questionnaires were given to both *Witnesses A* and *B*. *Witness B*, in turn, provided one

[8] http://earthquake.usgs.gov/hazards/products/prvi/2003/documentation/

of the questionnaires to *Witness A*. The completed questionnaires were then returned to this investigative team by *Witness B*.

Multiple phone calls were made with *Witness B* as well as a personal meeting with two of this team's investigators on February 15, 2014, at an undisclosed location. The following testimony is from *Witness B* and it describes what was seen prior to the thermal video.

Witness A and his crew took off on a routine aircraft patrol of the Puerto Rican coast on the night of April 25, 2013. The DHC-8 Turboprop aircraft took off from the runway heading east at 9:16 pm. The aircraft contained four crewmen including the primary witness, a copilot, and two instrument operators (one manning the on-board radar system and the other manning the thermal image mounted camera system). *Witness A* looked out his left window and saw a pinkish to reddish light over the ocean northwest of the airport. The light was moving towards the airport. He believed the light to be at a higher elevation than his aircraft, which was at 1600 to 2100 feet, based on the radar data and the thermal video system engaged a moment before. The pilot confirmed visual contact with the tower personnel. The tower personnel also confirmed visual contact. As the target approached shore, its light went out. The pilot then requested monitoring of the craft with the on-board surveillance equipment. According to the reporting witness the on-board radar did not pick the object up, but the thermal imaging camera did detect the object. (The CBP's DHC-8 aircraft are equipped with SeaVue Marine search radar primarily for detecting seacraft.[9,10])At this time, *Witness A* no longer had visual contact with the object but did see the object in his thermal imaging display in the cockpit along with the thermal imaging display in the rear of the aircraft under control of the instrument operator. He continued tracking the object while on routine patrol in the aircraft. The pilot made no attempt to intercept the unknown target nor did the target seem to react in any way to the tracking aircraft.

Witness B stated the close presence of this unknown object caused the delay of a commercial aircraft's departure from the airport. This statement from the witness could not be verified since the authors of this report were denied access to the airport tower logs. However, the statement's claim was supported when it was found that Fed Ex flight 58 was scheduled to depart the airport at 9:10 pm but did not actually depart until 9:26 pm. It would also be logical to believe the tower would delay departures if there was an unknown aircraft in the airport's immediate airspace. Nonetheless, it cannot be known for certain that this departure delay was due to the unknown object. There was only one arriving flight during this time period. It was MartinAir flight 5713 that landed at 9:00 pm prior to the onset of this event. No arriving flights were affected. This information was obtained from the FlightStats, Inc database and is available in Appendix D.

Witness B indicated the video provided in this report was the entire unedited video and that knowledge of this video was widespread within the CBP office located at an undisclosed location. According to *Witness* B, Air Force Intelligence was contacted and subsequently was provided a copy of the video. Air Force Intelligence offered no explanation to CBP and recommended other agencies to contact. The identity of those agencies is not known. It is not

[9]http://www.cbp.gov/sites/default/files/documents/FS_2014_DHC-8%20Bombardier.pdf
[10]http://www.raytheon.com/capabilities/products/seavue/

clear, based on discussions with *Witness B*, whether the evidence for this event had an official security level. Since the event, *Witness A* indicated there have been no follow up investigations by any other government agencies nor has any debriefing ensued with any of the CBP officers.

Auxiliary Witness Testimony During research and field investigations pertaining to the subject video evidence, additional indirect witness testimony was obtained regarding the event and other similar events near and above Rafael Hernandez airport in Aguadilla, Puerto Rico. *Witness A* indicated another independent fellow CBP pilot was east of the base and on his way back to the airport about 15 to 30 minutes before the primary witness's sighting. This officer witnessed a formation of pinkish/red lights flying extremely low over the airfield in an unusual flight pattern. According to *Witness A*, the fellow pilot made a call to the base to notify personnel of his observations. Additionally, according to *Witness A,* the primary witness's son witnessed a light similar to the observed unknown object exit and enter the ocean just off the coast north of the airport one to two evenings after the main event of April 25, 2013.

An anonymous email was sent to investigator and researcher Morgan Beall from an individual with the alias "John" and from a secure email address[11]. The IP address within the email sent to the email server was received showing only the service provider server locations. The writer stated he or she had worked for the CBP and could vouch that the video was real. The writer's subsequent statements supported their claims. The writer mentioned the specific model of the thermal imaging IR system used, an L-3 MX 15D and the writer named the CBP DCH-8 maritime patrol aircraft specifically, which the research for this report had already confirmed through *Witness A.* The writer goes on to describe the events of April 25, 2013 with information we have only been able to glean directly from cooperative witnesses to this event. The information provided by this anonymous writer is considered credible and corroborates information from *Witness A* and *B*'s testimonies. Uniquely, the writer mentions the unknown object first appeared as a "forward flying horseshoe" shaped craft and gradually changed its configuration to a spherical shape before entering the water. It is not known if this is his or her interpretation of the video or if it is information witnessed by airport personnel or other privy information to which the witness had access. Conversely to this report's observations and conclusions, the writer makes a statement that the object did not split into two parts but rather the original object was met by a second craft and both proceeded to enter the water together. It is suspected this witness is either an active duty CBP person on site or is acquainted with personnel actively serving on the base.

Another anonymous communication was posted under a YouTube commentary section next to a lesser quality copy of this video at https://www.youtube.com/watch?v=Hee70AwwUJ8. This statement was posted in Spanish in June of 2014 by an individual with the alias "Red Bill". This individual is suspected to have some inside knowledge of the event because contrary to the original user's post of the video, "Red Bill" correctly states the source of the video as the U.S. Customs and Border Protection and correctly states that the video was taken from an airplane and not a helicopter. He also indicates (unverified by the authors of

[11] john@truth.com is a fake email used under a secure or untraceable email address.

this report) that the video was analyzed in Quantico, Virginia and claims that two other videos were made in the same area on different dates. All attempts to initiate communication with "Red Bill" were unsuccessful.

A third anonymous communication was sent to John Greenewald Jr., creator of the web site Black Vault (http://theblackvault.com/), in October 2014. The statements made in that communication were nearly identical to that of the anonymous email sent to investigator Morgan Beall. It is suspected that all three of these anonymous communications may be from the same person. It was confirmed these communications were not made by *Witness B* when questioned directly about the content and the source. The factual information concerning the agency involved, the aircraft used by CPB and the object described is considered credible.

It should be noted that all primary research and witness interviews by the authors of this report were completed prior to any of the afore mentioned leaks of a video and commentary on YouTube and Facebook.

Radar Analysis—Verification of Thermal Imaging Video Information As noted earlier in this report, data used in this analysis was from the primary radar site known as QJQ and is a long range radar located 90 miles ESE of the area of interest and is at 3,417 feet elevation. The radar is a FPS-20E and has a range of 200 nautical miles.[12] The radar was manufactured by Bendix and is an L-Band radar that operates at 1280-1350 MHz and has a transmission power of 2.0-2.5 megawatts.[13] Based on the lowest altitudes detected of identified aircraft in the area of interest, this radar is capable of detecting objects, if near the airport, at 400 feet altitude. A graph and discussion of how this information was derived is in Appendix F.

The radar data was used to verify that there was a government aircraft on the day, time and location as noted in the thermal imaging video. Hoaxes were eliminated once the aircraft that took the video had been verified on radar from QJQ site.

It is a straightforward exercise to determine whether the aircraft on radar is an exact match to the aircraft that filmed the thermal video. The video provides the exact time and location of the aircraft as it was taking video of the unknown object. The radar data can verify if an aircraft was present at the same time and location.

The CBP aircraft's location at specific times using the thermal video's time and latitude/longitude stamps of the CBP aircraft was compared against radar data to verify the existence and location of the aircraft. Radar data confirmed an aircraft tracking the same path and time as shown on the thermal video. Figure 1 shows the path taken by the CBP aircraft. The aircraft traveled north over the ocean once it departed the airport (north is at the top of the map), then gradually to the southwest before traveling back over land and to the south. Radar data indicated the transponder number of this aircraft as 4406. This transponder number itself indicates that the aircraft is a military or law enforcement aircraft. FAA Order

[12] Lincoln Laboratory, MIT, *Correlated Encounter Model for Cooperative Aircraft in the National Airspace*. October 24, 2008.
[13] OCEANA NAS, Harvey Clute, Jr., Bendix Engineer.

7110.66 stipulates that all transponder codes between 4401 and 4433 are controlled by FAA Order 7110.67, which is named “Special Aircraft Operations by Federal, State Law Enforcement, Military Organizations and Special Activities.”

Based on the radar data, there is no doubt that the thermal video is a real video taken by a law enforcement or military controlled aircraft. Because we have time and distance information, the speed of the aircraft can be calculated. The aircraft's speed always varied from 180 mph to 240 mph, which indicates it is not a helicopter but is a fixed wing aircraft. All of this information supports the information in the thermal video as well as the story told by the CBP witness. (A detailed analysis of this work and the aircraft's calculated speeds is included in the Appendix F.)

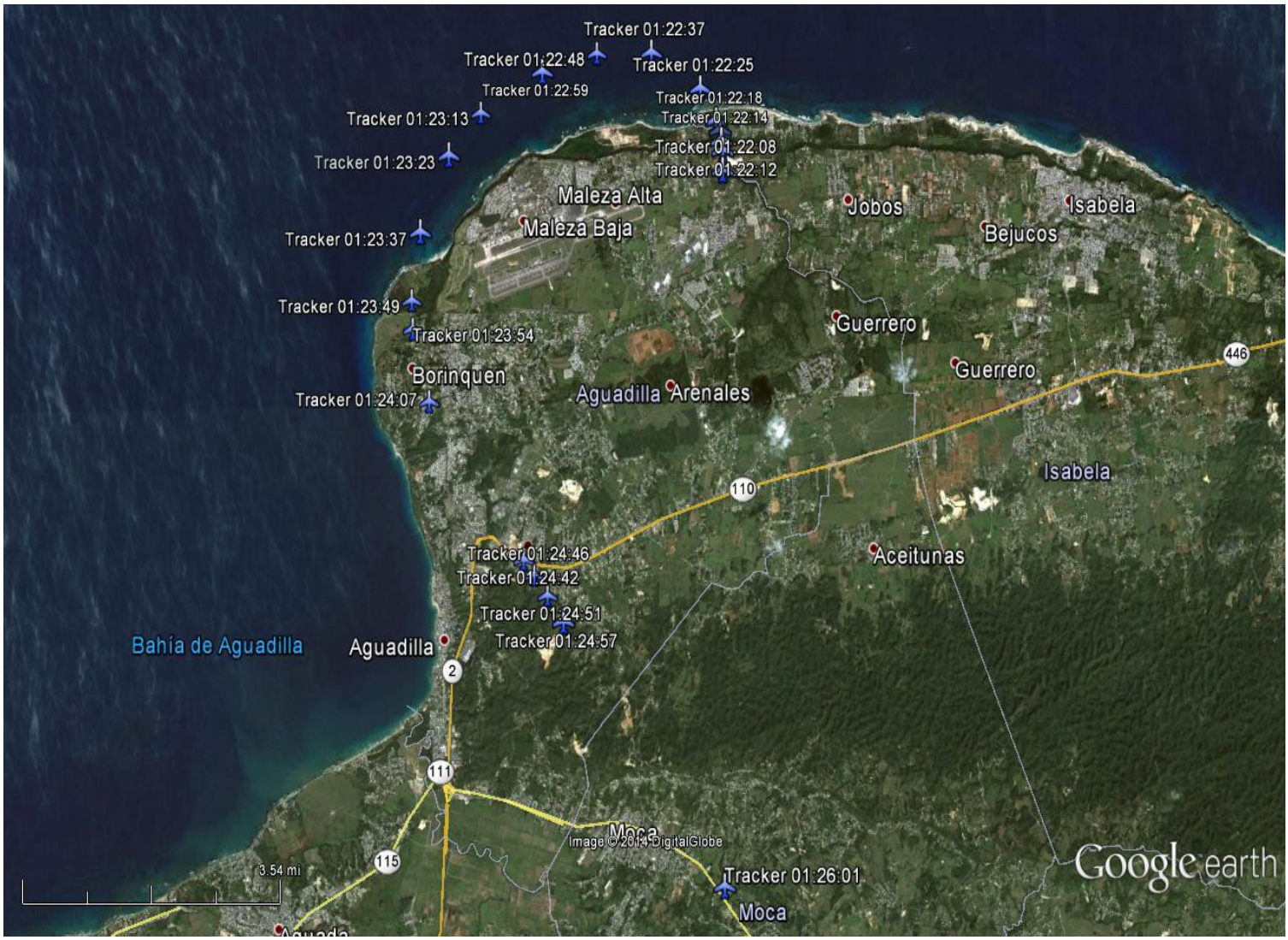


FIGURE 1: Tracking aircraft's location based on thermal and radar data. The name “Tracker” represents the CBP aircraft and the value to the right is Zulu time at that location. Radar data supports the time and location coordinates provided by the thermal imaging video.

Radar Analysis—Verification of Witness Testimony of Visual Sighting The witness indicated that the unknown aerial object was sighted just after takeoff and at the beginning of his standard nightly patrol. Visual confirmation of an approaching red light was made both by the pilot and the control tower.

Radar data shows that the aircraft made an extra search pattern around the airport before commencing what appeared to be its standard patrol and operational activities down the Puerto Rican coast. Although the thermal video shows the aircraft's path for only four minutes, the radar data shows the aircraft's path prior to and after the thermal video being engaged. In the Google Map in Figure 2 the aircraft images in blue represent both the matching thermal and radar data while the aircraft images in red are only radar data. It is clear that before the thermal imaging video was engaged (red colored plane), the aircraft circled the airport and then engaged the thermal video on its second pass (blue colored plane). This supports the witness testimony that the pilot was aware of an unknown target in the area, searched for the unknown target, and after finding it, engaged the thermal video tracking system prior to resuming the aircraft's normal course near the coast. Data that is discussed in the next section indicates that there is evidence to support the pilot's and control tower's claim of an unknown object in the area.

FIGURE 2: Radar only data of a law enforcement or military aircraft shown in red with Thermal Imaging & Radar data of the aircraft's location show in blue. The aircraft locations in red show the aircraft's flight pattern before engaging its thermal imaging video.

Radar Analysis—Verification of Unknown Targets

Radar data was reviewed for any primary data without a transponder code that would signify an unknown radar track in the area of interest. Primary radar tracks are those created by the actual reflection of the radar beam from a target. Known aircraft such as the law enforcement or military aircraft transmit a transponder code, which appears in the radar data, is also known as secondary radar. The radar picked up 50 primary radar strikes (no transponder) to the north and northwest of the airport of what appears to be a single object from Zulu time 00:58hrs to 01:14hrs, a 16 minute period of time. The CBP aircraft, which transmitted a transponder code, departed the airport runway at 01:16hrs. These 50 radar tracks (the radar sweeps every twelve seconds) of this unknown object are visually displayed in Figure 3. The amount of information in Figure 3 requires considerable commentary.

The first four radar strikes of the unknown target, seen at the far left area of Figure 3, occurred after each twelve second sweep of the radar and are designated as a, b, c, and d. The unknown target was not picked up for the next four sweeps, which equates to 48 seconds of no radar contact. The fifth radar strike designated as 1a++++[14] indicates the unknown was at the same location as it was one minute earlier. That does not necessarily mean that the object was stationary because the accuracy of the radar is only within 1/8 mile. If those first four target strikes are a single object then the movement indicates 7800 +/- 660 feet moved in 36 seconds or a speed of 135-160 mph. The altitude of the object is not known but based on the radar's minimum altitude detection limit at that distance, the object must have been about 800 feet altitude or higher. See Appendix F for detailed information.

The sixth radar strike occurs immediately after the fifth radar strike, i.e. the next twelve second sweep of the radar. Beginning with this sweep of the radar, the object shows up on almost every sweep of the radar for the next ten minutes. It could be that the first six radar strikes were not related to the next 42 radar strikes identified as 1b thru 1aq. Symbols 1b through 1aq are in consecutive order[15] and represent consecutive radar strikes 12 seconds apart. In total there were 42 radar strikes out of 50 possible in a ten minute period of time to the northwest of the airport. This level of activity would be sufficient to cause concern for anyone monitoring the radar system.

Within 18 minutes of this flurry of radar activity, the law enforcement aircraft with the thermal video imaging capability took off from the airport just before 01:16hrs, which is when the aircraft was first detected on radar at an altitude of 800 feet at the eastern end of the runway. Figure 3 reveals that the CBP aircraft made an extra sweep into the area where the unknowns were picked up on radar. Likely, the pinkish-reddish light seen to the northwest of the airport by the pilot was the unknown target seen on radar and the object later recorded by the CBP aircraft's thermal imaging video; it would be too coincidental to think otherwise.

The unknown target that appeared on radar for 16 minutes does not display characteristics expected of ordinary aircraft in flight. The speed variation and sudden changes in direction do not support mundane aircraft. Nonetheless, there are characteristics that can be attributed to the unknown target.

[14] The four plus signs indicate that four radar sweeps were missed.
[15] 1b 1c 1d … 1y 1z 1aa 1ab 1ac … 1ap 1aq.

First, this target's appearance on radar occurred at the right time and location to likely have been the object visually confirmed by the control tower and the CBP aircraft. Second, although the target jumped around, its overall directional movement was from the northeast to the southwest. Third, the target strength was strong as it was detected on almost every sweep of the radar for eight of the ten minutes it was on radar. Lastly, the target was no longer detected on radar during the time that the unknown was detected on the thermal imaging video. At that point in time the object was believed to be below the Pico Del Este radar's detectable altitude of 800 feet.

The authors of this report have looked for other explanations for the unknown radar strikes to the northwest of the airport. A temperature inversion is a possible cause of false radar returns. These occur when the upper air temperature is higher than lower air temperature. This possibility is discussed in Appendix F and discounted due to the lack of any temperature inversion layer in the area. One of the strongest arguments against some type of anomalous propagation is the consecutive radar returns every 12 second radar sweep within a small geographic area for a solid eight minutes coupled with the lack of these returns prior to this incident and the lack of these returns after the unknown is picked up on the thermal video at a lower altitude over land. It seems reasonable to consider the possibility that the visual confirmation of the object by the pilot and the control tower, the detection of these unknown radar returns on FAA radar data, and the detection of the unknown object on the thermal video are all related to the same event and the same object. No other reasonable explanation has yet been found.

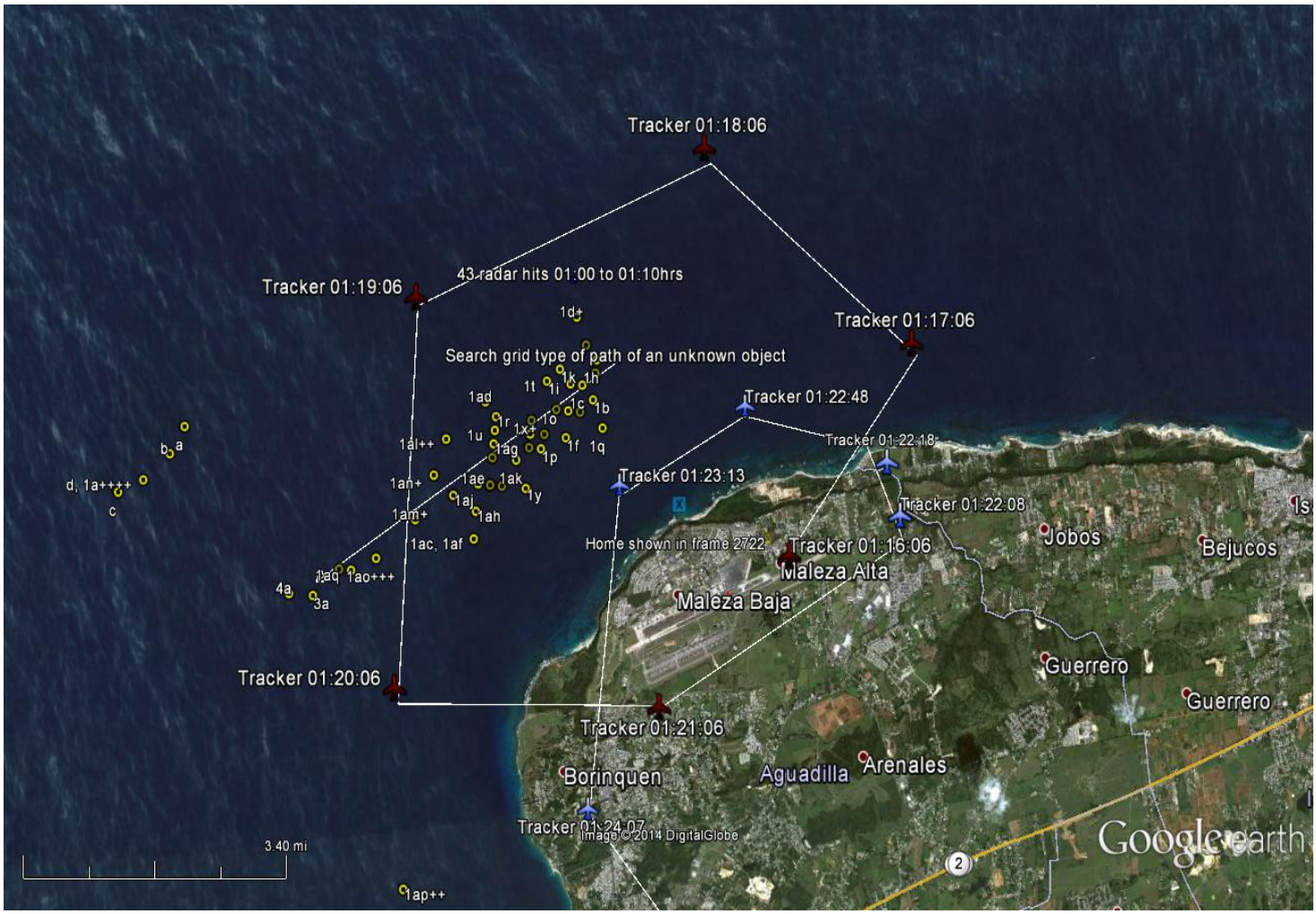


FIGURE 3: Radar plot of unknown that showed up off shore prior to the departure of the aircraft with thermal imaging capabilities. Tracks are designated in order of time beginning with a-d (segregated because of distance from the other radar tracks), followed by 1a-1aq, and followed by 2a, 3a, and 4a (segregated because of significant time delays of greater than one minute between radar tracks.

The radar sweeps every twelve seconds. Each "+" after a radar hit indicates that the target was not detected in the previous radar sweep. A designation such as "1ac,1af" indicates that two different radar sweeps occupied approximately the same physical location to within 1/8 of a mile of each other. (There is no difference between green & yellow circles and is due to a Google Earth issue.)

Object Size The object in this video was tracked using a state of the art WESCAM MX-15D multi-sensor multi-spectral targeting system. The MX-15D was mounted on the underbelly of a DHC8 turbo prop aircraft operated by U.S. Customs and Border Protection. This system has high definition thermal imaging, short range IR for enhanced haze penetration, a laser rangefinder and illuminator, and stabilization features. The video lasted more than three minutes and due to familiar objects in the background, the approximate size, speed, and path of travel of the object were identified. The camera's video output included the latitude and longitude coordinates, azimuth heading, and the altitude above sea level of the tracking aircraft. It also provided a target latitude/longitude, an altitude above sea level, and the distance in nautical miles as well as meters. Due to the capabilities of this particular camera its sale outside of the United States requires approval from the U.S. Government.

The video consists of 3 minutes and 54 seconds of video imagery of which 2 minutes and 56 seconds displays an unknown object arriving from over the ocean, traversing land, and then disappearing back into the ocean. The entire video was broken into individual frames for analysis of the unknown object. There were a total of 7027 frames with each frame approximately 1/30 of a second exposure. Breaking the video into individual frames allowed for detailed evaluations of the object's characteristics.

Specific information is provided as to how the size, speed, and location of this object were determined. The basic determinations were based upon trigonometry related to the actual object size, angular size, and distance of the object. If two of those variables are known then the third variable can be calculated.

The angular size of the object was calculated from the angular size of each pixel in the video at a given magnification. The angular size of a pixel was determined from several different objects of known size, known distance, and the number of pixels that made up the object's length in a video frame. Using the known distance and size, the angular size of the known object was calculated in degrees. Dividing this by the object's length in pixels provided the angular size in pixels at that particular magnification. A value of .001483º +/- .000045º per pixel was obtained. An example of one of the known objects and distances used is shown in Figure 4. The angular size of a pixel is proportional to the magnification used in the video. A detailed discussion of the technique and calculations used is available in Appendix G.

The angular size of the object can be used to calculate the object's true size if we know the distance to the object. Although distance and altitude of the object is shown on the thermal video display, these values are actually the distance to the terrain behind the object. An example is shown in Figure 5 where the altitude of zero feet is clearly that of the ocean as is the distance of 3.5 nautical miles. The unknown object's true altitude in Figure 5 is some value greater than zero and its true distance is some value less than 3.5 nautical miles.

The distance can be accurately calculated whenever the object is at a known or a very low altitude. This occurs towards the end of the video when the object passes behind a telephone pole, behind trees, and then finally enters the water. During these periods of time there are means to measure the distance.

FIGURE 4: Frame 0892. Known tank size and distance along with unknown.

FIGURE 5: Frame 0141. Unknown object near center of cross-hairs.

For example, in the right triangle shown in Figure 6 the camera is at point 'C'. The cross-hairs of the camera are pointing towards 'A'. Any object in the cross-hairs (represented by point 'D') of the camera could be at any location along line 'AC'. However, when foreground objects such as trees or a telephone pole or the water surface itself interact with point 'D' then one knows that point 'D' is close enough to point 'A' (point 'A' is on the ground) to allow for a reasonably accurate determination of the distance from the object to the camera.

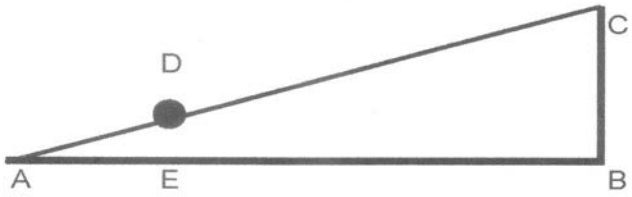


FIGURE 6: Right triangle

Calculations of the object's size were done on multiple frames whenever the object was a known distance from the ground which allowed accurate values of the object's distance and its size. Two examples are shown in Figure 7, where the object is seen four seconds after it had exited the water, and in Figures 8-10 that show the object moving behind a tree. In both examples the distance of the object is known because its approximate altitude is known; with a known distance then the object's size can be determined. The size values obtained for the object varied significantly from a minimum size of 3.0 feet to a maximum size of 5.2 feet. The variation in size could be due to either varied angular sides of the object as it is appears to be tumbling or temperature variations as seen by the IR camera that could distort the object's apparent shape. Regardless, the variations in apparent size seen by the IR camera are due to properties intrinsic to the object.

Object Path The path taken by this object during the video cannot be ascertained simply by plotting the latitude/longitude coordinates that are displayed by the thermal imaging system based on the cross-hairs. Those coordinates are driven by a laser range finder, which is not striking the object itself but the ground and other large objects in the background. This was done empirically using known objects in the background and verifying the longitude/latitude coordinates belonged to the background object. *Witness B* also supported this when he indicated to the authors that their laser range finder is used for ground targeting and only rarely has it been able to capture aerial targets. As a result, when the object is at altitudes above about 40 feet there can be significant differences in the actual distance between the object and the camera. This is the same issue discussed in the determination of the object's size. A powerful tool used in this analysis was “Image J” software that allows one to zoom in on groups of frames and run/reverse/stop the video at higher magnifications. This software was developed by the U.S. government.[16]

[16] ImageJ 1.47v. National Institute of Health, July 8, 2013. http://imagej.nih.gov/ij

FIGURE 7: Frame 5085. Unknown object in center of cross-hairs.

FIGURE 8: Frame 2697. Unknown object visible.

FIGURE 9: Frame 2705. Unknown object disappears behind trees.

FIGURE 10: Frame 2713. Unknown object reappears from behind trees.

The path was determined from various frames in the video where the approximate altitude of the object was known. This occurs during the last half of the video when the object's altitude was less than 40 feet and was descending into the ocean. Details of the calculations that identified the object's path are displayed in Appendix G.

The best determination of the object's possible paths is shown by the brightest of the three blue lines in Figure 11, a Google Earth image of the northwest coast of Puerto Rico. The airport that is seen in the image is the Raphael Hernandez Airport and is a joint civil-military airport located in Aguadilla, Puerto Rico. The top of the page faces west and the right hand side of the page faces north. The dark blue aircraft icons indicate the actual locations of the aircraft with the thermal camera. The locations were verified by both the thermal camera system's latitude/longitude values and by radar from the Pico Del Este radar site. In Figure 11, the numbers next to the aircraft represent the time in Zulu (aka Greenwich Mean Time) hours that the plane was at that specific location. A corresponding UAP (Unidentified Anomalous Phenomenon) location is on the map for the same time period. The UAP locations marked in red are exact locations of the object at those times due to accurate altitude values being available. The first exact location of the object is marked in red on the map at time 01:23:37 as the object passed behind a tree as shown in Figures 8-10. The UAP locations marked in orange represent approximate locations of the object within 500 feet. The UAP locations marked in yellow with a time value next to them and the darker blue line connecting them represent a “best guess” of the object's location based on the previous path of the object and its known direction from the aircraft. The brighter blue line begins at a question mark that represents the uncertainty of the object's location at the beginning of the video. The object's route does raise the possibility that its origin could have been its final destination or its origin could have been up to one mile farther to the west as shown by the other two light blue lines. The light blue lines connect possible routes taken by the unknown object that are farther to the west. The yellow colored UAP locations represent a higher level uncertainty of the object's position than those colored in red.

The object approached the island of Puerto Rico out of the north from the ocean. Its exact origin is unknown. Heading south it crossed the airport runway, turned east, then north again to recross the airport runway on its way back out to sea. The object's path reflects a complete 180 degree change in direction over land and a continual drop in altitude during the last half of the video. The object left land at 01:24:04 and changed direction again heading northwest. At 01:24:13 the object impacts the water and travels just below the surface. The object's movement through the water can be seen if you look carefully at the video. It exited momentarily at 01:24:18 before moving just below the surface again. Once more, the object can be followed until it exited the water at 01:24:31. The object changed its direction while underwater from northwest to west. (It is believed the reason the camera is able to follow the object while underwater is due to the Bernoulli[17] hump created by any object moving underwater. This is discussed further in Appendix H.) Eleven seconds after exiting the water at 01:24:42 the object split into two equal parts, both the same size as the original, as it continued to the west. One of the two parts entered the water at 01:24:52 while the other part

[17] Stefanick, T.; "Strategic Antisubmarine Warfare and Naval Strategy"; Institute for Defense and Disarmament Studies; (1987): Appendix 3

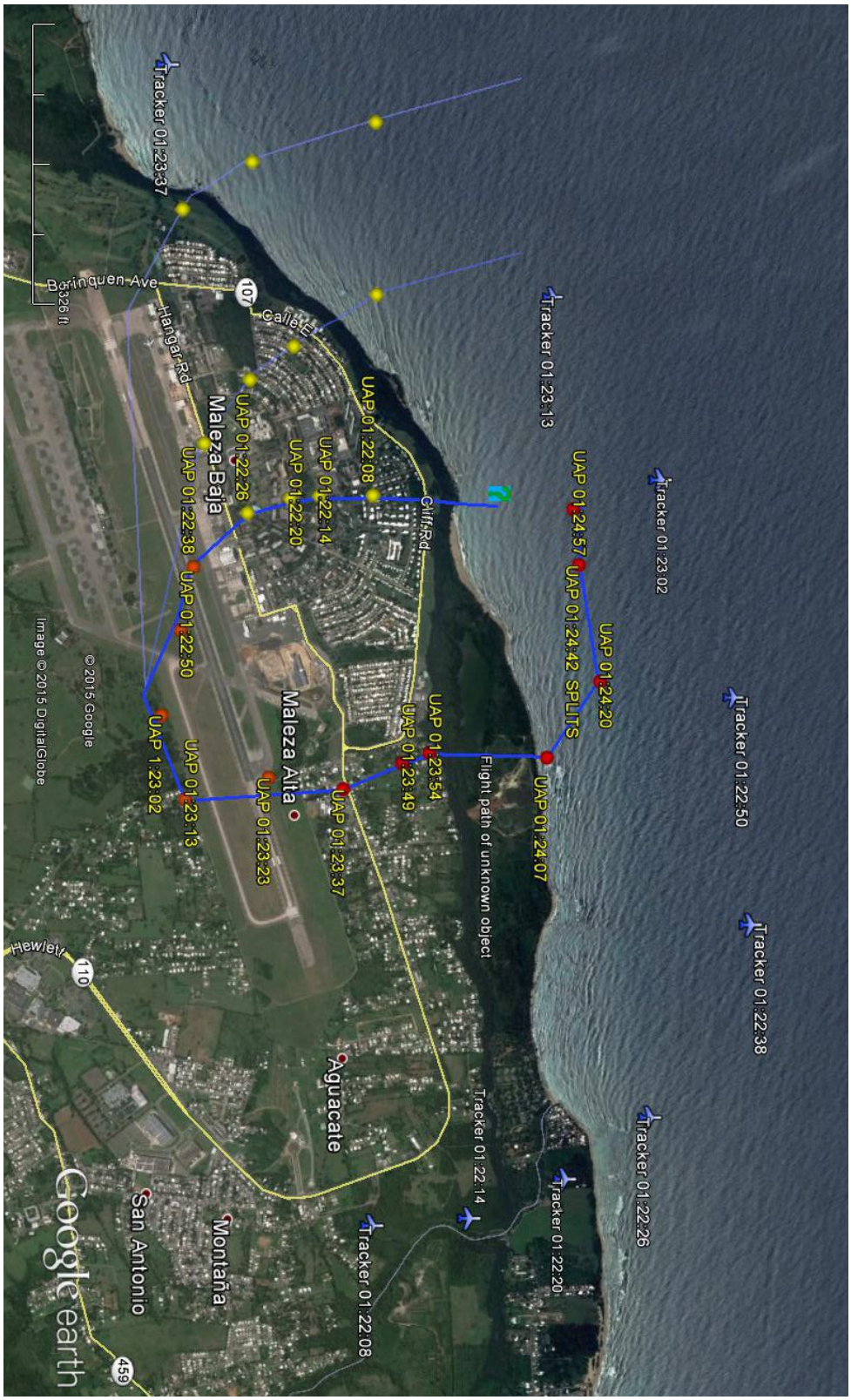


FIGURE 11: Google Map of three possible paths of the unknown object.

changed direction to the southwest before also disappearing into the water at 01:25:04.

Object Speed What is the energy source that propels the object in this video? The movements made by this object require some type of power source. The object traversed over four miles during the video and during that process changed direction; south to north to west then finally towards the southwest. No type of propulsion is evident from the thermal imaging video yet some form of propulsion is required for the object to maintain and vary its speed, change directions multiple times, and move in and out of the water. Again, the source that propels this object is not evident.

The speed of the object is most accurately calculated during the latter half of the video when the object's location can be more accurately determined. The calculation of the object's speed is straightforward and established from given distances and times. The thermal video system's clock and latitude/longitude locations allowed for the calculation of time and distance values. The clock accuracy is to the nearest 1/30 second due to the frame rate of the video. The main error is that the latitude/longitude values are in degrees, minutes, and seconds so that the location is a digitally displayed to the nearest second. The accuracy is within 0.5 seconds of a degree, which is roughly 51 ft. The rounding error is taken into consideration for the speed and distance calculations.

Table 1 shows the time of the latitude/longitude measurement, the distance traveled since the last measurement, and the calculated speed of the object. Although the speed of the object is fairly constant and normally varies from 70 mph to 110 mph, it is clear that the object accelerates and decelerates during this portion of the video, which again indicates some type of power source must be present. Some of the speeds shown in the table are noted as being through water. These speeds are average speeds and do not examine the possibility of higher speeds within short time bursts, which sometimes appear during the video.

ZULU TIME	ALT.	LAT./LONG.	DISTANCE TRAVELED	TIME	DIRECTION OF TRAVEL	SPEED
01:23:37	25 ft	18:30:08N 67:07:13W	------	------	------	------
01:23:49	16 ft	18:30:19N 67:07:18W	1213 ft	12.0”	north northwest	69 +/- 3 mph
01:23:54	16 ft	18:30:24N 67:07:20W	542 ft	5.0”	north northwest	74 +/- 7 mph
01:24:07	< 1 ft	18:30:46N 67:07:19W	2230 ft	13.0”	north	117 +/- 3 mph
01:24:20	**	18:30:56N 67:07:34W	1761 ft	13.0”	west northwest	92 +/- 3 mph
01:24:42	**	18:30:52N 67:07:57W	2246 ft	21.7”	west	70 +/- 2 mph
01:24:46	*	18:30:52N 67:08:01W	384 ft	3.95”	west	66 +/- 9 mph
01:24:51	*	18:30:53N 67:08:04W	305 ft	5.28”	west	39 +/- 7 mph
01:24:57	**	18:30:51N 67:08:08W	434 ft	6.03”	west southwest	49 +/- 6 mph

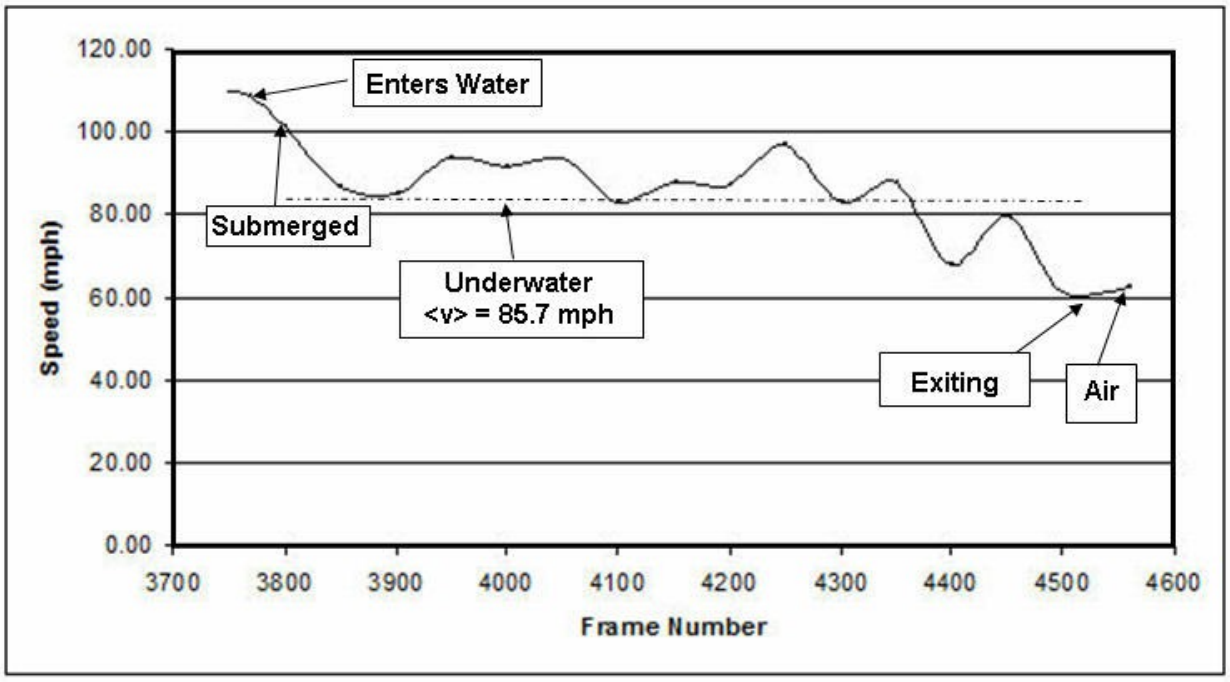
TABLE 1: Speed of object at known positions.

* Speed underwater. **Speed through water and air.

Table 1 uses 4 to 13 seconds in each calculation of the object's speed based on the latitude and longitude coordinates provided by the thermal imaging video.

Graph 1 shows speed averages over a total of about 800 frames. Average speeds were calculated for collections of about 50 frames each (covering approximately 1.5 seconds) from the 800 frames. Then, from all of the average speeds calculated, 15 sets of three each were used to generate a moving average. The purpose of the moving average was to emphasize longer term trends which may be seen in the curve of Graph 1. Even given the longer term speed trends of Graph 1, the object's speed is still seen to vary within a short period of time.

The speed of the object was also measured using a completely different method based on the object's ground speed by comparing its relative movement against background ocean waves whose speed was negligible. This method showed speed variations between frames 3769 to 3843 of 70 mph to 130 mph, which is comparable to the speeds found using latitude and longitude coordinates. Details on this second method are available in Appendix I. These two different methods clearly establish that this object moved at speeds above, through, and under the water that cannot be explained by simple conjectures such as a balloon, bird, or wind-blown object.



Graph 1: Speed measured every 50 frames

Object's Interaction with Water Although most of the video concerns the object moving through the air, there are portions in the latter part of the video when the object interacts with

the ocean. These include the object's actions immediately prior to impact in the ocean; entering the water; motion underwater; exiting the water; and object division.

Object's Interaction with Water: two seconds prior In the two seconds prior to ocean impact, there is no indication of the object slowing down. The object's speed prior to impact is near the highest speed measured during the latter part of the video. Frames 3700 through 3750 were used as the points of reference for measuring the object's speed prior to frame 3769 when the object began to impact the water. In order to minimize errors due to rounding, time to the nearest second and latitude/longitude to the nearest degree second, extrapolations were made using individual frames to provide higher accuracy. The speed calculated during the two seconds prior to impact was 109.7 mph with an error of +/- 11 mph. The details behind this calculation are shown in Appendix J.

Object's Interaction with Water: moment of impact In today's understanding of science, it is impossible to enter, leave and move through a fluid and not affect it. There is no visual indication within the video that the object immediately slows down on impact, (Graph 1 shows this minimal impact as the object slows by only 10% as it first impacts the water until total submersion.), creates an expected significant splash, or reacts with the water in any obvious fashion. The mystery around this lack of a splash is further compounded since the object doesn't appear streamlined but is more of an oval shape. The lack of a visual effect could be due to our difficulty in translating a heat signature into the more normal visual picture. A very detailed discussion of the object's shape is covered in Appendix H, “Modeling of the Object”.

At 01:24:13 Zulu hours, as shown in Frame 3769 and those following (see Figures 12 and 13) an object larger than three feet, traveling over 100 miles per hour, hit and entered the ocean seemingly with little or no splash. Although present science knows ways to minimize the splash, eliminating it is not possible. Effectively a splash is taking a volume of water and drastically increasing its surface area. Since both evaporative and radiative heat transfer are proportional to surface area, a splash enables that volume of water to become cooler. The change in temperature discussed here is very small and is nearly invisible in infrared as can be seen in Figure 14. In this figure, the red circle outlines the unknown object that has just hit the surface of the ocean. The red arrow indicates the object's direction of travel. As was stated above, even with a 300X zoom, no significant cooling (lighter shades) of the water can be seen.

A three-dimensional view of pixel intensities is helpful in looking for a splash. An “Image J” tool[18], "Surface Plot", was used to create a 3-D view. The software converts the pixel intensities (heat variations) in the IR frame to height variations with the lighter (cooler) pixels being represented as hills and the darker (hotter) pixels as valleys. The red outline in Figure 14 was provided to allow a direct comparison of that picture with the surface plot shown in Figure 15.

[18] ImageJ 1.47v. National Institute of Health, July 8, 2013. http://imagej.nih.gov/ij

FIGURE 12: Object's initial impact with water shown in Frame 3769

FIGURE 13: Object's < 1/6 of a second later in Frame 3773

Although still small, the cooler areas representing the splash are seen as raised areas around the upper-right corner of Figure 15. It is believed these represent a splash rather than simply cooler areas of the UAP since they only show up in these plots where the UAP is entering the water. The object in Figure 14 is moving to the left and slightly down. This raises an interesting observation. Rather than the splash being in front of the UAP, it is trailing. Since a frontal splash could not be found in this or any later frames, it is believed the splash was caused by the lower middle or back lower portion of the UAP. The UAP was angled such that it sliced into the water with little or no splash at a speed close to 109 mph. This feat requires a technology that would be at the forefront of the U.S. Navy's current capabilities. If it has been developed then it would most assuredly be highly classified.

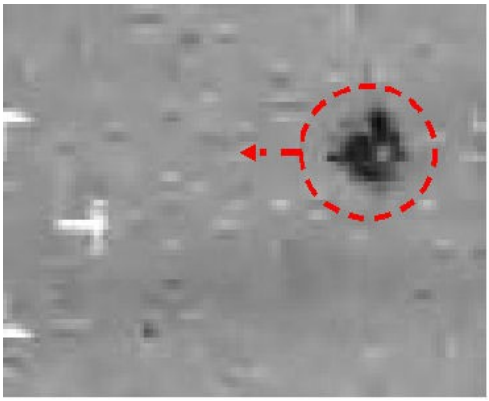


FIGURE 14: Frame 3769 - 300X zoom

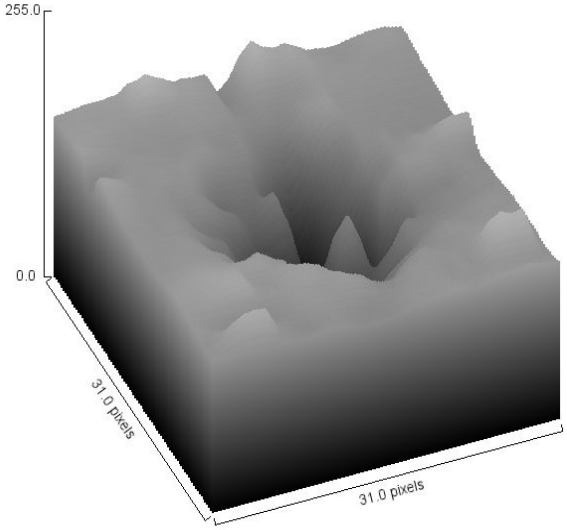


FIGURE 15: Frame 3769 – Surface Plot

Object's Interaction with Water: movement through water Although the video does not show the object for most of its underwater period, each time the object appears, the camera is found to be pointed almost directly at the unknown. Since one of the witnesses specifically rejected the idea that the camera was locked onto the object, this implies that the object has remained visible to either the camera operator or the pilot or both. It further implies that while traveling underwater the unknown object has remained relatively close to the surface throughout. Since these assumptions essentially mean the unknown is at an altitude of sea level and is placed at the target location printed on each frame, we can utilize the target location as the unknown's location throughout this period to calculate its speed.

During the first 26.7 seconds that the object is traveling underwater, it covers a distance of 3241.7 feet equating to an average speed of 82.8 mph. This is a slight drop from the object's aerial speed at impact. Whether that speed drop is due to the resistance in the water or is just coincidental is not known. The speed calculations made of the object's movement through the water is detailed in Appendix J. The speed of the object underwater is not beyond our current technological capabilities. These high speeds are easily exceeded by underwater torpedoes that reduce water resistance via a process known as super-cavitation.

At this point, it is worth discussing how the thermal imaging video is capable of seeing an object underwater. Infrared radiation is easily blocked by water and about one millimeter of water absorbs virtually all of the IR generated by the object; however, that does not necessarily eliminate detection of underwater objects using infrared.

When a solid object moves underwater, the water must be displaced and some of that water is displaced toward the surface which then manifests as a moving hump along the surface. Northrop Grumman is aware of this phenomenon, known as a Bernoulli Hump, and has mentioned this as one possible method to detect submarines.[19] Like the splash discussed earlier, that surface hump would increase the exposed surface area of the water and therefore decrease the temperature compared to the surrounding surface water. This thermal effect can be easily seen in the movie as a moving cool region and is easier to view than in individual frames. It is caused by the slight bulge in the surface due to water displaced by the motion of the unknown object. The infrared camera displays a lightly cooler (whitish) area associated with the object and can be seen in Figure 16. This whitish area, the Bernoulli Hump, increases with speed and cross sectional size of the object and decreases with depth. Using this information, the depth of the unknown object can be estimated. The average wave height off the coast of northern Puerto Rico is one to three feet on a typical day. The height of the waves seen in the video are then likely to be this height therefore the Bernoulli Hump seen in the video is also in this range. Consequently, from Graph 2, the maximum depth of the unknown object is in a range from 9 to 16 feet. See Appendix H for additional information.

[19] Haffa and Patton, "Analogs of Stealth," Northrup Grumman Analysis Center Papers, June 2002, p.14

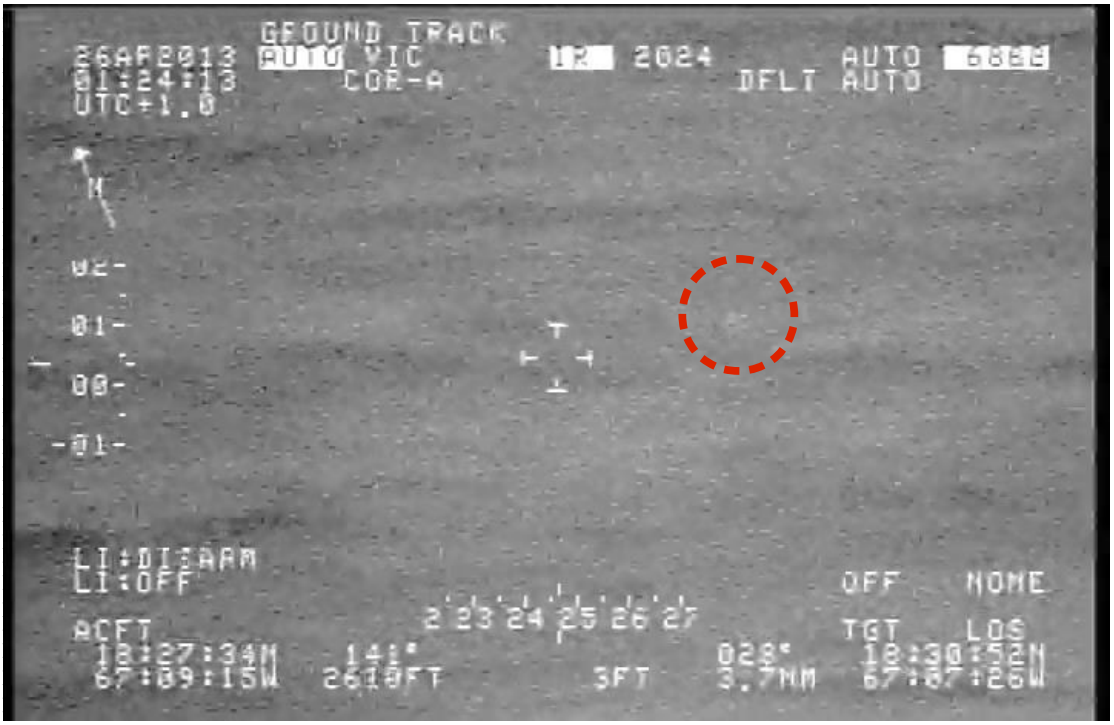
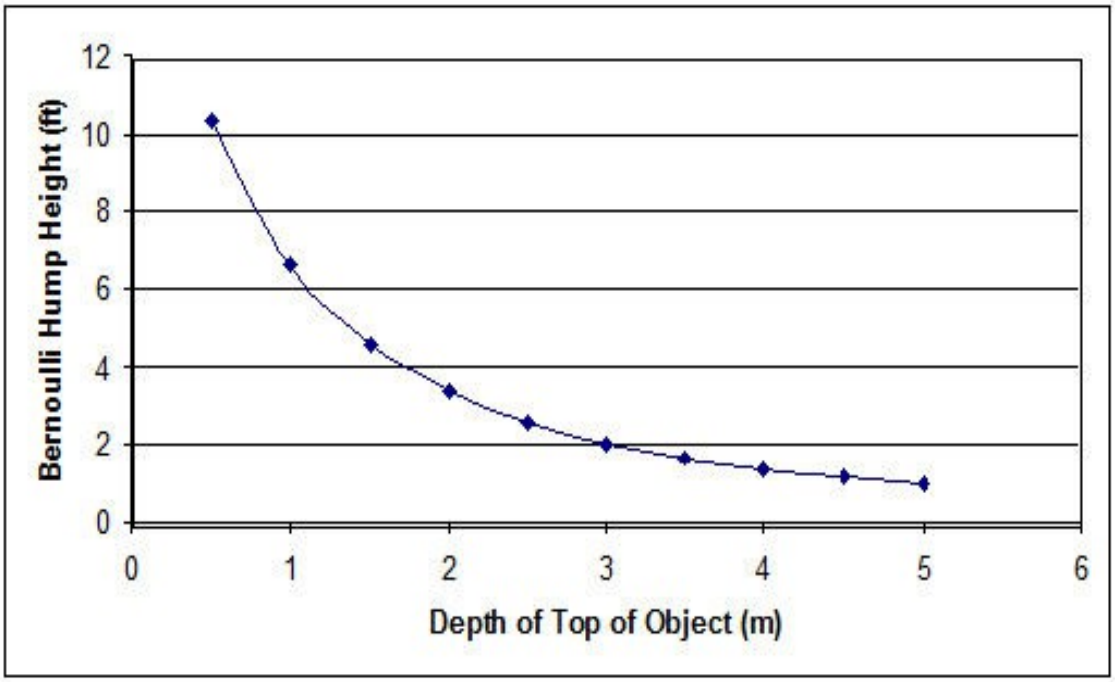


FIGURE 16: Cooler signature of object in frame 3781



Graph 2: Bernoulli hump; height vs depth based on a 3 ft object moving at 83 mph

Object's Interaction with Water: exiting the water Five seconds after the object enters the water at 01:24:18, it re-emerges for about two seconds and either skims along the surface or is only partially submerged. During those two seconds, it is clear that the object's temperature is still hotter than the water around it because it is still a distinct black. It is also clear that there has been no slowing of the object through the water. The object must have some type of power source that maintains its movement through the water as well as maintain its temperature. Figure 17 demonstrates the heat of the object is still present and, as shown in Table 1, the object maintained a significant underwater speed for a lengthy period of time; almost a minute. When the object made its next exit at 01:24:31 hours, it continued to maintain a heat signature on the video.

FIGURE 17: Heat of object indicated by dark color in frame 3937

Object Divides into Two A significant and unusual characteristic exhibited by this object is the moment when the object splits in half. No indication could be found of a second object that joins the first does the video evidence suggest the second object is due to reflection. A careful frame by frame analysis indicates that the object split in half. In less than one second, the object's thermal image doubled in size; its center of heat then became bimodal; the object then split into two halves. The process appeared similar to mitosis observed during cell division with the splitting of the nucleus, the expansion of the cell, and the final separation into two cells. Due to the significance of this event, a considerable amount of time was spent illustrating this segment of the video evidence.

The initiation and completion of the splitting process occurs largely within one second. This second of time was separated into 32 frames (frame numbers 4602 through 4633) allowing the events to be examined every 1/32 of a second. In order to display the object's appearance before and after the split, some of the frames displayed are within the immediate one to two seconds before and after Zulu time 01:24:41 hours.

The object's appearance is illustrated using four approaches. One uses full frame of the video, the second uses frame magnification that enable individual pixels to be seen, the third displays pixel values (0-255) with 0 representing the hottest IR signature and 255 the coldest IR signature, and the last uses a two dimensional contoured surface plot. The frames selected are representative of the ongoing change in the object and are represented as figures ##A through ##H. A few frames were not usable because the system's white screen overlay interfered with the object image.

Table 2 displays the important parameters for each selected frame. The comment section primarily describes the object's pixel distribution.

Frame #	Time	Comments
4563(A)	01:24:39	Typical display. Hotter in center.
4590(B)	01:24:40	Typical display. Hotter in center.
4611(C)	01:24:41	Size of object begins to increase.
4623(D)	01:24:41	Object's internal heat distribution increases uniformity. Center area enlarges.
4631(E)	01:24:41	Object's size continues to increase.
4634(F)	01:24:42	Still one object but interior is exhibiting bimodal heat zones.
4640(G)	01:24:42	Bi-modality of center heat zone is now clear.
4652(H)	01:24:42	There are now two separate objects.

TABLE 2: Frames used in evaluation of object splitting in two.

Figures 18A through 18H are the video frames analyzed. The laser range finder reticle, in white and shaped like four “Ts”, can be seen at the screen center with the object nearby in all eight frames. Figures 19A through 19H are enlargements of the previous frames. These enlargements display the individual pixels making up the object. The object has the darker (hotter) pixels than its surroundings. Figures 20A through 20H are the pixel values positioned in their relative screen centered around the unknown object. The pixel values represent the level of infrared intensity relative to other pixels. The pixel values in the 110-140 range are from the ocean. Those are much cooler values than the object, which are in the lower and hotter range from 10-105. Values >160 that occasionally show up are from the laser range finder reticle, which are the bright white pixels.

Figure 18A: Frame 4563

Figure 18B: Frame 4590

Figure 18C: Frame 4611

Figure 18D: Frame 4623

Figure 18E: Frame 4631

Figure 18F: Frame 4634

Figure 18G: Frame 4640

Figure 18H: Frame 4652

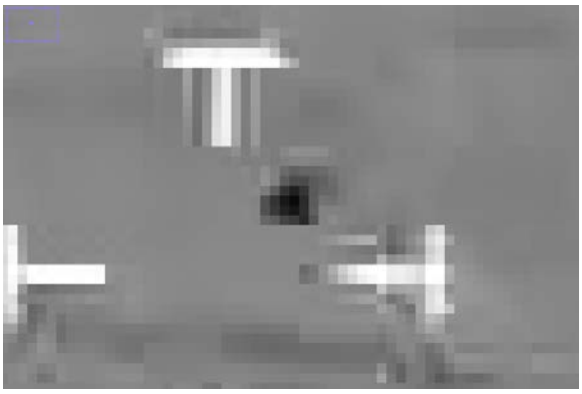


Figure 19A: Frame 4563

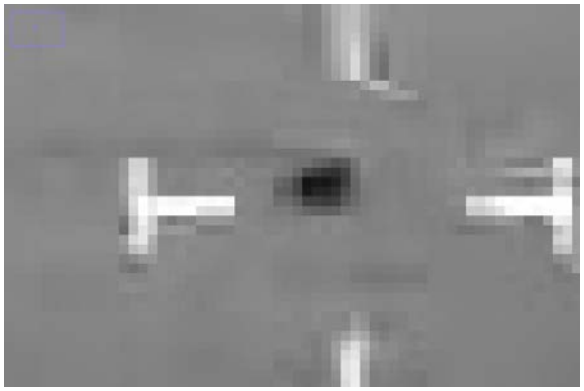


Figure 19B: Frame 4590

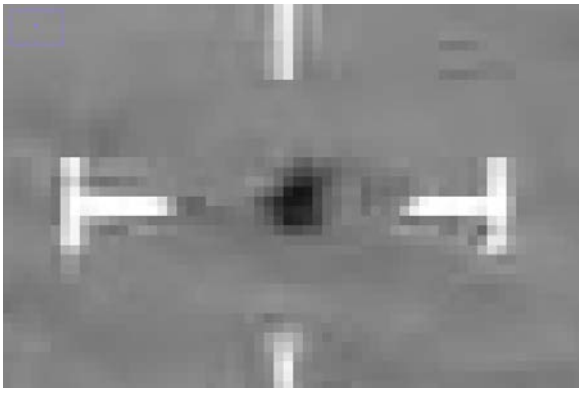


Figure 19C: Frame 4611

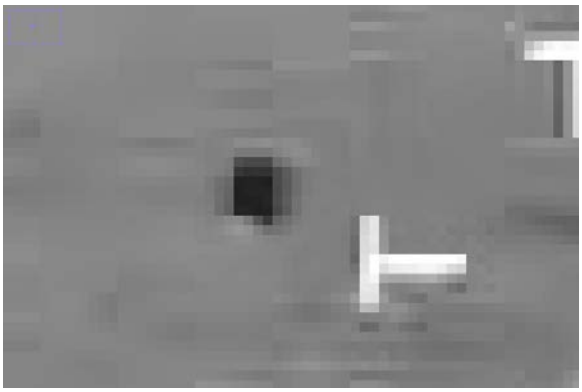


Figure 19D: Frame 4623

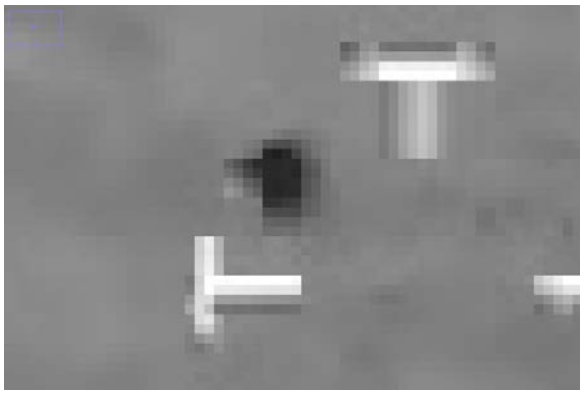


Figure 19E: Frame 4631

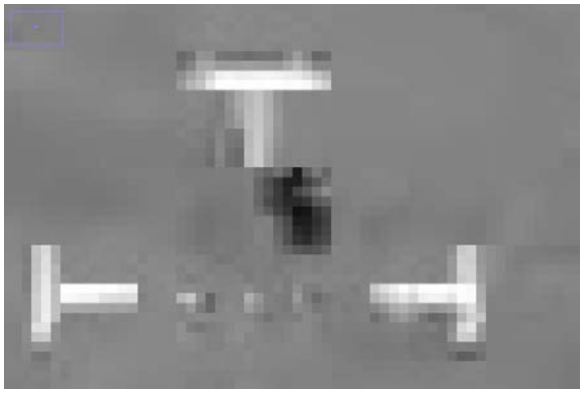


Figure 19F: Frame 4634

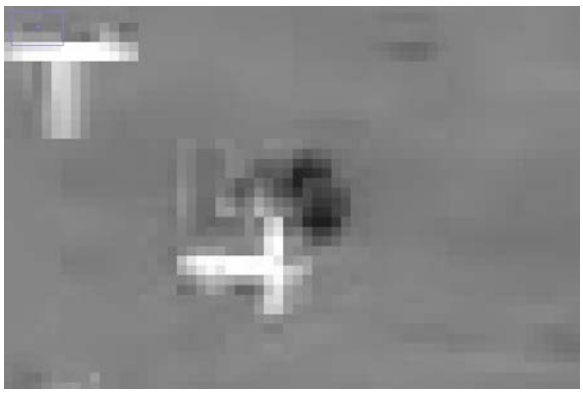


Figure 19G: Frame 4640

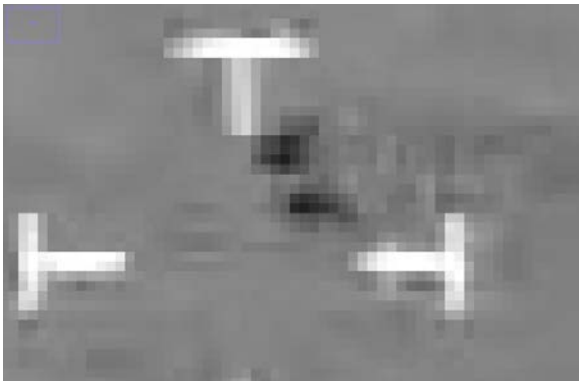


Figure 19H: Frame 4652

To make the object easier to visualize, the pixel values were color coded from the hottest (red = values <31) to the next hottest (orange = values 31-60) to the cooler parts of the object (yellow = values 61-105) all of which are distinct from the cooler areas of the ocean (no color). When white pixels belonging to the reticle were near the object, they were color coded as green. The ranges chosen for each color help visualize the changes in the IR emissions of the object as it split into two halves. The actual edge of the object cannot be discerned in any absolute way. The coloring of the pixels ends at the edge of the number that is closest to the arbitrary value ranges of <31, 31-60, etc. The infrared outline of the object can be seen when there is a significant change in the IR values of the object's periphery compared to the surrounding ocean.

138	129	124	135	143	141	142	141	129
128	128	124	128	130	133	130	130	128
129	142	128	108	97	103	104	107	117
130	147	129	92	76	76	92	98	108
137	124	94	52	33	54	91	102	105
132	82	52	24	11	43	93	115	112
133	82	58	35	23	46	95	130	130
133	104	93	69	60	42	85	131	139
136	136	136	136	136	136	134	134	129

Figure 20A: Frame 4563; normal image about two seconds prior to any change in the pixel.

133	133	134	135	136	140	144	147	142
116	116	116	117	119	123	129	132	136
126	121	114	114	101	95	83	90	115
124	120	104	74	63	53	50	67	109
106	99	73	21	27	24	35	63	102
96	93	72	25	37	37	48	77	101
109	110	97	65	64	60	65	91	108
123	122	114	102	97	95	98	113	118
129	130	127	130	134	132	134	135	128

Figure 20B: Frame 4590; normal image about 2/3 of a second prior to any changes.

129	127	128	134	141	133	126	126	133	134	129
126	128	121	128	132	122	103	97	115	110	113
126	132	128	123	109	95	79	75	89	90	103
133	144	143	132	109	74	52	47	67	85	107
132	134	120	104	82	34	20	25	65	98	115
127	118	92	69	45	24	25	32	71	102	109
120	119	102	82	54	36	42	45	71	102	114
115	114	104	92	66	32	39	48	67	103	121
117	115	110	108	91	77	76	86	89	112	121
117	116	116	117	119	114	114	114	114	115	117
121	120	119	119	119	123	123	124	124	125	125

Figure 20C: Frame 4611; size begins to increase.

129	131	133	139	138	140	143	137	139	138	133
127	128	131	122	122	122	122	131	138	142	139
128	128	123	80	73	73	73	110	122	134	137
130	127	120	55	49	51	51	77	93	112	123
122	113	105	34	35	34	31	76	91	110	122
122	110	101	32	35	36	36	74	90	109	122
124	111	99	32	32	33	37	76	94	114	126
127	110	97	37	36	32	34	71	91	115	126
130	131	137	138	120	86	58	101	112	122	127
134	137	145	151	145	128	113	116	122	128	129
134	135	138	141	141	136	132	129	131	131	129

Figure 20D: Frame 4623; center zone of object expands and the internal heat distribution increases in uniformity.

132	132	132	132	131	123	116	116	120	125	130
131	130	124	119	89	80	78	90	106	117	125
132	128	117	107	38	32	40	68	97	115	126
100	84	61	44	41	39	43	41	85	97	119
114	98	73	58	42	41	43	38	78	90	115
136	122	98	86	42	39	42	42	83	95	114
150	139	114	97	43	39	41	43	83	96	113
130	125	125	125	50	52	59	63	93	101	114
127	125	123	118	77	75	75	74	96	103	114
127	129	126	125	101	98	98	97	113	115	118
128	131	125	125	111	112	114	111	119	116	120

Figure 20E: Frame 4631; object's size continues to increase.

(green pixels due to white reticule)

186	202	165	136	131	133	133	132	129	131	131
129	114	101	114	90	28	95	123	101	129	129
128	102	79	56	30	31	65	87	114	130	129
126	103	85	60	36	69	89	115	140	127	128
125	102	76	59	42	43	53	88	99	123	126
124	111	93	67	50	18	22	53	71	121	125
124	127	129	95	73	29	30	47	65	124	127
123	130	128	102	80	42	36	53	69	126	129
123	131	127	108	81	53	44	65	75	125	130
127	126	127	113	101	89	82	87	101	133	130
126	125	128	120	121	123	128	124	126	129	132

Figure 20F: Frame 4634 at 1/10 of a second after Figure 20E; the center warmer area has become bimodal.

127	123	125	105	91	101	107	116	119	121	123
102	104	100	71	58	75	83	109	116	120	122
88	92	84	36	41	48	61	105	118	116	115
100	79	63	35	70	71	76	98	105	112	118
109	83	73	53	76	64	68	78	92	113	114
138	115	102	81	74	55	57	67	82	115	117
159	132	123	93	62	42	46	69	80	113	115
191	217	94	90	44	31	32	51	100	115	119
203	228	110	119	89	59	62	83	112	121	118
235	255	141	142	110	88	94	108	125	125	122
232	253	141	133	125	126	133	131	135	131	131

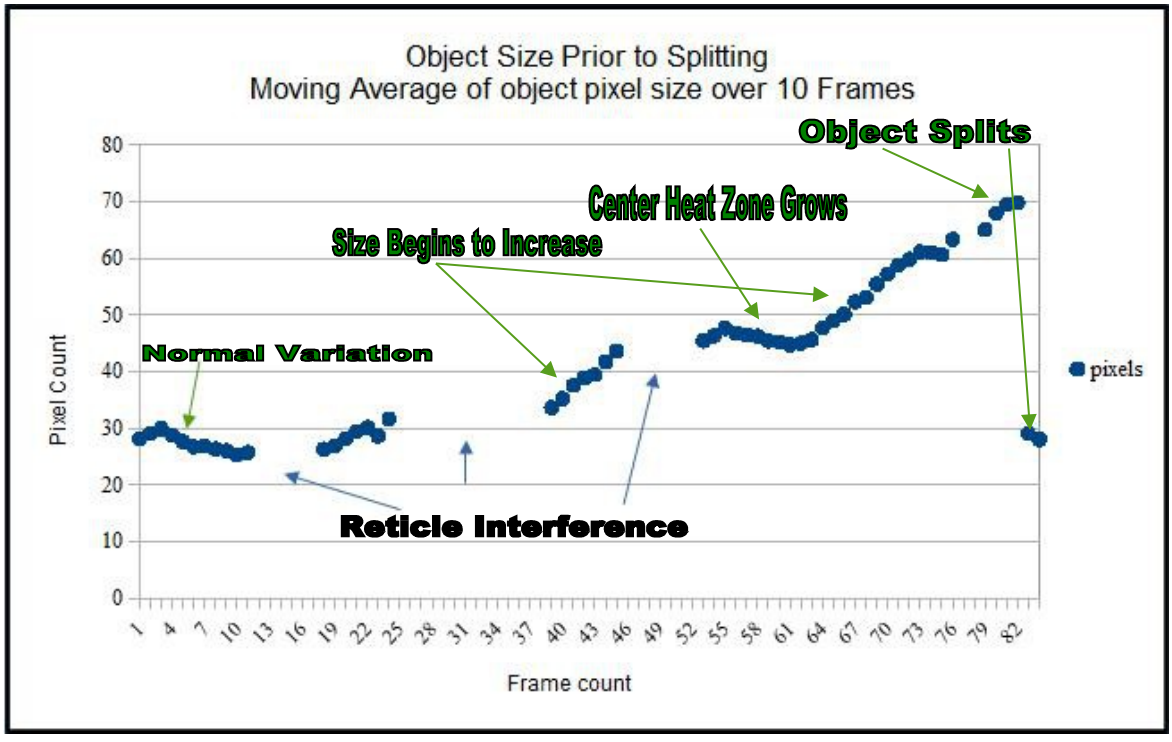
(green pixels due to white reticule)

Figure 20G: Frame 4640 at 1/5 of a second after Figure 20F; interior warm zones are now clearly bimodal and separate.

169	134	130	107	106	101	97	120	124	137	142	131	123
167	132	126	96	92	88	83	122	120	128	133	126	123
113	77	69	44	52	77	99	116	118	121	114	116	118
107	78	72	49	59	81	103	108	117	127	123	123	116
94	63	46	32	55	77	101	111	117	122	121	122	116
114	107	83	67	80	89	111	112	119	127	133	127	125
134	137	119	125	129	112	112	102	116	132	141	125	125
136	133	111	118	108	91	93	97	108	124	133	125	128
136	130	110	103	63	50	58	74	84	101	115	128	127
127	120	110	96	40	32	45	52	66	88	102	131	123
134	131	122	109	96	88	85	95	93	81	88	110	118
136	137	133	123	111	102	97	116	113	104	106	113	118
135	137	135	130	125	122	121	123	123	120	118	114	118

Figure 20H: Frame 4652 is 1/3 of a second after Figure 20G with two objects that are now separated.

The changes seen in these eight frames are representative of all the frames during that same time period. A ten-frame moving average was used to minimize any intrinsic pixel variation and/or subjective judgements as to whether a pixel was or was not part of the object. This change in pixel size is shown in Graph 3. Whenever the reticle cross obscured a significant part of the object then a note to that effect is shown on the graph. Those frames were not used in the calculation of the moving average.



Graph 3: Frame by frame moving average of object's change in size

The last of the four approaches used surface plots from ImageJ software to create a 3-D view. These are displayed in Figures 21A through 21H. Highlighting was done with the LUT feature that provided six shades used to note the IR heat with the bluer (cooler) pixels being represented as hills and the redder (hotter) pixels as valleys. The blue area is the water and the red-orange area is the object with the yellowish-greenish color being a debatable zone of either the object itself or heated areas around the object. The tall pinkish capped peaks seen in Figures 21E through 21H are the effect of the laser range finder reticle image. The size of the area chosen for each frame was kept constant at 13 x 13 pixels so that the change in size, the bimodal heat zone, and the final splitting of the object would be easier to compare across the eight surface plots.

Figures 21A through 21E depict the heat signature consistently seen through the unknown's complete transit. In Figures 21F through 21H a clear representation of the heat signatures can be seen splitting in to two similar parts as depicted in Figures 20 A through 20H.

Frame by frame analysis provides no evidence any pre-existing and independent second object arose out of the water; nor is there any indication that the second object is some type of infrared reflection of the first object. Frame by frame analysis, which was every 1/30 of a second, did not support either possibility.

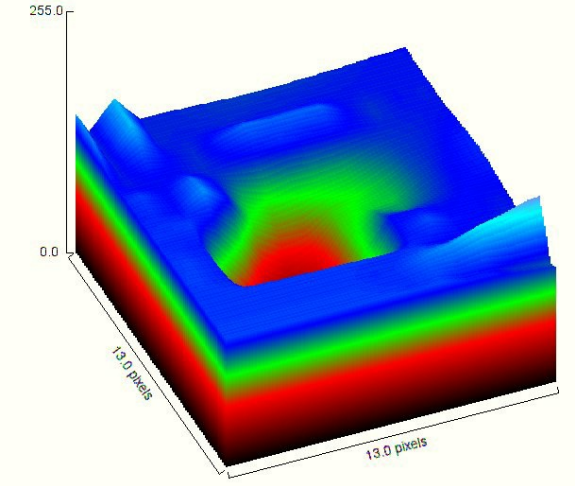


Figure 21A: Frame 4563

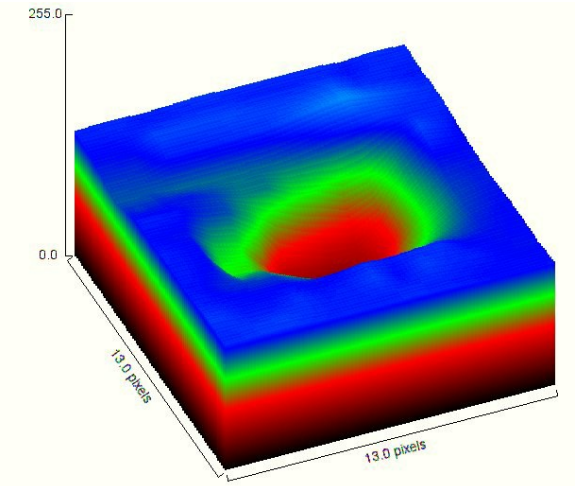


Figure 21B: Frame 4590

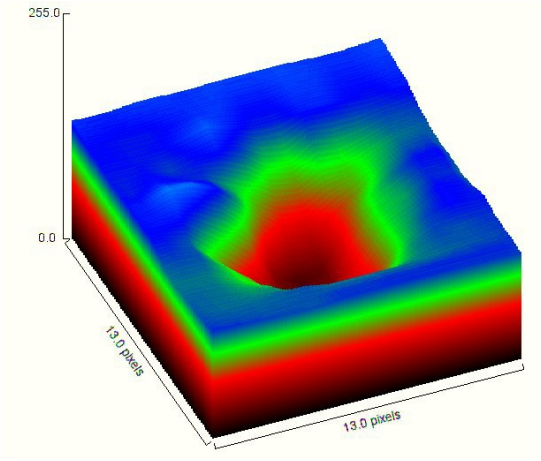


Figure 21C: Frame 4611

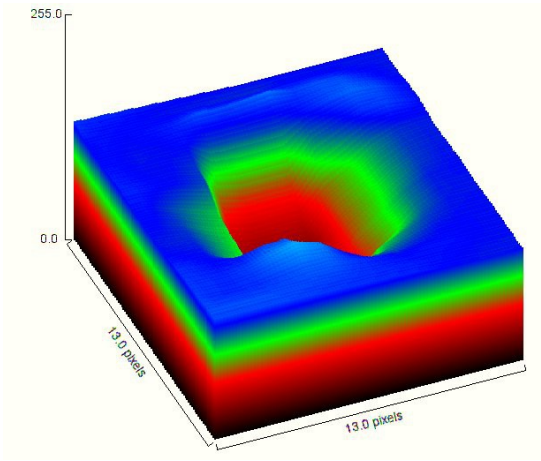


Figure 21D: Frame 4623

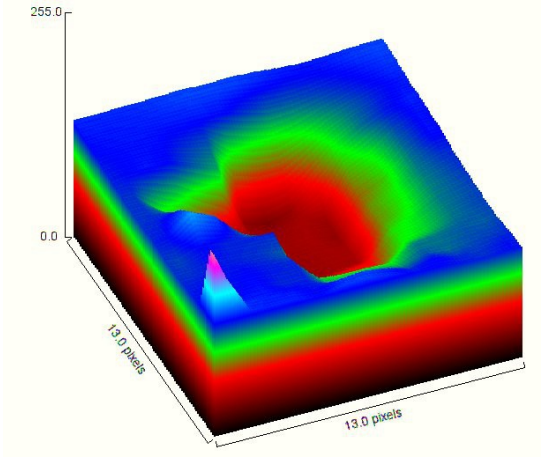


Figure 21E: Frame 4631

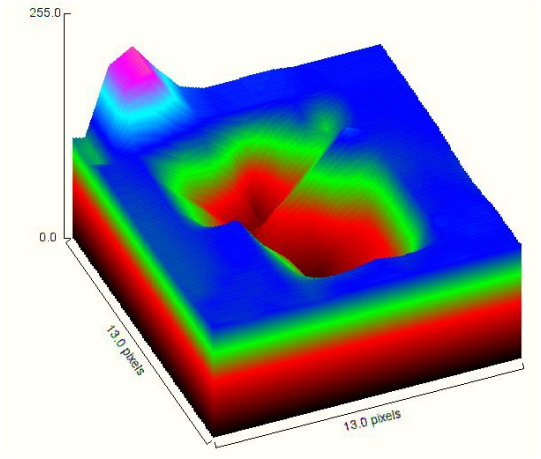


Figure 21F: Frame 4634

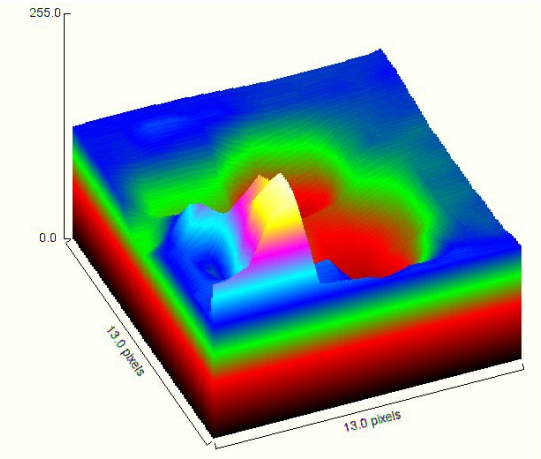


Figure 21G: Frame 4640

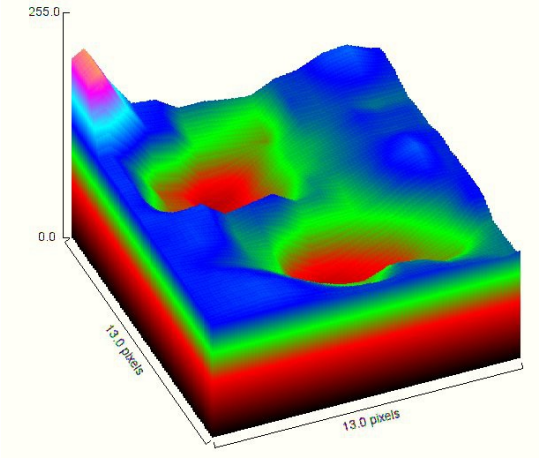
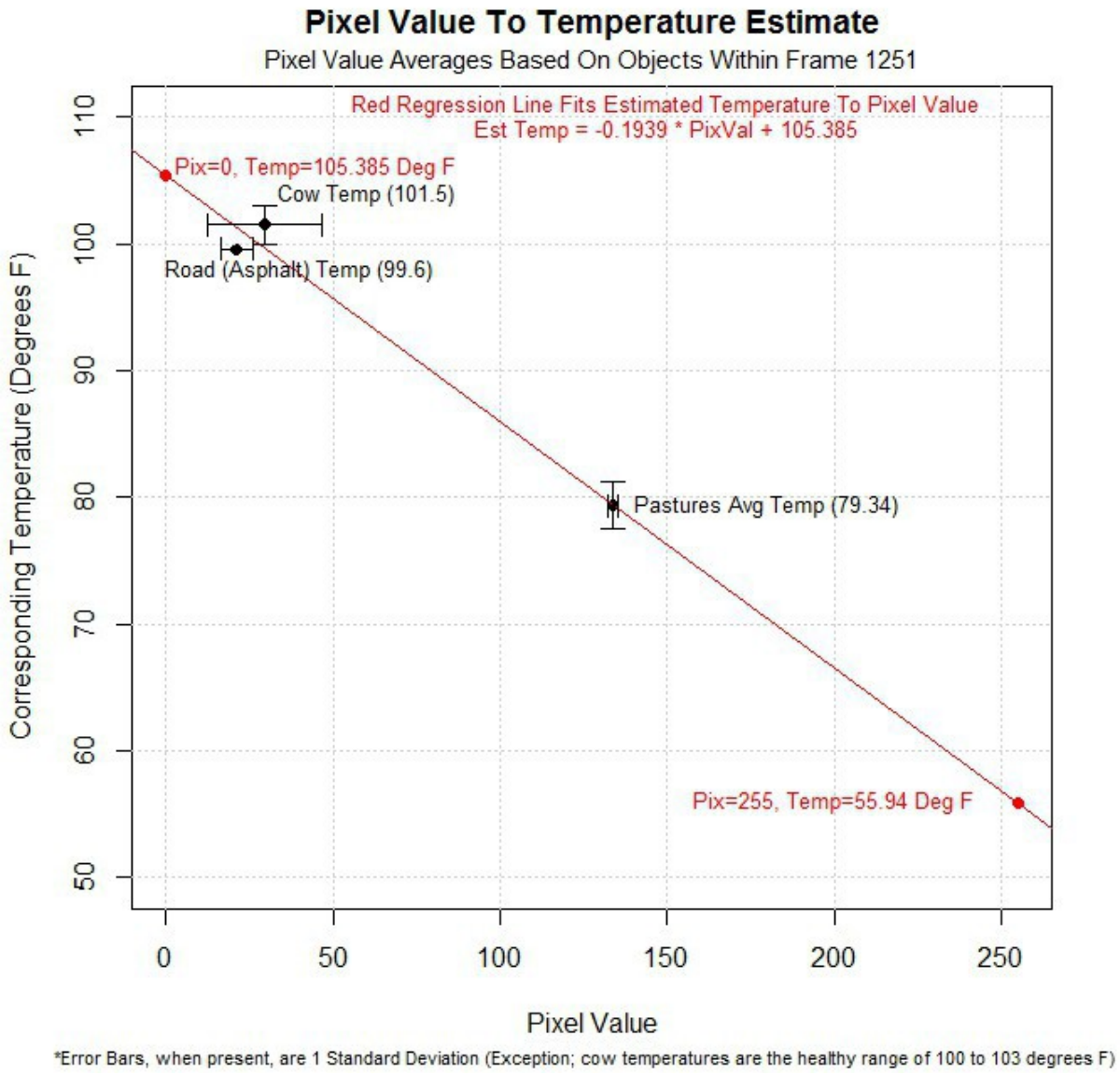


Figure 21H: Frame 4652

Power Source The unknown in the video displayed qualities and behaviors that require some type of power source. Over the course of more than four miles the object reached speeds of greater than 110 mph, made multiple changes in direction, accelerated and decelerated, maintained a temperature significantly greater than the ambient air temperature, entered and exited the ocean at speeds of over 100 mph, and finally split into two parts. The unknown object in the video clearly generated heat which statistically remained near its center with its outer areas at a lower temperature. The heat generated is usually much less than what is seen in the video from jet engines and automobiles. There is no exhaust plume or any other indication of an ordinary aircraft power source. It is also evident the unknown object generates more heat than the ambient air and continues to maintain its heat signature after submersing in the ocean and re-entering the air. These actions and characteristics cannot be achieved without some power source.

It was possible to determine approximate temperatures of the object. The thermal video contains gray scale pixel values between 0 to 255 where 0 is the hottest and is represented by 'black' while 255 is the coldest and is represented by 'white.' Using ImageJ software, the heat signature of the individual pixels comprising the object could be compared. This type of display has already been shown in Figures 20A through 20H where the object's lower IR pixel values of 10-60 in the object's center represent a hotter temperature than the ocean water's pixel values of 115-140, which represent an ocean temperature of about 79 to 83 degrees during April off the Puerto Rican coast. While we have the temperature of the ocean and its corresponding pixel values, for these particular frames with a single known temperature, we can only state that the object's pixel values of 10-60 is warmer than 79 to 83 degrees. Other portions of the video have been analyzed where objects such as cattle, roads and pastureland are in the same frame and enable the establishment of temperature reference points that permitted the temperatures of the object to be estimated. In Frame 1251, time stamped 01:22:49 hours in the video, the unknown object can be seen as well as cattle, an asphalt road, and a pasture. The temperatures of the latter two could be determined based on their natural characteristics and known cooling rates while the skin temperature of cattle is a known value. The details of this analysis are discussed in Appendix K. Graph 4 displays the temperature values vs. the pixel values using the three known temperatures in Frame 1251. The eight center pixel values of the object vary from 0 to 8, which on this graph equates to a temperature of 105 degree Fahrenheit assuming that the thermal video distributes the 255 pixel values linearly. If not then the temperature would be greater than 105 degrees. The sixteen pixel values surrounding those are slightly cooler with pixel values ranging from 16 to 96. Those temperatures range from 103 degrees to 87 degrees.



Graph 4: Temperature distributions in Frame 1251 at 01:22:49 hours.

A similar but less exact observation can be made by viewing the video from 01:22:33 to 01:22:36 during the time that the object is crossing in front of the airport's tarmac. In those frames the object's inner temperature is represented by pixel values from 1 to 23 and its outer temperature pixel values from 6 to 79. The tarmac registers a cooler temperature with pixel values of 100-115. There is no question that the object's temperature is significantly above the ambient and its center zone is usually hotter than its outer areas. Whether the object's warmest temperature is only 105 degrees Fahrenheit or hotter cannot be determined without knowing the specific algorithm used by the manufacturer of the thermal video which controls the video's pixel values.

Maneuverability The object's ability to maneuver at speeds of 80-100 miles per hour at low altitude is of interest. A notable characteristic of the object is its apparent tumbling as it moves through the air. This tumbling appearance ends prior to the object's entry into the water and as it moves through the water. At 01:23:37 hours in the video the object can be seen to disappear behind a tree momentarily, placing its altitude at below 40 feet. The ability to fly at that altitude at night and between trees requires precise control and a highly responsive propulsion system particularly given the apparent lack of control by aerodynamic devices (like wings). In terms of current technology, advanced GPS satellites and sophisticated vision pattern recognition in communications with an on board microprocessor might partially explain such maneuvers. More difficult to explain would be the willingness of any government or organization to expose this capability by traversing a residential area where malfunctions during flight could result in harm to the civilian population as well as compromise an advanced military technology.

IV. DISCUSSION AND CONCLUSIONS

Summary The authors of this paper received this video in October of 2013 and have spent more than a year and a half composing this report. Hundreds of hours of work has been spent in gathering information and analyzing the video, radar data, witness claims, and other information related to this event that took place in northwestern Puerto Rico on April 25, 2013. Additionally, our efforts took into consideration protection of the witnesses' identity; it is unfortunate that stigma often accompanies the reporting of what is commonly termed a UFO/USO, but what we have referred to as an UAP. It is hoped that the work that went into this report will inspire future work in the identification of any phenomenon that displays unusual technological capabilities.

We believe that there is sufficient information in the video to characterize this object as: three to five feet in size; the shape is circular to oval but changes; air speed varies from 70 to 120 mph; capable of changing direction; internal temperature of about 105 degrees Fahrenheit usually in the center of the object and exterior temperatures above the ambient air temperature; capable of traveling at low altitude through a residential area; able to enter the water with no obvious splash or impact; underwater speed varies from 39 to 95 mph; ability to exit and re-enter water; and the capability of splitting into two independent parts that appear to be the same size as the original object based on its infrared signature.

Examination of Possible Explanations Entire classes of animals and man-made objects may be eliminated by comparison of properties attributed to the unknown object. The most likely explanations of the unknown object are discussed here.

Examination of Possible Explanations: Hoax One of the first possibilities examined was that of a hoax. The authors of this report spent hundreds of hours in review of the video, detailed review of over 5,000 individual frames and that included pixel level enlargements. During all of this analysis there was never any indication of pixel manipulation. The background in the video corresponds, in extreme structural and geographic detail, to

hundreds of square miles of the actual location. Every on-screen GPS position corresponded to real locations verified by satellite images. Additionally, the location, date and time stamps of independent radar data verified the locations, dates and times of the aircraft taking the video. As noted earlier in this report in the section labeled “Radar Analysis---Verification of Thermal Imaging Video Information,” the radar data supports that there was an aircraft at the exact time and location indicated on the full three minutes of the video and the radar data verifies the pilot's claim that he flew a circle around the base before continuing on his standard surveillance mission along the Puerto Rican coast. The possibility of a hoax is therefore considered extremely unlikely.

Examination of Possible Explanations: Any Lighter Than Air Devices (Not Powered)

The possibility that the object in the video was a balloon or any other windblown object is discussed next. The appearance that the object is tumbling is a main attraction of the balloon theory. Although it is difficult to give this serious consideration, as mentioned previously there was a poor quality copy of this video released on the internet that caused a lot of speculation with the leading explanation being a balloon carried by the wind. The balloon theory posits that a balloon was basically stationary and the movement seen in the video was actually that of the aircraft as it moved in a semi-circle around the balloon. There are multiple reasons why the object in the video cannot be explained as a balloon and they are listed as follows:

1. The object's speed was too great. The actual path of the object was derived in the section of this report labeled “Object Path.” Based on portions of the video where the approximate altitude of the object is known, it was straight forward to calculate the speed of the object which approached 120 mph at times. The wind speeds were 8-13 mph out of the east at ground level and 12-18 mph out of the northeast at elevations of 400 to 3200 feet---much too slow to support a balloon explanation.

2. The object changed directions multiple times, which cannot be explained by a balloon with winds out of the east or northeast. The pilot saw the object traveling from north to south and the video also confirmed that. The object then turned east into the wind then headed back north towards the ocean. Multiple directional changes cannot be explained by a balloon.

3. Temperature information from the thermal video indicates that the object was hotter than the ambient and the center of it was near 105 degrees Fahrenheit with a cooler exterior. A balloon would be near ambient temperatures and there would not be the large temperature gradient as seen in the unknown object. Chinese lanterns would not display the area of heat seen in the video nor could they continue to burn underwater nor could they split into two parts while maintaining the same speed well in excess of the wind.

4. The object impacts the water, and this is clearly seen when analyzing the video frame by frame. The object disappears into the water, travels underwater at an average speed of 82.8 mph then exits back into the air. Prior to impacting the water and after departing the water, the object's heat signature was still present. A balloon or Chinese lantern cannot enter water and stay underwater due to its buoyancy, and it certainly cannot maintain a temperature hotter than the ambient during the process.

5. The splitting of the object into two parts also eliminates a balloon as a possibility.

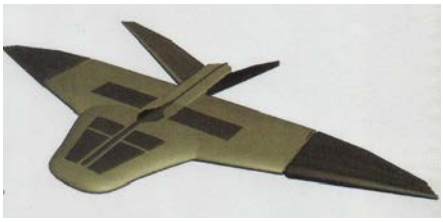
6. Line of sight movement seen during the video based on the latitude/longitude of the CBP aircraft eliminates any possibility of the object being a balloon. Some arguments have been advanced that the motion of the balloon relative to the background is an illusion created by the motion of the plane circling the balloon. This argument is not valid since the object can be seen moving behind background objects. Further, angular analysis reveals that a balloon, traveling at 15 mph, could be no farther away than 1520 feet from the plane. Using the on-screen GPS data across frames, this relatively short distance creates major line of sight inconsistencies.

The authors of this report do not consider a wind-blown object as a reasonable explanation for the object in the video due to speed characteristics, directional changes, temperature, buoyancy issues in water, splitting into two parts, and line of sight issues related the movement of a windblown object.

Flying Animals One possibility that is supported by the object's temperature is the possibility of some species of large fast flying bird. This could explain the ability to maintain a temperature above the ambient, the capability to dive into water, and the ability to change directions. The key to a "bird explanation" is the ability of a bird to fly continuously, without diving, at an average speed of about 80 mph, maximum speeds of up to 120 mph, and the ability to dive into water at high speed. There are three large birds capable of sustained horizontal speeds of 80 mph: the golden eagle, the grey-headed albatross, and the peregrine falcon. The golden eagle is about three feet tall with a wingspan of 6-8 feet and its average horizontal speed is 28 to 35 mph with a maximum horizontal speed of 80 mph. It does not live near dense populations of humans and is not native to Puerto Rico. The grey-headed albatross is almost three feet in size with a 7 foot wingspan and has been recorded flying horizontally for eight hours at 79 mph with a South Atlantic tail wind. This albatross is native to the colder areas of the South Atlantic and South Pacific near Antarctica. Lastly, the peregrine falcon does visit Puerto Rico during the winter. Its body is one to two feet in size and it has a three foot wingspan. Although it can dive at extreme speeds, its average horizontal speed is 40-56 mph with a maximum horizontal speed of 65-68 mph. None of these birds, along with being native to the area, fits all the characteristics of speed and size of the unknown object. Nor is there ever any indication of flapping wings during this three minute video, which would be expected over that period of time especially when making directional changes. Additionally, none of these birds are capable of moving underwater at a speed of 95 mph. The fastest swimming bird is the Gentoo penguin at a paltry 22 mph. There is no type of flying animal that can mimic the object seen in the video.

Aircraft Including Drones An explanation worthy of consideration would be some new type of military drone that is perhaps launched from an ocean platform such as a ship or submarine. The size of the object at three to five feet fits into the drone category as does its speed through the air. Currently the Navy is working on a drone capable of traveling in water and air. "The goal is to basically fly as an airplane, splash down and become a submarine,"

according to an aerospace engineer at the Naval Research Laboratory.[20] With both flying and swimming characteristics, it is referred to as a Flimmer. The current model can fly at 68 mph and a swimming speed that has not yet been tested. It is reasonable to suspect that the Navy's current capabilities exceed what is released to the public. It may be within our current technological capability to build a drone that can match the air and water speeds of the object in the video. Although the splash seen in the photo is quite large, there are torpedoes capable of minimizing their interaction with water and it would not be unreasonable to suspect that the same capability might be possible with an advanced drone. This could potentially explain the speed, movement capabilities over land, underwater movement, and the seeming lack of interaction with the water on impact.



Rendition of the Navy's new Flimmer (fly and swim)

Early Flimmer model splashing into the Potomac

Still to be explained is the thermal heat signature of the object and its ability to split in half. There is no indication of the power sources that would be expected with the familiar types of drones or an air/water drone such as the Flimmer. Any type of internal combustion engine, jet engine or rocket would have been consistently detectable by the thermal imaging system as seen with the automobiles and jets on the tarmac. This characteristic eliminates a drone such as the Flimmer. However, the absence of any comparable heat signature could be addressed by some type of drone more similar to an artillery shell than an aircraft. It is conceivable such a projectile could change direction multiple times after launch and perhaps that is related to the apparent tumbling action. It might even be possible for such a projectile to enter the water with very little impact. As mentioned before, there are missiles and torpedoes designed with that capability. An advanced drone without a power source and that is launched could explain the changes in direction, low altitude maneuverability among trees if equipped with advanced vision/GPS/navigational technology and the ability to impact water with very little disturbance. But a non-powered drone cannot explain the increases and decreases in speed that occur multiple times during the object's flight, the ability to enter and leave water, nor can it explain the ability to split into two parts. Lastly, a drone powered by a lithium battery or low temperature fuel cell might be able to fly with a minimal heat signature. A lithium powered torpedo has traveled at over 50 mph underwater.[21] The military has published aerial drones such as the Wasp III with speeds of 40 mph so it would expected that classified battery powered military drones might reach speeds in the air of 100 mph. It might be possible that a new drone has been developed that can travel in water and air at the speeds of the object in the video. Still, this leaves two capabilities that such a drone would need to match the characteristics of the unknown object: the ability to move in and out of water at high speed; and the ability to split into two parts with both sections capable of independently

[20]Signal Magazine, "Fast-Flying Flimmer No Underwater Fluke". December 1, 2014.

[21]DCNS Jan. 23, 2013. http://en.dcnsgroup.com/news/a-torpedo-powered-by-a-lithium-ion-battery-breaks-speed-records-in-complete-safety/

traversing through air and water.

Careful consideration has been given to the “drone theory” but the authors do not believe that it is a sufficient explanation of what was seen in the video. There are four arguments against a drone as a possible explanation. The first; the authors' question that an advanced drone would be tested at night over civilian areas where there is possible exposure of advanced technology and the risk of loss of the drone when the same testing could be safely achieved over a military operating area. It is also difficult to believe that our military would accept the inherent safety risks of flying a drone across airport runways at low altitude with commercial jets active on the tarmac. Second is the ability of the object to maintain a high speed, even accelerate, underwater, along with the ability to move back and forth between air and water. Third is the appearance of the object in the video; there is nothing in the video to indicate the presence of any type of wings. Lastly, which begs explanation, how one drone splits into two distinct drones of the same size as the initial drone.

Commercial or military aircraft larger than 8 feet are summarily dismissed as impossible given the maximum size of the unknown object as well as some of the same arguments listed in the previous paragraph.

Recommended Actions Further examination and study of this video is warranted as well as collection of additional information. There are remaining questions. Are there additional videos from the Puerto Rico area from other dates in the possession of the CBP as claimed by the anonymous source discussed earlier? Could the FAA provide copies of the Tower logs? Could the military provide radar from the radar facility located at the airport?

Efforts should continue to enlist professional and academic help for work already done as well as suggestions for further research into this video. There remains more follow up that can be done on the software algorithms used in the infrared video system. We should continue efforts to obtain technical manuals for this equipment. What cannot be gleaned from technical manuals that we may or may not obtain, we should attempt experimental projects to determine the visual and measurable limitations of this camera's infrared technology.

Methodologies need to be developed and refined to measure, within this video, object altitudes, angular and absolute velocities and acceleration both in the air and underwater. These accelerations need to be compared to the object temperature fluctuations to determine any correlations. This will help determine any possible relationship between the heat emitted by the object and its motions. Means of measuring the curvature (sharper turns) in the path of the object should be explored.

Conclusion The study of unknown anomalous phenomena often referred to as UFOs usually carries with it many negative connotations. This negativity has often been brought about due to claims of aliens and little green or grey men in our midst. These types of claims are then further dramatized and stigmatized in the media. This stigma prevents the type of open minded evaluation of aerial phenomena that needs to be undertaken. It is this stigma along with the fact that this object could be labeled a UFO and a USO that we choose instead to refer to this as an Unidentified Anomalous Phenomenon. This bypasses the arguments and instead focuses on the fact that it does not fit any logical classification commonly used.

Logically, there should be nothing negative associated with the study of a video that displays an object that appears to be capable of movements not readily explainable by current technology. If others can establish a plausible explanation that reasonably accounts for the characteristics of the object in this video, then so be it. But any explanation must be supported by a detailed report and not assertions or what-ifs. This video is the best documentation of an unknown aerial and submerged nautical object exhibiting advanced technology that the authors of this report have seen.

V. ACKNOWLEDGEMENTS

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Refer to Appendix A for author biographical information.

APPENDIX

APPENDIX A

Author Acknowledgements

Robert Powell has a B.S. in Chemistry from Southeastern Oklahoma State University. He has 28 years experience in engineering management in the semiconductor industry. While working at Advanced Micro Devices he took numerous internal courses related to device physics, design of experiments, and statistical analysis. He helped the company develop its first flash memory technology used in today's flash cards. His experience includes managing a state-of-the-art chemistry laboratory and managing a Research and Development group that worked on nanotechnology using atomic force microscopes, near-field optical microscopy, and other techniques. Mr. Powell is also a co-holder of four patents related to nanotechnology. He has held the position of Director of Research at MUFON (Mutual UFO Network) since 2007 and is also the head of MUFON's Science Review Board. He is a member of the National Space Society and the Society for Scientific Exploration.

Morgan Beall has a B.S. in Earth Science from Frostburg State University. He has worked in the field of environmental consulting and OSHA/EPA regulations for the last 12 years. He has learned and developed team building skills and discipline both in the classroom and in the university athletic program. Mr. Beall has been a MUFON field investigator since 2009 and has had vested interest for many years in the investigative field of the UFO phenomenon. He has conducted many investigations throughout Florida both privately and publicly through MUFON. He is currently the MUFON State Director for Florida, a MUFON STAR Team investigator, and has held held many project management positions within the MUFON organization.

Larry Cates has a B.S. in Mathematics from Jacksonville University. He has 40+ years of programming experience; systems analysis, application and hardware development. He did statistical work for Florida Health and Rehabilitative Services which included design of statistical methods and setting up data analysis queries. Mr. Cates has investigated and researched the UFO phenomenon for over eight years including fielding investigations and analysis of radar data.

Carl Paulson has a B.S. *magna cum laude* in Physics and spent four years working on a PhD in Physics at New York University's Dept of Physics Graduate program. He previously served four years in the United States Air Force. During his career he designed power systems for the Tokamak fusion reactor at the Princeton Plasma Physics Laboratory and then worked for Grumman Aerospace in their Advanced Energy department located at Princeton. This work led to similar positions at Northrop-Grumman and Lockheed Martin. Simultaneously, Mr. Paulson provided the physics designs for multiple linear accelerators. Those designs included the entire CWDD linear accelerator at Argonne National Laboratory and portions of the BEAR accelerator which was placed and operated in space. He is a MUFON STAR Team investigator and is a member of the MUFON Science Review Board.

Richard Hoffman has a B.A. in Organizational Communications from Wright State University. He is an Information Technology consultant and strategist. He has been a defense contractor for over 20 years working primarily for the Army Materiel Command HQ with a variety of companies. Currently, Mr. Hoffman is a Senior Engineer supporting the U.S. Army Materiel Command HQ at Redstone Arsenal in Huntsville. He has 51 years of experience as an investigator, researcher, writer, and presenter on the subject of the UFO phenomenon. He

was one of the first to join MUFON in 1969 and is currently the MUFON STAR Team Manager as well as the State Director for Alabama.

Daina Chaviano has a B.A. in English Language Translation from the University of Havana in Cuba. She began her career as a literary and cultural consultant. While in Cuba she published several fantasy and science fiction books and became the best-selling author in both genres in the island's history. She has lived in Miami, Florida, for the last 23 years and has won several international literary awards. Her works have been translated into 30 languages.

10.5281/zenodo.7837470

APPENDIX B

WESCAM Model MX-15D

10.5281/zenodo.7837470

MX™-15D

WESCAM's MX-15D. Fully Digital. High Definition.

An Extreme Multi-Sensor, Multi-Spectral Targeting System in a single LRU configuration.

Ideal for: Medium-Altitude; Covert Intelligence, Surveillance & Reconnaissance, Armed Reconnaissance, CSAR, Target Designation

Airborne Installations: Fixed-Wing, Rotary-Wing, UAV

FEATURES & BENEFITS: MX-15D

Weight-Optimized System
- 113 lb turret
- Electronics unit inside the turret
- Built-in GPS receiver

Interface Flexibility
- Simultaneous SMPTE HD digital & analog (NTSC or PAL) video outputs
- 720p or 1080p HD video
- Supports all standard MX-Series command & control, moving map, radar & searchlight interfaces
- Wide range of electrical interfaces: ARINC 429, Ethernet, MIL-STD-1553B, RS-422/232

High Resolution Imaging
- <5 microradian stabilization minimizes platform-induced image degradation
- Individually optimized optics to maximize performance in each sensor
- MX-Series steering eases workload & ensures steady high magnification video

Sensor Flexibility
- 10 sensor payload
- Delivers 6 separate digital imaging modes & 4 discrete laser capabilities
- Precision zoom low light & HD color optics for situational awareness
- Long range low light, HD color & short wave IR (SWIR) spotter optics for day and night positive target ID
- Laser illuminator, dual mode rangefinder/ designator & spot tracker
- Multi-FOV 640x512 mid-wave IR with option for 1280x1024 High Definition mid-wave IR

Short Wave IR Imaging
- Enhanced haze penetration & target contrast
- Laser spot imaging

Advanced Image Processing
- 14-bit IR and 12-bit EO digital cameras
- Advanced image processing on all sensors improve haze penetration, feature recognition & identification
- Image blending

Consistent Targeting Accuracy
- Simple integration
  - Built-in IMU, GPS & MX-GEO software
  - Connect to GPS antenna
  - Automatic alignment to aircraft
- High target location accuracy
- Automatic video & GEO tracking
- Full laser stabilization minimizes spot jitter
- Internal isolator minimizes vibration-induced boresight shifts
- Operationally proven precision target designation

Ruggedness and Reliability
- MIL spec environmental & EMC
- Sealed heat exchanger does not degrad stabilization
- Built-in vibration isolation protects internal payload components
- High fielded reliability for intense op tempo ISRT applications

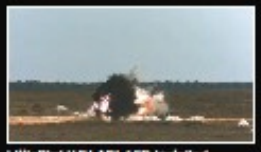
See our products in action on YouTube Search:
- MX-15D Product Video
- MX-Series Product Video

wescam.com

Previous Description, MX-15Di

L3 WESCAM

Product Enhancements:
- 10 Sensor Payload Capability



LittleBird UAV: MX-15D Installed

WESCAM's EO/IR/Laser Systems

10.5281/zenodo.7837470

MX-15D

PAYLOAD SPECIFICATIONS - SELECT UP TO 10 IMAGING & LASER SENSORS

Sensor Options for Thermal Imager

Sensor #1a - **Thermal Imager:**
Type: 3-5µm staring array
Fields of View: 26.7°, 5.4°, 1.1°, 0.36°

or

Sensor #1b - **HD IR:**
Type: 3-5µm staring array
Fields of View: 35.5°, 9.4°, 1.9°, 1.3° 720p & 1080p
Resolution: 1280 x 1024

Sensor #2 - **Daylight Continuous Zoom TV:**
Type: 5 Megapixel Color HD
Fields of View: 36.3° to 1.1° - 720p
27.6° to 1.6° - 1080p

Sensor #3 - **Lowlight Continuous Zoom TV:**
Type: Electron Multiplied CCD (Mono)
Fields of View: 40.8° to 2.38°

Sensors #4 & #5 - **Laser Designator/Rangefinder:**
Laser Type: Diode Pumped - Nd:YAG/OPO (Class 4)
Wavelenght: 1064nm/1570nm Selectable
Code Compatibility: US & NATO Laser Guided Munitions
Range: Up to 20km
Range Resolution: ±2m

Sensor #6 - **Laser Illuminator (LI)[1]:**
(Used in conjunction with Sensor 3)
Laser Type: Diode - (Class 4)
Wavelength: 860nm
Modes: Continuous, Pulsed
Beam Divergence: Narrow or Ultra Narrow

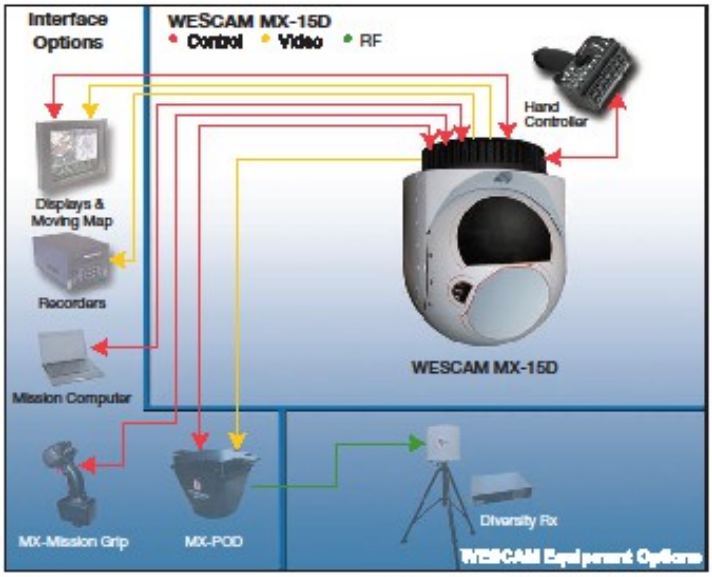
Sensor #7 - **Daylight Spotter TV with Triple Channel Spotter Lens:**
Type: 2 Megapixel Color HD
Fields of View: 0.37° 720p
0.55° 1080p

Sensor #8 - **Lowlight Spotter TV:**
(Requires Sensor #7)
Type: Electron Multiplied CCD (Mono) 640 x 480
Fields of View: 0.37°

Sensor #9 - **SWIR Spotter TV:**
(Requires Sensor #7)

Sensor #10 - **Laser Spot Tracker**
Type: Quadrant Detector
Wavelength: 1064nm
Code Compatibility: US & NATO Laser Guided Munitions

Note:
• Consult factory for Analog Video specifications.



Equipment described herein may require Canadian and/or U.S. Government authorization for export purposes. Diversion contrary to Canadian and/or U.S. law is prohibited.

SYSTEM SPECIFICATIONS

MX-15D Turret
<113 lbs / 51.4 Kg (all sensors)
16.5"(D) x 19.75"(H)
419mm (D) x 495mm (H))

Power
MIL-STD-704E, 280W - 430W (Avg.) 1000W (Max.)

Hand Controller Unit (HCU)
2.2 lbs / 1.0 Kg
4.25"(W) x 8.97"(L) x 3.00"(D)
108mm (W) x 228mm (L) x 76mm (D)
Powered by turret; 5W (Max.)

Cables
Consult factory for available variants

Environmental
MIL-STD-461, MIL-STD-810

TURRET SPECIFICATIONS

Line-of-sight Stabilization
Typically <5 µradians
Consult factory for performance under specific vibration conditions.

Stabilization and Steering
(2) Axis Inner (pitch/yaw)
(2) Axis Outer (azimuth/elevation)

Vibration Isolation
(6) Axis Passive (x/y/z/pitch/roll/yaw)
AZ/EL Slew Rate: 0-60°/sec
Azimuth Field of Range: Continuous 360°
Elevation Field of Range: +90° to -120°

MCU STANDARD INTERFACES
6 Simultaneous EO/IR Digital and Analog Video channels; 1080p configurable for 720p,1080I, 525I & 625I digital options
MX-Hand Controller

OPTIONS AVAILABLE

Interfaces Types:
RS-232
RS-422
MIL-STD-1553B
ARINC 429
Ethernet

Functional Interfaces:
Moving Map
Remote Control
Searchlight
Radar
Microwave/Data Linkz
Aircraft INS/GPS
Metadata

Controller:
MX Mission Grip

Microwave Equipment:
MX-POD, Digital Transmitter
Diversity Rx

WESCAM has a policy of continuous product improvement. Specifications are therefore subject to change without notice.

642996 / July 2012

Inquiries: 1 800 668 4355
sales.wescam@l-3com.com

APPENDIX C

FOIA Requests and Replies

10.5281/zenodo.7837470

1.0 Initial Letter - Investigator Larry Cates Letter to USAF Regarding 84 RADES

Email to: acc.foia@langley.af.mil
11/04/2013

Dear Sir or Madam:

This is a request under the Freedom of Information Act. I am willing to =
pay up to $50 for this request for the cost of
duplication. If fees will exceed this amount, please contact me first.

This request is to the 84 Radar Evaluation Squadron (84 RADES) for all =
primary and secondary(transponder) surveillance
radar information related to the continuous time period of 23:00hrs Zulu =
Time on April 25, 2013 through 02:00hrs Zulu
Time on April 26, 2013. I request that a radar data extraction be =
produced using the following latitude and longitude
coordinates: a boundary box of upper left N19=BA 00=92 00=94, W68=BA =
00=92 00=94 to lower right N18=BA 00=92 00=94, W066=BA 00=92 00=94. If
possible, please send radar data on a CD in a text or excel format with =
data such as date, time, transponder code or
lack of, range, azimuth, altitude, longitude, and latitude. If you need =
any additional information regarding this
request, please feel free to contact me via email or telephone.

In order to determine my status to assess fees, you should know that my =
fee category is: an individual seeking records
for personal use and not for profit. Thank you for your consideration of =
this request.

Regards,

Larry Cates
[redacted]

10.5281/zenodo.7837470

2.0 Response E-mail - Acknowledgment Letter - FOIA Case # 2014-0638

Bautista, Jesica <jesica.bautista@langley.af.mil>
11/5/13
Dear Mr. Cates

This is an acknowledgement for receipt of your 4 November 2013 Freedom =
of Information Act request for a copy of all 84
Radar Evaluation Squadron (84 RADES) primary and secondary transponder =
surveillance radar information related to the
continuous time period of 23:00hrs Zulu Time on April 25, 2013 through =
02:00hrs Zulu Time on April 26, 2013.

We received your request on 5 November 2013. Your case has been =
assigned case number 2014-0638. For all future FOIA
request please submit through the PAL for immediate processing: =
https://www.efoia.af.mil/palMain.aspx
In addition before we can process your request, FOIA Case 2014-0638, we =
require your mailing address.

If you have any questions concerning your request, you may contact us =
at 757-764-7633 or email us at
acc.foia@langley.af.mil. Please reference your assigned case number =
when making inquiries.

Sincerely

JESICA L. BAUTISTA, SrA, USAF
Assistant Freedom of Information Act Manager
FOIA Case 2014-0638

In addition before we can process your request, FOIA Case 2014-0638, we =
require your mailing address. If you have any
questions concerning your request, you may contact us at 757-764-7633 =
or email us at . Please reference your
assigned case number when making inquiries. Sincerely JESICA L. =
BAUTISTA, SrA, USAFAssistant Freedom of Information
Act Manager FOIA Case 2014-0638

10.5281/zenodo.7837470

3.0 Phone Call Reference Response - FOIA Case# 2014-4053

Bautista, Jesica <jesica.bautista@langley.af.mil>
11/7/13

Mr. Cates,

This is response to your recent telephone call on 7 November 2013. We =
have received your address and updated your
information in our system. Your request FOIA Case 2014-0638 is =
currently being processed. Our target completion date
is 5 December 2013. If you have any questions concerning your request =
please call me at 757-764-7633 or email us at
acc.foia@us.af.mil.

V/r

JESICA L. BAUTISTA, SrA, USAF
Assistant Freedom of Information Act Manager
Air Combat Command

FOIA Case 2014-0638

10.5281/zenodo.7837470

4.0 FOIA Case# 2014-0638-F Official Response

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS AIR COMBAT COMMAND
JOINT BASE LANGLEY-EUSTIS VA

20 November 2013

HQ ACC/A6XP (FOIA)
180 Benedict Avenue, Suite 210
Joint Base Langley-Eustis VA 23665-1993

Mr. Larry Cates
[redacted]

Dear Mr. Cates

This is in response to your 4 November2013 Freedom of Information Act request for a copy of radar information from the 84th Radar Evaluation Squadron at Hill AFB Utah.

The subject records requested are fully releasable and attached. Department of Defense Regulation 5400.7 indicates fees be assessed for processing this request; however, there were no chargeable fees.

Sincerely

JESICA L. Bautista, SrA, USAF
Assistant FOIA Manager
Air Combat Command

Attachment:
Releasable Records

FOIA Case 2014-0638-F

Agile Combat Power

10.5281/zenodo.7837470

4.1 FOIA Case# 2014-0638-F Example of data provided

Id	Time	MsgType	Rng(nmi)	Az(deg)	Hgt(ft)	MC(ft)	MCV	M3	M3V	M2	M2V	Lat	Lon	Date
QJQ	23:00:00.040	Sch	86.625	270.615								18.16.41.614 N	067.16.26.937 W	25 Apr 2013
QJQ	23:00:00.055	Bcn	62.125	274.482		3600	1	4743	1	0	0	18.20.48.585 N	066.50.37.558 W	25 Apr 2013
QJQ	23:00:00.118	Reinf	78.375	272.549		16200	1	4046	1	0	0	18.19.19.333 N	067.07.45.226 W	25 Apr 2013
QJQ	23:00:00.149	Bcn	76.75	278.262		1100	1	401	1	0	0	18.26.54.783 N	067.05.24.771 W	25 Apr 2013
QJQ	23:00:00.211	Sch	70.75	276.592								18.24.01.878 N	066.59.23.247 W	25 Apr 2013
QJQ	23:00:00.227	Sch	71.125	275.449								18.22.39.358 N	066.59.55.539 W	25 Apr 2013
QJQ	23:00:00.352	Sch	29.125	279.756								18.21.01.975 N	066.15.40.948 W	25 Apr 2013
QJQ	23:00:00.414	Sch	67.125	283.359								18.31.28.497 N	066.54.12.468 W	25 Apr 2013
QJQ	23:00:00.414	Sch	98.5	283.271								18.38.21.181 N	067.26.22.744 W	25 Apr 2013
QJQ	23:00:00.695	Bcn	26.375	293.906		1100	1	1200	1	0	0	18.26.49.258 N	066.10.52.968 W	25 Apr 2013
QJQ	23:00:00.789	Sch	58.875	293.555								18.39.35.138 N	066.42.19.891 W	25 Apr 2013
QJQ	23:00:00.898	Bcn	16.5	297.686		900	1	4515	1	0	0	18.23.48.229 N	066.00.52.945 W	25 Apr 2013
QJQ	23:00:00.913	Bcn	23.25	298.74		200	1	1200	1	0	0	18.27.19.235 N	066.06.57.709 W	25 Apr 2013
QJQ	23:00:00.929	Bcn	40.75	299.795		4700	1	3272	1	0	0	18.36.23.041 N	066.22.44.974 W	25 Apr 2013
QJQ	23:00:00.945	Bcn	24.875	299.971		1100	1	1200	1	0	0	18.28.34.268 N	066.08.11.413 W	25 Apr 2013
QJQ	23:00:01.038	Bcn	18.75	301.729		400	1	4746	1	0	0	18.26.00.219 N	066.02.17.454 W	25 Apr 2013
QJQ	23:00:01.054	Sch	22.625	300.059								18.27.28.235 N	066.06.06.470 W	25 Apr 2013
QJQ	23:00:01.116	Bcn	17.375	305.244		-100	1	23	1	0	0	18.26.10.244 N	066.00.26.418 W	25 Apr 2013
QJQ	23:00:01.116	Bcn	49.25	306.123		80000	1	1274	1	0	0	18.44.09.608 N	066.25.57.072 W	25 Apr 2013
QJQ	23:00:01.147	Bcn	17.25	305.508		-100	1	1200	1	0	0	18.26.09.805 N	066.00.17.072 W	25 Apr 2013
QJQ	23:00:01.147	Bcn	17.25	305.332		-100	1	2000	1	0	0	18.26.07.207 N	066.00.19.003 W	25 Apr 2013
QJQ	23:00:01.584	Bcn	30	321.24		90000	1	1275	1	0	0	18.36.43.428 N	066.02.53.044 W	25 Apr 2013
QJQ	23:00:11.413	Sch	27.5	250.752								18.06.59.602 N	066.12.45.896 W	25 Apr 2013
QJQ	23:00:11.459	Sch	29	252.949								18.07.33.157 N	066.14.37.012 W	25 Apr 2013
QJQ	23:00:11.522	Sch	40	255.674								18.06.07.022 N	066.26.11.556 W	25 Apr 2013
QJQ	23:00:11.522	Sch	27.75	253.125								18.08.00.320 N	066.13.23.357 W	25 Apr 2013
QJQ	23:00:11.647	Reinf	48	255.674		4700	1	4423	1	0	0	18.04.05.754 N	066.34.19.781 W	25 Apr 2013
QJQ	23:00:11.849	Sch	82.5	265.078								18.08.42.005 N	067.11.44.091 W	25 Apr 2013
QJQ	23:00:11.912	Sch	63.5	267.188								18.12.48.127 N	066.52.06.304 W	25 Apr 2013
QJQ	23:00:12.052	Reinf	77.25	272.637		15900	1	4046	1	0	0	18.19.23.956 N	067.06.34.179 W	25 Apr 2013

10.5281/zenodo.7837470

5.0 Initial Request Letter - Investigator Daina Chaviano

Daina Chaviano
[redacted]

March 26, 2014
Federal Aviation Administration
Eastern Service Center Air Traffic Organization FOIA Coordinator, AJO-2E5
P.O. Box 20636
Atlanta, GA 30320

FOIA Coordinator:

This is a request under the Freedom of Information Act. I request that a copy of the following documents (or documents containing the following information) be provided to me:

Dear Sir or Madam, this request is for a copy of the Daily Record of Facility Operation (FAA Form 7230-4) from the Rafael Hernandez Airport located in Aguadilla, Puerto Rico. The Daily Record of Facility Operation being requested are those for the time period of April 23 through April 27 of 2013.

In order to determine my status to assess fees, you should know that my fee category is: an individual seeking records for personal use and not for profit.

The maximum dollar amount I am willing to pay for this request is $25. Please notify me if the fees will exceed $25.00 or the maximum dollar amount I entered.

Thank you for your consideration of this request.

Sincerely,

Daina Chaviano

[redacted]
dch_000@yahoo.com

10.5281/zenodo.7837470

6.0 FAA Certified Mail - Return Receipt - FOIA Case# 2014-008277(ES)

U.S. Department
of Transportation
**Federal Aviation
Administration**

1701 Columbia Avenue
College Park, GA 30337

APR 10 2014

Certified Mail – Return Receipt

Mr. Daina Chaviano
[redacted]

RE: Freedom of Information Act (FOIA) Control No. 2014-008277(ES)

Dear Mr. Chaviano:

This is an Air Traffic Organization, Eastern Service Center no records response to your FOIA request received in this office on April 4, 2014 made under the provisions of Title 5 United States Code, Section 552. You requested a copy of the Daily Record of Facility Operation from the Rafael Hernandez Airport (BQN), in Aguadilla, Puerto Rico from April 23 through April 27, 2013.

Unfortunately, we were not able to conduct a search because BQN is a Federal Contract Tower. These facilities are non-government entities operated by Robinson Aviation, Inc., under contract to the FAA. They are not obligated to provide records pursuant to the FOIA program. You may contact them at:

Robinson Aviation, Inc.
9063 Farmoor Road
Germantown, TN 38139

There were no fees incurred in processing your request.

Your request has also been assigned for action to other FAA offices for any other responsive records. They will be responding directly to you.

There were no fees associated with your request.

The undersigned and Mr. Mark D. Ward, Director, Air Traffic Organization, Eastern Service Center, are responsible for this no records determination. You may request reconsideration of this determination by writing to:

Assistant Administrator for Finance and Management, AFN-1
Federal Aviation Administration
800 Independence Avenue, S.W.
Washington, DC 20591

7.0 April 2014 Request - Regarding 84 RADES

Dear Sir or Madam:

This is a request under the Freedom of Information Act. I am willing to pay up to $50 for this request for the cost of duplication. If fees will exceed this amount, please contact me first.

This request is to the 84 Radar Evaluation Squadron (84 RADES) for all primary and secondary(transponder) surveillance radar information related to the continuous time period of 23:00hrs Zulu Time on April 25, 2013 through 02:00hrs Zulu Time on April 26, 2013. I request that a radar data extraction be produced using the following latitude and longitude coordinates: a boundary box of upper left N19° 00′ 00″, W68° 00′ 00″ to lower right N18° 00′ 00″, W066° 00′ 00″. If possible, please send radar data on a CD in a text or excel format with data such as date, time, transponder code or lack of, range, azimuth, altitude, longitude, and latitude.

If you need any additional information regarding this request, please feel free to contact me via email or telephone.

In order to determine my status to assess fees, you should know that my fee category is: an individual seeking records for personal use and not for profit. Thank you for your consideration of this request.

Regards,

Larry Cates
[redacted]

10.5281/zenodo.7837470

8.0 FOIA Case# 2014-0638-F Official Response - 84th Radar Evaluation Squadron

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS AIR COMBAT COMMAND
JOINT BASE LANGLEY-EUSTIS VA

16 May 2014

HQ ACC/A6XP (FOIA)
180 Benedict Avenue, Suite 217
Joint Base Langley-Eustis VA 23665-1993

Mr. Larry Cates
[redacted]

Dear Mr. Cates

This is in response to your Freedom of Information Act requests for radar data from the 84th Radar Evaluation Squadron at Hill AFB Utah.

Your requests have been reviewed by the Air Combat Command, Department of Defense/Department of Homeland Security Long Range Radar Joint Program Office and they have determined that the 84 RADES will no longer process FOIA requests to create a federal record for release to the public.

The radar data is jointly owned by the Department of Defense, Department of Homeland Security and the Federal Aviation Administration. Even though the 84 RADES has been processing previous requests and providing records, they have never received or requested approval to release this information to the public. Also, in accordance with DoDr 5400.7 the 84 RADES is not obligated to create a record to satisfy a FOIA request. Creating these records are not considered minor operations for day-to-day operations because a trained radar technican must perform the radar data extraction and parsing of the radar data to create a usable product.

If you are dissatisfied with this response, you may contact the Air Force Public liaison officer to address your concerns to the Air Force FOIA Public Liaison Office, Ms. Anh Trinh at usaf.pentagon.saf-cio-a6.mbx.af-foia@mail.mil or 703-614-8500.

Department of Defense Regulation 5400.7 indicates fees be assessed for processing this request; however, there were no fees assessed in this instance.

Sincerely

JESICA L. Bautista, SrA, USAF
Assistant FOIA Manager
Air Combat Command

FOIA Case 2014-4053-F

Agile Combat Power

APPENDIX D

Delay of Fed Ex Flight 58

information provided by Flight Stats

10.5281/zenodo.7837470

BQN Departures: Thu Apr-25-2013 from All day

Choose Destination
— All Airports —

Show Codeshares
Hide Codeshares
What is a Codeshare?

Choose Airline
— All Airlines —

Update

LEGEND
^ CODESHARE FLIGHT
~ ESTIMATED TIME
SET FLIGHT ALERT
FLIGHT TRACKER
FLIGHT NOTES (DRILLDOWN)
ON-TIME
DELAYS 15-29 MIN.
DELAYS 30-44 MIN.
DELAYS 45+ MIN.
CANCELLED

For details, click on Airport Code, Flight Number or On-time Rating

Destination	Flight	On-time Rating	Airline	Departure Sched	Departure Actual	Term Gate	Status	Equip	Track
EWR Newark	UA 1162	★★★★☆	United Airlines	1:50 AM	2:05 AM		Landed On-time	738	
EWR Newark	AC 2211^	★★★★☆	Air Canada	1:50 AM	2:05 AM		Landed On-time	738	
MCO Orlando	B6 730	★★★★☆	JetBlue Airways	3:19 AM	3:04 AM		Landed On-time	320	
JFK New York	B6 728		JetBlue Airways	5:01 AM	4:57 AM		Landed On-time	320	
CUR Curacao	AMF 8118		Ameriflight	9:35 AM	9:46 AM		Unknown		
PLS Providenciales	MTN 8115		Mountain Air Cargo	9:40 AM	9:40 AM ~		Unknown		
SLU Saint Lucia	AMF 8110		Ameriflight	9:55 AM	9:57 AM		Unknown		
BGI Bridgetown	AMF 8106		Ameriflight	9:55 AM	9:49 AM		Unknown		
POS Port Of Spain	MTN 8129		Mountain Air Cargo	10:05 AM	10:52 AM		Unknown		
AUA Aruba	AMF 8120		Ameriflight	10:10 AM	10:05 AM		Unknown		
SJU San Juan	AMF 6911		Ameriflight	7:20 PM	7:29 PM		Landed On-time		
FRA Frankfurt	LH 8263		Lufthansa	7:45 PM	7:55 PM ~		Unknown	M1F	
FRA Frankfurt	GEC 8263		Lufthansa Cargo	7:55 PM	7:35 PM		Unknown		
MEM Memphis	FX 58		FedEx	9:10 PM	9:26 PM		Landed On-time		
AMS Amsterdam	MP 1158		Martinair	10:20 PM	12:26 AM		Unknown	M1F	
IND Indianapolis	FX 9302		FedEx	11:10 PM	10:56 PM		Landed On-time		
GSO Greensboro/High Point	FX 9306		FedEx	11:44 PM	11:33 PM		Landed On-time		

[1]

[1]The "Landed On-Time" statement refers to FedEx flight 58's arrival at its destination on time. The delay in departure is shown by the scheduled time of 9:10pm vs the actual time of 9:26pm.

BQN Arrivals: Thu Apr-25-2013 from All day

Choose Origin
— All Airports —

Choose Airline
— All Airlines —

Show Codeshares
Hide Codeshares
What is a Codeshare?

Update

LEGEND
^ CODESHARE FLIGHT
~ ESTIMATED TIME
SET FLIGHT ALERT
FLIGHT TRACKER
FLIGHT NOTES (DRILLDOWN)
ON-TIME
DELAYS 15-29 MIN.
DELAYS 30-44 MIN.
DELAYS 45+ MIN.
CANCELLED

For details, click on Airport Code, Flight Number or On-time Rating

Origin	Flight	On-time Rating	Airline	Arrival Sched	Arrival Actual	Term Gate	Status	Equip	Track
EWR Newark	UA 1071	★★☆☆☆	United Airlines	12:36 AM	1:02 AM		Landed △ 26 min	738	
EWR Newark	AC 2210^	★★☆☆☆	Air Canada	12:36 AM	1:02 AM		Landed △ 26 min	738	
MCO Orlando	B6 729	★★★★☆	JetBlue Airways	2:04 AM	1:43 AM		Landed ● On-time	320	
JFK New York	B6 727		JetBlue Airways	3:39 AM	3:24 AM		Landed ● On-time	320	
MEM Memphis	FX 57		FedEx	7:45 AM	8:03 AM		Landed △ 18 min		
GSO Greensboro/High Point	FX 9305		FedEx	7:46 AM	7:33 AM		Landed ● On-time		
IND Indianapolis	FX 9301		FedEx	8:54 AM	8:33 AM		Landed ● On-time		
STT Saint Thomas	AMF 6910		Ameriflight	12:31 PM	1:29 PM		Diverted		
SJU San Juan	AMF 6910		Ameriflight	5:43 PM	5:45 PM		Landed ● On-time		
UIO Quito	LH 8262		Lufthansa	6:45 PM			Unknown	M1F	
BGI Bridgetown	AMF 7106		Ameriflight	7:31 PM	8:00 PM		Landed △ 29 min		
CUR Curacao	AMF 7120		Ameriflight	7:56 PM	7:37 PM		Landed ● On-time		
SLU Saint Lucia	AMF 7110		Ameriflight	8:02 PM	7:50 PM		Landed ● On-time		
BOG Bogota	MP 5713		Martinair	9:00 PM	9:00 PM ~		Unknown		
BOG Bogota	MP 1158		Martinair	9:20 PM	10:59 PM		Landed ■ 99 min	M1F	
POS Port Of Spain	MTN 7129		Mountain Air Cargo		8:19 PM		Landed		

APPENDIX E

Auxiliary Witness Communications

1.0: Anonymous Email to John Greenewald and the Back Vault

This information is location on BlackVault site (http://www.theblackvault.com/m/events/view/

Anonymous-Letter-Authenticates-Puerto-Rico-UFO-Video-And-Sets-Record-Straight) and sent sometime in October 2014. Items of interest are highlighted in yellow.

Recently, I received a letter from an anonymous source, authenticating a UFO video that has circulated for a couple months. Although he claims that the video is authentic, he does mention the information circulating about the video's origins are false, and seems to have quite a bit of knowledge about the videos origin, the technology used, and how the information about the video that is circulating (like it was shot from a Black Hawk helicopter) is actually not true. This letter is in regards to a UFO video, shot by an infrared camera, in Puerto Rico. Special thanks to Jorge Martín, Journalist and UFO researcher in Puerto Rico, for this higher resolution, and clearer, version of the UFO video: The anonymous letter is also below:

The anonymous letter, is as follows:

Hello John,

I was reading about your involvement in getting documents from the NSA concerning UFO's. Sir, if you want undeiable proof of UFO's on earth from a government source it is in the video below. Try a FOIA request for this video that was leaked onto youtube.

I can vouch that the following video is 100% real. I am remaining anonymous to avoid government reprisals. https://www.youtube.com/watch?v=Hee70AwwUJ8

If you ever wanted to truly see how aliens are monitoring or studying us, and witness their technology, this is it. The video is a black and white infrared recording using a L3 MX15 EOIR camera. The IR video uses back hot, meaning the blacker something is the hotter, or fuller of energy it is. The video was leaked onto youtube because the Federal Agents who recorded it realized the Federal Government was not interested in disclosing it. The video was recorded from the screen of a laptop using a iPhone type device. Spanish is heard as background noise to distort the leaker's voices so they are not discovered, so disregard all audio. Lastly, the poster of the video speculates it was recorded from a CBP Blackhawk. In reality it was recorded by a CBP DHC8 turboprop maritime patrol aircraft. This is not a maybe, this is 100% alien technology on earth, in our skies, and under our oceans. The video was taken in Aguadilla Puerto Rico, and can be verified by calling CBP Caribbean Air and Marine Branch, and Aguadilla airport control tower (the UFO was over the airport without permission and tower controllers saw it and tracked it on radar.

On April 25, 2013 at 2122 Local/April 26, 2013 0122Z a Customs and Border Protection Caribbean Air and Marine Branch DHC8 maritime patrol aircraft was on a routine patrol when it encountered a UFO immediately after takeoff. The object was spotted visually by the Captain of the aircraft, and the Aguadilla control tower operator. It appeared to have a strange red light. The Customs and Border Protection crew thought the aircraft might be a smuggler so they began to follow the UFO, and record a IR video. The UFO circled the Aguadilla airport and made its way to the ocean. Initially the UFO appears as a forward flying horseshoe, then as it makes its way to the ocean, it changes its configuration to a more spherical shape. The UFO skims on top of the ocean, and submerges, unaffected by the hydrodynamic forces. Watch the video carefully at 01:24:39 (time in upper left corner) when the object gets really dark (hot) another UFO actually pops out of the ocean and joins the original UFO in formation. Then both UFO's make controlled entries into the ocean. Alien technology is no doubt under the ocean near Puerto Rico!

Final note from The Black Vault: *Unfortunately, I can not verify the above letter. There was no contact information whatsoever, and it was sent via my online contact center. Although a false email address was given, I was able to verify the IP address (unique number given to every computer on the internet) was from the Miami area - but I will not list the IP address for obvious privacy reasons. I feel by disclosing in the Miami area - is not a breach of anything.*

2.0 Anonymous Email to Florida MUFON State Director from Alias John Truth

to:Xxxxxxxxxxxxxxxx (Morgan Beall personal email)
date:Sun, Aug 17, 2014 at 3:43 PM
subject:MUFON Florida: UFO recorded by Customs and Border Protection Aircraft

Having worked for CBP I can vouch that the following video is 100% real. I am remaining anonymous to avoid government reprisals. *https://www.youtube.com/watch?v=Hee70AwwUJ8*

If you ever wanted to truly see how aliens are monitoring or studying us, and witness their technology, this is it.

The video is a black and white infrared recording using a L3 MX15 EOIR camera. The IR video uses back hot, meaning the blacker something is the hotter, or fuller of energy it is. The video was leaked onto youtube because the Federal Agents who recorded it realized the Federal Government was not interested in disclosing it. The video was recorded from the screen of a laptop using a iPhone type device. Spanish is heard as background noise to distort the leaker's voices so they are not discovered, so disregard all audio. Lastly, the poster of the video speculates it was recorded from a CBP Blackhawk. In reality it was recorded by a CBP DHC8 turboprop maritime patrol aircraft. This is not a maybe, this is 100% alien technology on earth, in our skies, and under our oceans. The video was taken in Aguadilla Puerto Rico, and can be verified by calling CBP Caribbean Air and Marine Branch, and Aguadilla airport control tower (the UFO was over the airport without permission and tower controllers saw it and tracked it on radar.

On April 25, 2013 at 2122 Local/April 26, 2013 0122Z a Customs and Border Protection Caribbean Air and Marine Branch DHC8 maritime patrol aircraft was on a routine patrol when it encountered a UFO immediately after takeoff. The object was spotted visually by the Captain of the aircraft, and the Aguadilla control tower operator. It appeared to have a strange red light. The Customs and Border Protection crew thought the aircraft might be a smuggler so they began to follow the UFO, and record a IR video. The UFO circled the Aguadilla airport and made its way to the ocean. Initially the UFO appears as a forward flying horseshoe, then as it makes its way to the ocean, it changes its configuration to a more spherical shape. The UFO skims on top of the ocean, and submerges, unaffected by the hydrodynamic forces. Watch the video carefully at 01:24:39 (time in upper left corner) when the object gets really dark (hot) another UFO actually pops out of the ocean and joins the original UFO in formation. Then both UFO's make controlled entries into the ocean. Alien technology is no doubt under the ocean near Puerto Rico!

10.5281/zenodo.7837470

3.0 Youtube Account Anonymous Informant

The statement below was placed in the YouTube commentary on roughly June of 2014 by an individual who has some inside knowledge of the event because he indicates that the video was taken by the U.S. Customs and Border Patrol. The location of the YouTube site at the time of the postings is https://www.youtube.com/watch?v=Hee70AwwUJ8

Interestingly, this individual claims that there are two other videos made in the same area. He/she also claims the video was analyzed in Quantico, Virginia.

Two emails were sent to Red Bill through his YouTube homepage. The emails asked if he could communicate with the researcher of the current investigation. No reply has been received to the date of this report.

The YouTube page has no information in it and it appears that Red Bill created this name for the express purpose of making his YouTube comment.

Red Bill

2 months ago

No se cómo tiene ese video, no fue en un helicóptero. Fue en un avión de Us Customs and border protection. El video original es en blanco y negro, tiene audio, fue examinado en Quantico, Virginia. Hay 2 video más y son de la misma área, de diferente fecha y como punto de referencia es la playa surfers beach.

TRANSLATION:

No way in that video, it was not a helicopter. It was an airplane of the US Customs and Border protection. The original video is in black and white, has audio, was examined in Quantico, Virginia. There are 2 more videos and are of the same area, different date and point of reference is the beach surfers beach.

10.5281/zenodo.7837470

Below is a second comment made by Red Bill on a different YouTube site that has posted the same video. This comment was made in July of 2014. The site of that YouTube video was the following at the time of this report:
https://www.youtube.com/watch?v=Pm-Sg_J_hB8

In this comment, Red Bill claims that he/she was there. It is difficult to tell if he/she means that he was on the airplane or at the airport when this occurred.

Saludos, fue un avión. Lo que gira es la cámara. El avión de color gris de Aduana. Para las dudas yo estaba ahí, cuando paso. Desde el año pasado esta y hay dos videos de diferentes fechas. Si quiere preguntar dos semanas antes los vecinos de la Base Ramey llamaron a la policía en relación a unas luces que salían del mar. Varios policías llegaron a ver esas luces. Todo se quedo en secreto. Hay una playa que tiene un portón, hay noches que lo cierran. En ese lugar puedes ver esferas de luces, no todo el tiempo, pero pasa a menudo.

TRANSLATION:

Cheers, it was a plane. It is the camera that rotates. The plane is a gray colored Customs. For the doubters, I was there when it happened. From this last year, there are two videos of different dates. If you want to ask two weeks before residents of the Ramey Base called police regarding some lights coming out of the sea. Several policemen came to see those lights. All remained in secret. There is a beach that has a gate, there are nights that close. In this place you can see fields of lights, not all the time, but it happens often.

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APPENDIX F

Analysis of Radar Information

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Radar Information on the Puerto Rico Thermal Video

Introduction

The purpose of this radar analysis is to verify the legitimacy of the video by identifying the aircraft that took the video through correlation of exact times and radar locations of the aircraft taking the video. A search will also be made to identify any unknown aerial objects that were detected on radar.

1.0 Acquisition of Radar Information

The thermal system's latitude/longitude coordinates indicated that the video of this unknown object occurred over Puerto Rico and the time stamp indicated that the video was taken between 01:22:07 UTC+1 and 01:26:01 UTC+1 on April 26, 2013. Based on this, a request was made for all primary and secondary radar data related to the continuous time period of 23:00hrs Zulu Time on April 25, 2013 through 02:00hrs Zulu Time on April 26, 2013, from FAA radar sites in the vicinity of Puerto Rico. The request included information such as date, time, transponder code or lack of, range, azimuth, altitude, longitude, and latitude.

Radar data was received for that time period from the following radar sites:

QJQ located 92 miles to the east southeast at Pico Del Este, Puerto Rico, at an elevation of 3417 feet and 18º16'07”N 65º45'31”W.

SJU located 75 miles to the east in San Juan, Puerto Rico, at an elevation of 20 feet and 18º27'06”N 65º59'29”W.

STT located 144 miles to the east in St Thomas, Virgin Islands.

The data included a time stamp for each radar contact, type of radar beacon, azimuth/range bearings, latitude, longitude, transponder identification, and altitude. This information is sufficient to verify if the thermal information matches with an aircraft at the exact time and location as shown on radar, thus verifying the validity of the thermal video.

2.0 Radar Analysis of Aircraft Matching Time/Location of Thermal Video

It is a straightforward exercise to determine if there is an aircraft on radar that is an exact match for the aircraft that filmed the thermal video. The thermal video provides the exact time and location of the aircraft as it was taking video of the unknown object. The radar data can verify if an aircraft was present at the same time and location. If there was an aircraft present, then there is no doubt that the video in question was taken by an actual aircraft in maneuvers over Puerto Rico.

The aircraft's location at specific times was obtained from the thermal video and is represented on the Google Map in Figure 1. The initial thermal video shown in Figure 2 indicates that the aircraft was ½ mile east of the Rafael Hernandez airport at 01:22:07 hours at an altitude of 1875 feet. The aircraft departed in an easterly direction, turned towards the north, passed over the coastline in a westerly direction, and finally headed to the south along the coastline. The last frame of the thermal video shows the aircraft located one mile to the southeast of the village of Moca at 01:26:01 hours and at an altitude of 4523 feet.

The radar data was examined and an aircraft was detected that matched the signature of the aircraft that created the thermal video. The transponder number on this aircraft was 4406. This aircraft showed up on the radar data from all three radar sites. Data from the QJQ radar site at Pico Del Este was used to correlate against the thermal video. The following table displays latitude and longitude coordinates from a portion of both the thermal and the radar data. All of these coordinates are at the same time and are within ¼ mile of each other. No other aircraft was in this area with a similar flight pattern at the time. The date based on Zulu time is 04/26/2013 for this table.

Time (Zulu)		thermal Lat/Long	Radar Lat/Long	thermal Alt	Radar Alt	Speed
01:22:08		18º30'11”N 67º05'48”W	18º29'52”N 67º05'51”W	1875'	1600'	
01:22:25		18º31'00”N 67º06'05”W	18º30'44”N 67º06'01”W	1912'	1700'	209 mph
01:22:59		18º31'09”N 67º08'04”W	18º31'09”N 67º07'55”W	1784'	1500'	230 mph
01:23:23		18º30'19”N 67º09'14”W	18º30'30”N 67º09'05”W	2075'	1700'	239 mph
01:23:49		18º28'53”N 67º09'41”W	18º29'06”N 67º0'39”W	2491'	2300'	238 mph
01:24:07		18º27'53”N 67º09'27”W	18º28'05”N 67º09'37”W	2561'	2300'	236 mph
01:24:42		18º26'20”N 67º08'15”W	18º26'27”N 67º08'25”W	3222'	2900'	228 mph
01:26:01		18º23'06”N 67º05'43”W	18º23'16”N 67º05'53”W	4523'	4200'	211 mph

TABLE 1: Correlation of thermal data to radar data

The transponder code on this aircraft is 4406. This indicates that it is a military or law enforcement aircraft. FAA Order 7110.66 stipulates that all transponder codes between 4401 and 4433 will be controlled by FAA Order 7110.67, which is named “Special Aircraft Operations by Federal, State Law Enforcement, Military Organizations and Special Activities.”

Based on the radar data, there is no doubt that the thermal video is a real video taken by a law enforcement or military controlled aircraft. Because we have time and distance information in Table 1, the speed of the aircraft can be calculated. The aircraft's speed varied from 209 mph to 239 mph, which indicates it is not a helicopter but is a plane.

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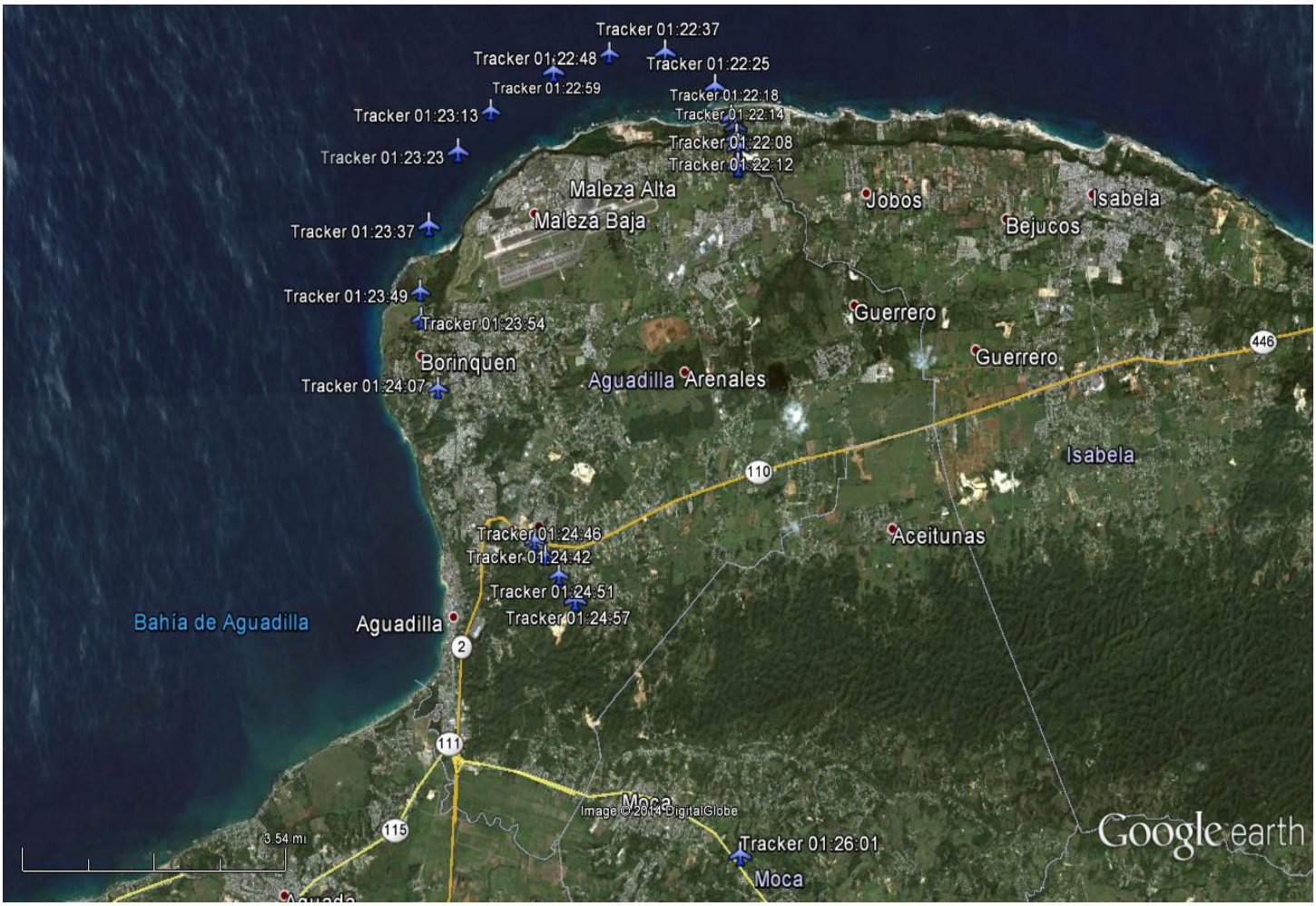

FIGURE 1: Tracking aircraft's location based on video and radar data. The name "Tracker" represents the aircraft and the value to the right is Zulu time at that location.

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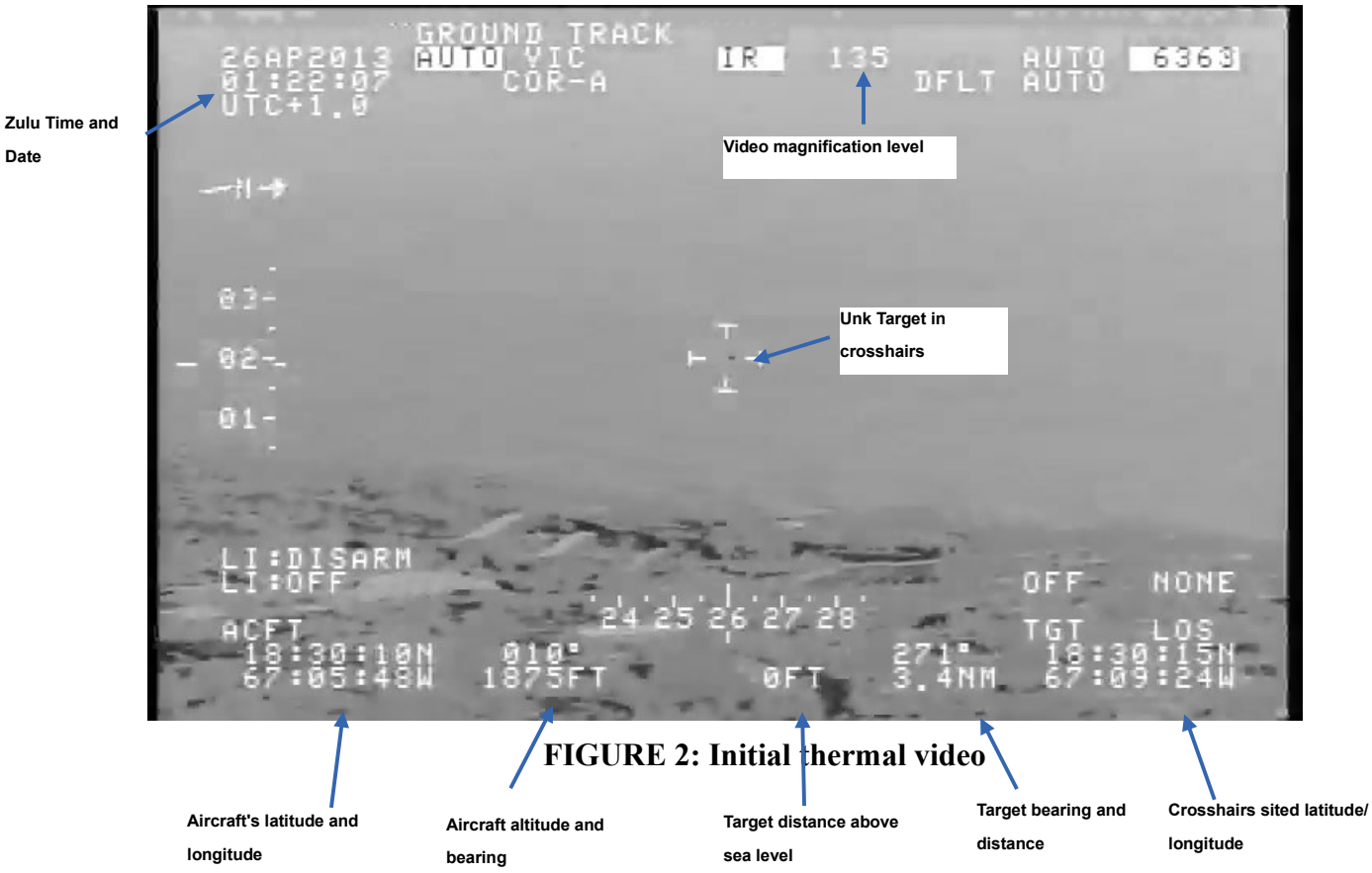

FIGURE 2: Initial thermal video

It is also worth noting that the aircraft made what appears to be an extra search pattern over the ocean to the north and northwest of the airport before commencing what is probably its standard patrol and operational activities down the Puerto Rican coast. Although the thermal video shows the aircraft's path for only four minutes, the radar data shows the aircraft's path prior to and after the thermal video was engaged. In the Google Map in Figure 3 the aircraft images in blue represent both the matching thermal and radar data while the aircraft images in red are only radar data. It is clear that before the thermal video was engaged (red colored planes), the aircraft circled to the north and northwest of the airport and then engaged the thermal video on its second pass of the airport (blue colored planes). This may indicate that the pilot was aware that an unknown target was in the area, searched for the unknown target, and upon finding it, engaged the thermal video system prior to resuming the aircraft's normal course down the coast. Data that will be discussed in the next section indicates that there was a potential reason for the pilot to suspect there was an unknown object in the area.

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FIGURE 3: Radar only data of a law enforcement or military aircraft shown in red with Thermal Imaging & Radar data of the aircraft's location show in blue

3.0 Radar's Minimal Detection Elevation near Airport

It has been determined in conversations with the witnesses that the initial indication of an unknown object came from the Raphael Hernandez Control Tower. That means that at least at some point, the object had to be high enough such that the radar system used could resolve it as a target. Since not all agencies are required to answer FOIA (Freedom of Information Act) requests, this investigation could not determine which radar system made this determination. The only radar system in the area, other than a military radar system, that could have detected the target is Pico Del Este located at 3417 feet altitude and approximately 91.5 miles from the middle of the Raphael Hernandez airport and on the opposite (eastern) end of Puerto Rico. It is therefore important that the minimum detection height of the radar system be determined.

It is known that in standard conditions the vertical gradient of the index of refraction decreases with height. This tends to bend the beam down toward the Earth's surface. It is also

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known that being a oblate spheroid, the Earth's surface tends to fall away from a horizontal line. Therefore a radar beam will tend to travel farther than normally thought; however, since the second effect is normally larger than the first, the beam will still slowly move away from the Earth's surface.

Further complicating this effect is beam divergence. This means the beam spreads as it moves away from its antenna and widens the envelope in which the beam is able to resolve targets. Since this spreading is a function of the design of the beam's antenna, this effect cannot be calculated without knowledge of the complete design plans of the system.

Although the exact beam envelope cannot be determined, given data of targets seen by the radar system, it is possible to make an approximation of the envelope. Figure 4 is a 2 hour plot of height verses range of all transponders up to 10,000 feet regardless of azimuth and time. The maximum height of 10,000 feet was chosen since it highlights the sloped area under review. This plot will help determine the minimum resolving height of the radar at the target's location. The red dashed line to the right in Figure 4 is the height based on distance from the radar. It was found to have a slope of ~114.34 ft/mile and an intercept of ~88.3 miles. The distance of the unknown targets to the northwest of the airport in Figure 4 vary from 94 to 104 miles from the radar at Pico Del Este. At those distances the radar's minimum detection altitude would vary from 652 feet to 1795 feet. A target directly over the airport (91.5 miles from the radar) would need a minimum altitude of 366 feet to be detected.

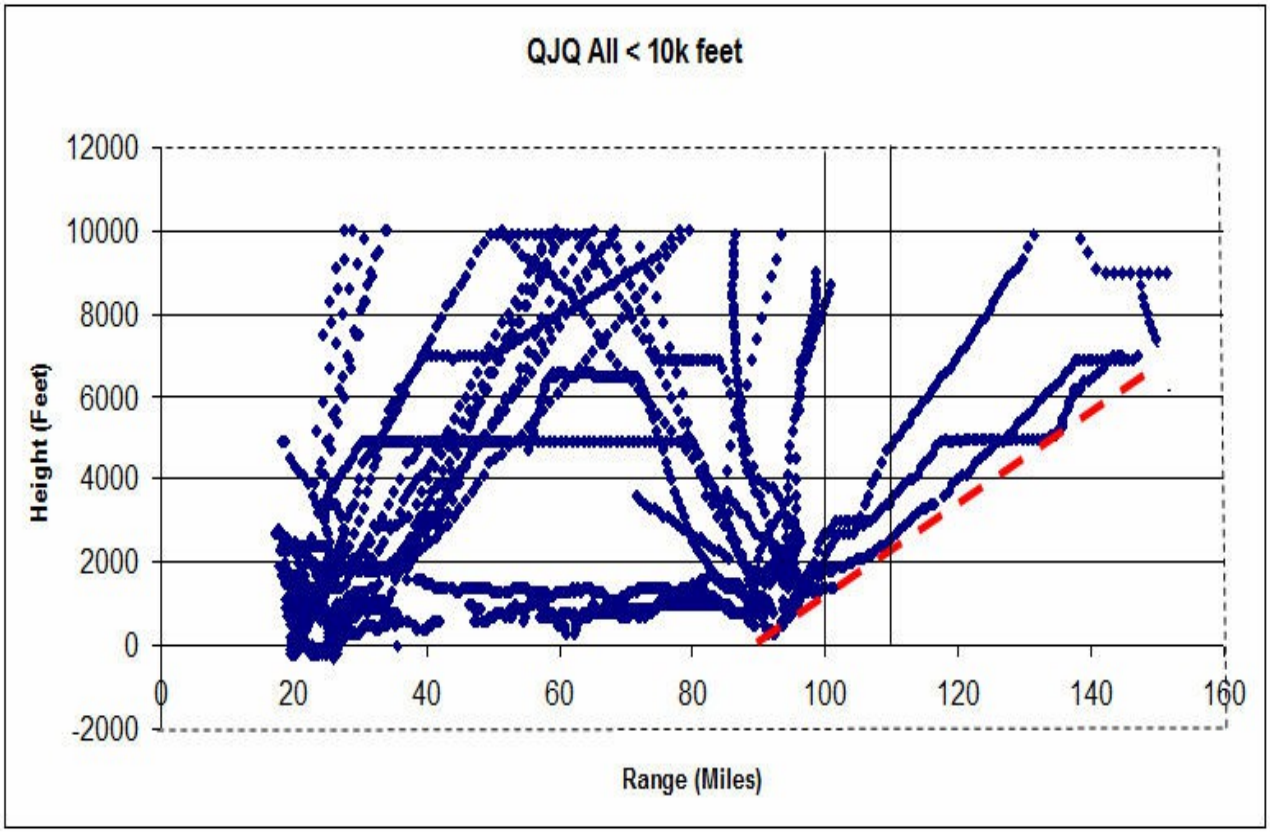

Figure 4: Minimal altitude detection level of the Pico Del Este radar system QJQ

4.0 Radar Analysis of Unknown Target in Area Prior to Aircraft Launch

The data from radar site QJQ was reviewed for any primary data without a transponder code that identified an unknown radar track in the area of interest. Primary radar tracks are those created by the actual reflection of the radar beam from a target. Known aircraft such as the law enforcement or military aircraft that took the thermal video will transmit a transponder code, also known as secondary radar. Primary radar tracks are identified with the designation "Sch" as shown in column 2 (Msg Type) of Table 2. As can be seen in that table, the radar picked up 50 primary radar tracks of what appears to be a single object from Zulu time 00:58hrs to 01:14hrs, a 16 minute period of time. The CBP aircraft departed the runway with instructions to look for an unknown to the northwest of the airport at 01:16hrs. These 50 radar tracks (the radar sweeps every twelve seconds) of this unknown object are visually displayed in Figure 5. The amount of information requires considerable commentary.

The first four radar strikes occurred after each twelve second sweep of the radar and can be seen at the far left area of Figure 5 and are designated as a, b, c, and d. The object is not picked up in the next four sweeps, which equates to 48 seconds. The fifth radar strike designated as 1a++++ (the four plus signs indicate that four previous radar sweeps were missed) indicates the unknown is at the same location as it was one minute earlier. That doesn't necessarily mean that the object is stationary because the accuracy of the radar is only to within 1/8 mile. A list of the radar target's longitude/latitude locations, speed and its direction of movement is shown in Table 3. Due to the potential 1/8 mile (660 feet) possible error in the primary radar, the speeds when the object is traveling less than 1200 feet could vary by almost 100% therefore the speeds shown in Table are not meant to be accurate. A statistical analysis of those speed numbers gives a mean of 168 mph with a standard deviation of 97 mph. The altitude of the object is not known but based on the minimum altitude in which the radar picked up the tracking aircraft, the object must be at 652 feet altitude or higher.

The sixth radar strike occurs immediately after the fifth radar strike, i.e. the next twelve second sweep of the radar. Beginning with this sweep of the radar, the object shows up on almost every sweep of the radar for the next ten minutes; however, if the sixth radar strike was created by the same object that created the first five then its speed is a minimum of 1700 mph. This calculation is not significantly affected by the radar error due to the large distance of 30,000 feet that was traveled. This perceived speed is unlikely so it is possible that the first six radar strikes are not related to the next large set of radar strikes identified as 1b thru 1aq. Symbols 1b through 1aq are in chronological order and represent the results of each subsequent 12 second radar sweep. Each plus sign following a symbol indicates that there was no strike on the previous radar sweep.

The group of radar strikes from 1b through 1aq cover 42 radar hits during 10 minutes. These radar hits occur with almost every sweep of the radar and they are all in the same general area.

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Radar Site: QJQ 26 Apr 2013

Time	MsgType	Rng(nmi)	Az(deg)	Lat	Lon
00:58:16.909	Sch	85.25	280.811	18.31.48.965 N	067.13.32.938 W
00:58:28.874	Sch	85.375	280.635	18.31.34.812 N	067.13.43.643 W
00:58:40.902	Sch	85.875	280.371	18.31.16.718 N	067.14.19.057 W
00:58:52.899	Sch	85.625	280.459	18.31.21.911 N	067.14.02.078 W
00:59:52.882	Sch	85.625	280.459	18.31.21.911 N	067.14.02.078 W
01:00:04.941	Sch	81	281.25	18.31.39.674 N	067.09.01.791 W
01:00:16.922	Sch	81.125	281.338	18.31.48.439 N	067.09.08.066 W
01:00:40.900	Sch	81.25	281.777	18.32.26.646 N	067.09.08.238 W
01:00:52.866	Sch	81	281.426	18.31.54.354 N	067.08.58.828 W
01:01:04.909	Sch	81.25	280.986	18.31.20.395 N	067.09.21.664 W
01:01:16.875	Sch	81.125	281.602	18.32.10.482 N	067.09.03.561 W
01:01:28.871	Sch	81	281.514	18.32.01.690 N	067.08.57.329 W
01:01:40.837	Sch	81.25	281.338	18.31.49.862 N	067.09.15.816 W
01:01:52.880	Sch	81.375	281.162	18.31.36.533 N	067.09.26.518 W
01:02:04.970	Sch	81.375	281.426	18.31.58.658 N	067.09.22.072 W
01:02:16.842	Sch	81.5	281.074	18.31.30.543 N	067.09.35.733 W
01:02:28.855	Sch	81.125	281.162	18.31.33.732 N	067.09.11.009 W
01:02:40.883	Sch	81.125	281.162	18.31.33.732 N	067.09.11.009 W
01:02:52.910	Sch	81.25	281.162	18.31.35.133 N	067.09.18.764 W
01:03:04.954	Sch	81.5	280.898	18.31.15.756 N	067.09.38.618 W
01:03:16.997	Sch	80.875	281.074	18.31.23.597 N	067.08.56.951 W
01:03:29.103	Sch	82	281.074	18.31.36.098 N	067.10.06.759 W
01:03:41.178	Sch	81.625	280.898	18.31.17.122 N	067.09.46.379 W
01:03:53.159	Sch	81.5	281.338	18.31.52.708 N	067.09.31.316 W
01:04:05.203	Sch	82	280.986	18.31.28.660 N	067.10.08.216 W
01:04:17.231	Sch	81.625	281.074	18.31.31.932 N	067.09.43.489 W
01:04:29.243	Sch	81.375	281.162	18.31.36.533 N	067.09.26.518 W
01:04:53.361	Sch	81.625	280.986	18.31.24.528 N	067.09.44.940 W
01:05:05.405	Sch	81.625	280.635	18.30.54.891 N	067.09.50.624 W
01:05:29.507	Sch	82	280.811	18.31.13.778 N	067.10.11.095 W
01:05:41.504	Sch	82	280.635	18.30.58.887 N	067.10.13.925 W
01:05:53.485	Sch	81.875	280.635	18.30.57.555 N	067.10.06.158 W
01:06:05.529	Sch	82.125	280.283	18.30.30.367 N	067.10.27.217 W
01:06:17.541	Sch	82.125	281.162	18.31.44.934 N	067.10.13.044 W
01:06:29.678	Sch	82.125	280.635	18.31.00.219 N	067.10.21.692 W
01:06:41.737	Sch	82.125	280.283	18.30.30.367 N	067.10.27.217 W
01:06:53.656	Sch	82	280.898	18.31.21.220 N	067.10.09.661 W
01:07:05.668	Sch	82.125	280.459	18.30.45.297 N	067.10.24.478 W
01:07:17.696	Sch	82	280.635	18.30.58.887 N	067.10.13.925 W
01:07:29.708	Sch	82.375	280.547	18.30.55.399 N	067.10.38.629 W
01:07:41.705	Sch	81.75	280.811	18.31.11.069 N	067.09.55.569 W
01:08:17.835	Sch	82.5	280.898	18.31.26.683 N	067.10.40.705 W
01:08:41.766	Sch	82.75	280.371	18.30.44.320 N	067.11.04.719 W
01:09:05.838	Sch	82.5	280.283	18.30.34.225 N	067.10.50.542 W
01:09:53.762	Sch	83.125	280.107	18.30.25.533 N	067.11.32.140 W
01:10:29.643	Sch	82.625	278.086	18.27.27.119 N	067.11.28.651 W
01:10:41.780	Sch	83.375	280.02	18.30.20.472 N	067.11.49.044 W
01:12:53.743	Sch	83.5	280.02	18.30.21.723 N	067.11.56.826 W
01:13:53.836	Sch	83.75	279.844	18.30.08.979 N	067.12.15.055 W
01:14:17.923	Sch	84	279.844	18.30.11.435 N	067.12.30.625 W

TABLE 2: Raw radar data that shows targets northwest of the airport

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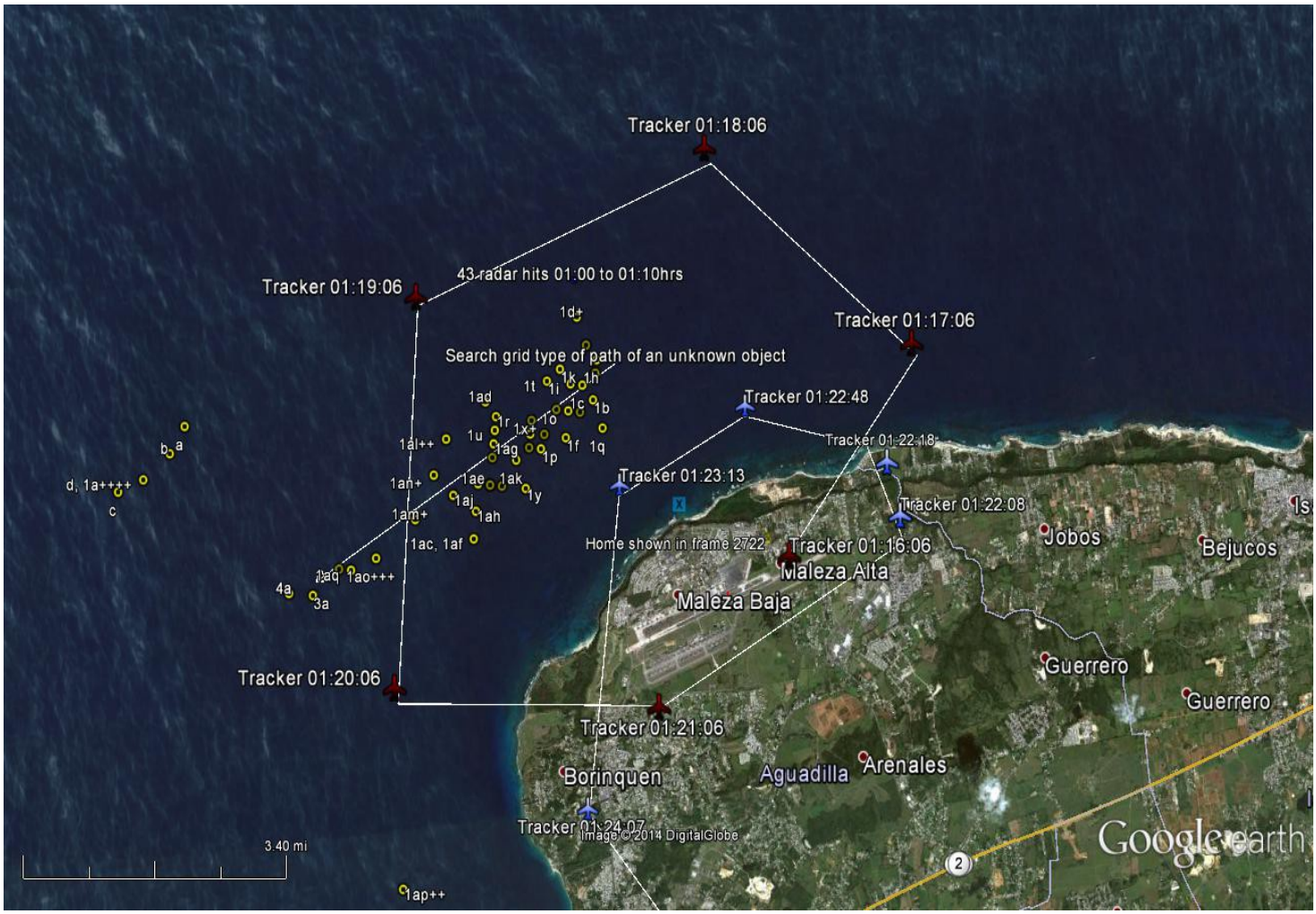


FIGURE 5: Radar plot of unknown that showed up off shore prior to the departure of the aircraft with thermal imaging capabilities. Tracks are designated in order of time beginning with a-d (segregated because of distance from the other radar tracks), followed by 1a-1aq, and followed by 2a, 3a, and 4a (segregated because of significant time delays of greater than one minute between radar tracks.

The radar sweeps every twelve seconds. Each "+" after a radar hit indicates that the target was not detected in the previous radar sweep. A designation such as "1ac,1af" indicates that two different radar sweeps occupied approximately the same physical location to within 1/8 of a mile of each other.

	Elapsed Time	GPS Points: Start Point		GPS Points: End Point		Points: Distance (ft)	Heading (Degrees)	Speed	Radar Skips
1	11.965 sec	From 18.530268	-67.225816	To 18.526337	-67.228790	1798.27	215.6	102.47	
2	12.028 sec	From 18.526337	-67.228790	To 18.521311	-67.238627	4029.98	241.7	228.44	
3	11.997 sec	From 18.521311	-67.238627	To 18.522753	-67.233911	1799.25	72.1	102.26	
4	59.983 sec	From 18.522753	-67.233911	To 18.522753	-67.233911	0.00	---	0.00	+++++
5	12.059 sec	From 18.522753	-67.233911	To 18.527687	-67.150498	30482.85	86.4	1723.51	
6	11.981 sec	From 18.527687	-67.150498	To 18.530122	-67.152241	1092.37	325.8	62.16	
7	23.978 sec	From 18.530122	-67.152241	To 18.540735	-67.152288	3871.82	359.8	110.10	++
8	11.966 sec	From 18.540735	-67.152288	To 18.531765	-67.149674	3408.47	164.6	194.21	
9	12.043 sec	From 18.531765	-67.149674	To 18.522332	-67.156018	4146.99	212.5	234.78	
10	11.966 sec	From 18.522332	-67.156018	To 18.536245	-67.150989	5397.00	18.9	307.52	
11	11.996 sec	From 18.536245	-67.150989	To 18.533803	-67.149258	1092.07	146.1	62.07	
12	11.966 sec	From 18.533803	-67.149258	To 18.530517	-67.154393	2224.02	236.0	126.72	
13	12.043 sec	From 18.530517	-67.154393	To 18.526815	-67.157366	1732.21	217.3	98.07	
14	12.090 sec	From 18.526815	-67.157366	To 18.532961	-67.156131	2286.90	10.8	128.97	
15	11.872 sec	From 18.532961	-67.156131	To 18.525151	-67.159926	3167.60	204.7	181.92	
16	12.013 sec	From 18.525151	-67.159926	To 18.526037	-67.153058	2526.17	82.3	143.38	
17	12.028 sec	From 18.526037	-67.153058	To 18.526037	-67.153058	0.00	---	0.00	
18	12.027 sec	From 18.526037	-67.153058	To 18.526426	-67.155212	798.58	280.8	45.27	
19	12.044 sec	From 18.526426	-67.155212	To 18.521043	-67.160727	2811.32	224.2	159.15	
20	12.043 sec	From 18.521043	-67.160727	To 18.523221	-67.149153	4296.45	78.8	243.24	
21	12.106 sec	From 18.523221	-67.149153	To 18.526694	-67.168544	7186.55	280.7	404.75	
22	12.075 sec	From 18.526694	-67.168544	To 18.521423	-67.162883	2821.86	134.5	159.34	
23	11.981 sec	From 18.521423	-67.162883	To 18.531308	-67.158699	3915.92	21.9	222.85	
24	12.044 sec	From 18.531308	-67.158699	To 18.524628	-67.168949	4463.28	235.5	252.67	
25	12.028 sec	From 18.524628	-67.168949	To 18.525537	-67.162080	2527.56	82.1	143.28	
26	12.012 sec	From 18.525537	-67.162080	To 18.526815	-67.157366	1781.84	74.0	101.14	
27	24.118 sec	From 18.526815	-67.157366	To 18.523480	-67.162483	2228.21	235.5	62.99	++
28	12.044 sec	From 18.523480	-67.162483	To 18.515248	-67.164062	3058.05	190.3	173.12	
29	24.102 sec	From 18.515248	-67.164062	To 18.520494	-67.169749	2822.50	314.2	79.85	++
30	11.997 sec	From 18.520494	-67.169749	To 18.516358	-67.170535	1536.02	190.2	87.30	
31	11.981 sec	From 18.516358	-67.170535	To 18.515988	-67.168377	798.56	100.3	45.44	
32	12.044 sec	From 18.515988	-67.168377	To 18.508435	-67.174227	3484.95	216.3	197.29	
33	12.012 sec	From 18.508435	-67.174227	To 18.529148	-67.170290	7691.67	10.2	436.59	
34	12.137 sec	From 18.529148	-67.170290	To 18.516728	-67.172692	4615.24	190.4	259.27	
35	12.059 sec	From 18.516728	-67.172692	To 18.508435	-67.174227	3076.48	190.0	173.94	
36	11.919 sec	From 18.508435	-67.174227	To 18.522561	-67.169350	5451.73	18.1	311.86	
37	12.012 sec	From 18.522561	-67.169350	To 18.512583	-67.173466	3937.82	201.4	223.52	
38	12.028 sec	From 18.512583	-67.173466	To 18.516358	-67.170535	1743.61	36.4	98.84	
39	12.012 sec	From 18.516358	-67.170535	To 18.515389	-67.177397	2528.22	261.5	143.51	
40	11.997 sec	From 18.515389	-67.177397	To 18.519741	-67.165436	4643.46	69.0	263.90	
41	36.130 sec	From 18.519741	-67.165436	To 18.524079	-67.177974	4839.82	290.0	91.33	+++
42	23.931 sec	From 18.524079	-67.177974	To 18.512311	-67.184644	4934.68	208.3	140.59	++
43	24.072 sec	From 18.512311	-67.184644	To 18.509507	-67.180706	1763.64	126.9	49.95	
44	47.924 sec	From 18.509507	-67.180706	To 18.507092	-67.192261	4306.39	257.6	61.27	++++
45	35.881 sec	From 18.507092	-67.192261	To 18.457533	-67.191292	18083.37	178.9	343.62	+++
46	12.137 sec	From 18.457533	-67.191292	To 18.505687	-67.196957	17688.18	353.6	993.67	

TABLE 3: Time, location, and direcitonal movement of targets northwest of the airport

The unknown target(s) seen on the QJQ radar were likely the same unknown target(s) that caused the control tower to request the CBP aircraft to look in the area to the northwest of the airport. Figure 5 shows that the CBP aircraft flew directly into the area where the unknowns were picked up on radar. It is reasonable to consider that the pinkish-reddish light seen to the northwest of the airport by the pilot may have been the cause of the unknown target seen on radar in the same area and that same object picked up by the CBP aircraft's thermal imaging video. If those objects were not related then it is a very unusual coincidence that an unknown object on video was in the same area as an unknown target on radar during a similar period of time.

The unknown target that was detected on radar for 16 minutes does not display characteristics that would be expected of an aircraft in flight. The speed variation and sudden changes in direction are nonsensical. Nonetheless, there are characteristics that can be attributed to the unknown target. First, this target's appearance on radar occurs at the right time and location to likely be the object detected by the control tower and the resulting subsequent alert to the CBP aircraft. Second, although the target jumps around, its overall directional movement is from the northeast to the southwest. Third, the target strength is strong as it is detected on almost every sweep of the radar for eight of the ten minutes it is on radar. Lastly, the target is no longer detected on radar during the time that the unknown is detected on the thermal imaging video. At that point in time the object is below the Pico Del Este radar's detectable altitude.

Conclusion

The authors of this report have examined other explanations for the unknown radar strikes to the northwest of the airport. A temperature inversion is a possible cause of false radar returns. These occur when the upper air temperature is higher than lower air temperature. This possibility was examined and discounted due to the lack of any temperature inversion layer in the area. A copy of the upper atmospheric conditions was obtained and is shown in Table 4. One of the strongest arguments against some type of anomalous propagation is the continuation of the radar returns within a small geographic area for ten minutes and with almost every 12 second sweep of the radar, the lack of these returns prior to this incident, and the lack of these returns after the incident of the unknown object recorded on thermal video at a lower altitude over land. It seems reasonable to consider the possibility that the control tower decision to vector an aircraft into the same area as this unknown radar return, the detection of these unknown radar returns on FAA radar data, the visual by the pilot of an unknown object with a red light, and the detection of the unknown object on the thermal video are all related to the same event and the same object. No other reasonable explanation has yet been found.

78526 TJSJ San Juan Observations at 00Z 26 Apr 2013

PRES hPa	HGHT m	TEMP C	DWPT C	RELH %	MIXR g/kg	DRCT deg	SKNT knot	THTA K	THTE K	THTV K
1015.0	3	25.8	20.8	74	15.49	55	4	297.7	342.8	300.4
1000.0	137	25.0	20.5	76	15.43	60	12	298.1	343.2	300.9
980.9	305	23.4	20.2	82	15.41	60	12	298.1	343.1	300.9
947.3	610	20.4	19.6	95	15.38	65	16	298.1	342.9	300.9
943.0	649	20.0	19.5	97	15.38	64	15	298.1	342.9	300.9
925.0	816	19.2	17.5	90	13.79	60	13	298.9	339.3	301.4
914.5	914	18.6	16.5	88	13.11	60	13	299.3	337.8	301.6
898.0	1071	17.6	15.0	85	12.08	60	11	299.8	335.4	302.0
882.6	1219	16.5	13.7	84	11.31	60	9	300.2	333.6	302.2
881.0	1234	16.4	13.6	84	11.23	59	9	300.2	333.4	302.2
876.0	1283	15.6	14.3	92	11.83	56	8	299.9	334.7	302.0
865.0	1390	15.8	9.8	68	8.86	49	7	301.2	327.6	302.8
858.0	1459	16.2	9.2	63	8.58	45	7	302.3	328.1	303.9
853.0	1509	15.8	11.4	75	10.02	42	6	302.4	332.3	304.2
850.0	1539	15.6	11.0	74	9.79	40	6	302.5	331.8	304.3
845.0	1589	15.2	11.5	79	10.18	38	6	302.6	333.0	304.4
832.0	1721	14.2	8.2	67	8.26	34	7	302.9	327.8	304.4
827.0	1772	13.6	11.2	85	10.20	32	7	302.7	333.3	304.6
823.0	1812	13.2	11.4	89	10.39	31	7	302.7	333.8	304.6
821.4	1829	13.2	10.8	85	10.02	30	7	302.9	332.9	304.8
809.0	1957	13.4	6.4	63	7.50	5	7	304.4	327.3	305.8
792.1	2134	12.1	6.8	70	7.91	330	7	304.9	329.0	306.4
783.0	2232	11.4	7.1	75	8.14	324	7	305.1	329.9	306.6
770.0	2372	11.4	3.4	58	6.38	314	7	306.6	326.4	307.8
763.9	2438	10.8	3.7	62	6.57	310	7	306.6	326.9	307.8
757.0	2514	10.0	4.0	66	6.78	316	8	306.6	327.5	307.9
752.0	2569	9.8	1.8	57	5.83	321	9	307.0	325.1	308.0
744.0	2658	9.2	3.2	66	6.52	328	10	307.2	327.4	308.4
740.0	2702	9.2	-0.8	50	4.90	332	10	307.7	323.1	308.6
736.4	2743	9.0	0.0	53	5.23	335	11	307.9	324.3	308.9
733.0	2781	8.8	0.8	57	5.56	334	11	308.1	325.5	309.1
721.0	2918	8.4	-7.6	31	3.01	331	10	309.1	318.9	309.7
700.0	3161	6.4	-8.6	33	2.87	325	9	309.5	318.9	310.1
696.0	3208	6.0	-10.0	31	2.58	327	9	309.6	318.1	310.1
683.0	3362	6.2	-16.8	17	1.51	333	10	311.5	316.6	311.8
674.0	3471	5.4	-11.6	28	2.35	337	11	311.8	319.6	312.2
670.0	3519	5.8	-20.2	13	1.15	339	11	312.8	316.8	313.0
658.7	3658	6.2	-30.4	5	0.47	345	12	314.7	316.5	314.8
653.0	3729	6.4	-35.6	3	0.28	344	13	315.8	316.8	315.8
641.0	3881	5.6	-37.4	3	0.24	343	14	316.5	317.4	316.6
610.8	4267	2.3	-37.9	3	0.24	340	18	317.1	318.0	317.1
566.0	4877	-2.9	-38.6	4	0.24	325	17	317.9	318.9	318.0
550.0	5106	-4.9	-38.9	5	0.24	310	16	318.2	319.1	318.3
544.7	5182	-5.1	-41.2	4	0.19	305	16	318.9	319.6	318.9
528.0	5426	-5.7	-48.7	2	0.09	321	22	321.0	321.4	321.0
523.9	5486	-6.1	-48.2	2	0.09	325	24	321.2	321.6	321.2
500.0	5850	-8.5	-45.5	3	0.13	315	28	322.6	323.1	322.6
484.3	6096	-10.5	-45.0	4	0.14	305	32	323.1	323.7	323.1
475.0	6245	-11.7	-44.7	5	0.15	303	35	323.4	324.0	323.4
465.4	6401	-12.3	-46.0	4	0.13	300	39	324.6	325.1	324.6
462.0	6458	-12.5	-46.5	4	0.13	300	39	325.0	325.5	325.0
435.0	6914	-16.7	-45.7	6	0.15	304	37	325.3	325.9	325.3
410.0	7357	-18.9	-54.9	3	0.05	308	35	328.0	328.2	328.0
400.0	7540	-20.3	-55.3	3	0.05	310	34	328.5	328.8	328.5
395.6	7620	-20.9	-55.0	3	0.06	310	34	328.8	329.0	328.8
363.9	8230	-25.4	-52.9	6	0.08	285	37	330.6	331.0	330.7
353.0	8453	-27.1	-52.1	7	0.09	289	36	331.3	331.7	331.3
320.0	9144	-33.2	-52.2	13	0.10	300	32	332.2	332.6	332.2
300.0	9600	-37.3	-52.3	19	0.10	285	34	332.7	333.1	332.7
284.0	9975	-40.7	-54.7	21	0.08	281	33	333.1	333.4	333.1
280.5	10058	-41.3	-55.0	21	0.08	280	33	333.3	333.6	333.3
256.1	10668	-46.1	-57.5	26	0.06	275	44	335.1	335.4	335.1
252.0	10777	-46.9	-57.9	27	0.06	278	48	335.4	335.7	335.4
250.0	10830	-47.1	-58.1	27	0.06	280	50	335.9	336.2	335.9

245.0	10964	-46.9	-65.9	10	0.02	281	53	338.1	338.3	338.2
239.0	11128	-47.3	-71.3	5	0.01	283	56	339.9	340.0	340.0
233.6	11278	-48.0	-71.6	5	0.01	285	59	341.1	341.1	341.1
200.0	12290	-52.9	-73.9	6	0.01	290	64	348.8	348.9	348.8
197.0	12388	-53.3	-74.3	6	0.01	291	65	349.7	349.8	349.7
187.0	12725	-52.7	-78.7	3	0.00	295	68	355.9	355.9	355.9
186.0	12759	-52.9	-78.9	3	0.00	295	68	356.2	356.2	356.2
184.8	12802	-53.0	-79.2	3	0.00	295	68	356.6	356.6	356.6
169.0	13376	-55.5	-82.5	2	0.00	297	59	361.7	361.7	361.7
157.0	13844	-58.3	-83.3	3	0.00	299	51	364.6	364.7	364.6
150.0	14130	-60.7	-84.7	3	0.00	300	46	365.3	365.3	365.3
124.8	15240	-69.2	-87.6	5	0.00	280	28	369.7	369.7	369.7
118.7	15545	-71.5	-88.4	7	0.00	255	35	370.8	370.8	370.8
115.0	15733	-72.9	-88.9	7	0.00	263	37	371.5	371.5	371.5
114.0	15785	-72.5	-88.5	7	0.00	265	38	373.2	373.2	373.2
107.0	16155	-74.1	-90.1	7	0.00	280	43	376.9	376.9	376.9
100.0	16550	-72.9	-88.9	7	0.00	300	30	386.6	386.6	386.6
86.8	17374	-75.7	-91.7	7	0.00	340	9	397.1	397.1	397.1
82.3	17678	-76.7	-92.7	6	0.00	335	14	401.0	401.0	401.0
80.6	17801	-77.1	-93.1	6	0.00	7	13	402.6	402.6	402.6
79.0	17916	-75.9	-91.9	7	0.00	37	12	407.4	407.4	407.4
75.0	18216	-76.5	-92.5	7	0.00	116	9	412.2	412.2	412.2
74.1	18288	-77.1	-92.9	7	0.00	135	8	412.4	412.4	412.4
71.5	18489	-78.9	-93.9	7	0.00	185	7	412.8	412.8	412.8
70.0	18610	-77.9	-92.9	8	0.00	245	6	417.4	417.4	417.4
65.4	19002	-73.9	-89.9	7	0.00	165	3	434.3	434.3	434.3
63.2	19202	-73.5	-90.1	6	0.00	125	2	439.6	439.6	439.6

TABLE 4: Upper Air Wind Conditions; San Juan, PR.

Univ of Wyoming, Dept of Atmospheric Sciences.

10.5281/zenodo.7837470

APPENDIX G

Object Location, Speed, Size

Introduction

The object in this video was tracked using a state of the art WESCAM MX-15D multi-sensor multi-spectral targeting system. The MX-15D is mounted on the underbelly of a DHC8 turbo prop aircraft operated by U.S. Customs and Border Patrol. This system has high definition thermal imaging, short range IR for enhanced haze penetration, a laser rangefinder and illuminator, and stabilization features. The video lasted for about three minutes and due to familiar objects in the background, we were able to identify the approximate size, speed, and path of travel of the object. The camera's video output included the latitude/longitude coordinates, azimuth heading, and the altitude above sea level of the tracking aircraft. It also provided the latitude/longitude of any object within the crosshairs of the camera, the altitude above sea level, and the distance in nautical miles of any object in the crosshairs of the camera. Due to the capabilities of this particular camera its sale outside of the United States requires approval from the U.S. Government.

The video consists of 3 minutes and 54 seconds of video imagery of which 2 minutes and 56 seconds displays an unknown object arriving from over the ocean, transversing land, and then disappearing back into the ocean. The entire video was broken into individual frames for analysis of the unknown object. There were a total of 7027 frames with each frame equating to 1/30 of a second exposure. Breaking the video into individual frames allowed for detailed evaluations of the object's characteristics.

Specific information will be provided as to how the size, speed, and location of this object were determined. The basic determinations hinge on the trigonometry related to the actual object size, angular size, and distance of the object. If two of those variables are known then the third variable can be calculated using trigonometry.

1.0 Angular size of pixels in the video frame

The angular size of an object represents the angle subtended by an object in the sky. This is measured in degrees, arcminutes, and/or arcseconds. As an example, the angular size of the moon is approximately 0.5 degrees or 30 arcminutes or 1800 arcseconds.

The angular size of any object in the camera frame can be calculated using the number of pixels that comprise the object's apparent length. The pixel size is constant for the camera as long as the magnification is constant. Changes in magnification in the camera result in linearly proportional changes to the size of the pixels.

In order to determine the angular size of a pixel, frame 892 was used. (See Figure 1.) This frame displays a tank of known size. The tank is 108 feet in diameter based on satellite photos from Google Earth. The ground distance between the tank and the camera is calculated using the latitude and longitude of the tank and of the aircraft. The aircraft's location in this frame is 18º 31' 21” N and 67º 06' 42” W, while the tank is located at 18º 29' 02” N and 67º 08' 29” W. Using the haversine formula, the distance between the two points is calculated as 17,441 feet. The air to ground distance from the camera to the tank can be calculated since it is represented by the hypotenuse of a right triangle. The aircraft's altitude

is 1760 feet so the actual distance between the camera and the tank is 17,530 feet. Now that we have the size of the tank and its distance, we can calculate the tank's angular size based on the trigonometric properties of a right triangle. The tangent of the angle (angular size) is equal to the opposite side the angle (width or diameter of the tank) divided by the adjacent size (distance to the tank). Solving tan θ = 108 / 17441 gives an angle of 0.35299º. Image processing software developed at the National Institute of Health and known as ImageJ was used to analyze the image and calculate the diameter of the tank in pixels. The diameter of the tank was equal to 238 pixels. The angular size represented by each pixel is therefore equal to 0.35299 / 238 or .001483 degrees.

The angular size of the unknown object in the videos will vary with distance. But with the value of .001483º, we can determine the the object's angular size in any video frame, even if the zoom factor (focal length) changes since the pixel size will be proportional to the zoom factor.

Figure 1: Frame 0892. Known tank and unknown object.

2.0 Size of the object

As one watches the video at regular speed the object appears to tumble and if one watches carefully, it even appears to change shape. Viewing of the object frame by frame makes it much easier to see the sometimes rapid changes in shape and apparent size. Any change in apparent size of the object will add an error into the calculation of the object's distance when using a known angular size and a hopefully constant actual object size. Later in this appendix, an error factor will be used in calculating the object's actual locations during the video.

The size of the object can be determined when its distance is known. The angular size of the object is known based on the discussion in Section 1.0. The distance can be accurately calculated whenever the object is at very low altitude. This occurs towards the end of the video when the object passes behind a telephone pole, behind trees, and then finally enters the water. During these periods of time the crosshairs of the camera, via its laser range finder, are providing an accurate distance measurement because the object is at a very low altitude and there is no longer any error due to the crosshairs actually focusing on an object that is potentially far from the camera. For example, in the right triangle shown in Figure 2 the camera is at point 'C.' The crosshairs of the camera are pointing towards 'A'. Any object in the crosshairs (represented by point 'D') of the camera could be at any location along line 'AC'. However, when foreground objects such as trees or a telephone pole or the water surface itself interact with point 'D' then one knows that point 'D' is close enough to point 'A' (point 'A' is on the ground) to allow for a reasonably accurate determination of the distance from the object to the camera.

Figure 2: Right triangle

An example of the calculation will be discussed utilizing Table 1, which reflects information from Frame 5085 in Figure 3. In this frame the object is just above the water as three seconds previous to this frame the object was in the water. The distance to the object using the system's laser range finder is 5.2 nautical miles, which equates to 31,595 feet. This value is accurate to within 304 feet because the distance in nautical miles on the screen is rounded to the nearest .1 nautical miles. The use of the latitude/longitude coordinates that the thermal imager displays for the object and for the aircraft provides a distance that is accurate to

within 70 feet of the object's location and probably much closer. Using the haversine formula, the distance between the locations of the aircraft and the object is 31,469 feet. The object's angular size in video frame 5085 consists of six pixels, which at .000149º per pixel as described in Section 1.0. is an angular size of .00894º. With a known distance and a known angular size, the actual size of the object can be calculated. As described in Section 1.0, the tangent of the angle (angular size) is equal to the opposite side the angle (length of the unknown object) divided by the adjacent size (distance to the unknown object). In this frame, the calculated size of the object is 4.9 feet.

Time	1 24 57
Aircraft location	18:25:43N 67:07:45W
Aircraft altitude	3522'-645'=2877'
Cross hair's location	18:30:51N 67:08:08W
Object's location	18:30:51N 67:08:08W
Object's altitude	just above the water
FLIR distance	31595 feet
Object azimuth	356 degrees
Object's angular size	.00894 based on frames 5081-5089; 6 pixels
Gnd dist to cross hairs	31469'
Aircraft dist to cross hairs	31600'
Object's size	4.9 feet
Object's dist traveled	434 feet
Time since last frame	6.03 seconds
Object's speed	49mph
Aircraft dist traveled	1989 feet
Aircraft speed	225mph

Table 1: Information and calculations from Frame 5085

Figure 3: Frame 5085. Object in cross-hairs and just above the water.

Calculations of the object's size were done on multiple frames whenever the object was a known distance from the ground which allowed accurate values of the object's distance and its angular size. These values varied significantly from a minimum size of 3.0 feet to a maximum size of 5.2 feet. The variation in size is believed to be due to either varied angular sides of the object as it is tumbling or temperature variations that are reflected in the shape that the object presents to the IR camera. Calculations done on known objects in the video such as water tanks, aircraft, cows, and moving automobiles eliminate issues with the accuracy of the IR camera as a significant source of the variations in size. We can conclusively say that this object is between 3.0 feet to 5.2 feet in length.

3.0 Path of the object during the video

The path taken by this object during the video cannot be ascertained simply by plotting the latitude/longitude coordinates that are displayed by the thermal imager based on the cross-hairs. Those coordinates are driven by a laser range finder, which is not necessarily striking the object itself but the ground and other large objects in the background. As a result, when the object is at altitudes above about 40 feet there can be significant differences in the actual distance between the object and the camera. This was ascertained by careful observation of the latitude/longitude values displayed on the thermal video as the object moved and

sometimes the cross-hairs in the thermal video were stationary, which resulted in latitude/longitude values linked to the cross-hairs and not the object itself. It was clear that the latitude/longitude measurements correlated to the farthest ground-based location that was at the center of the cross-hairs. Referring back to Figure 2, the line AC represents the distance as measured by the thermal imaging system while line DC represents the true distance between the object and the camera.

The actual distance between the camera and the object can be determined using the angular size of the object and the object's true size. The one exception is when the thermal video system was at minimal magnification and the object consisted of only a 3-4 pixels in size. The errors in the calculated distance values using angular size were gross and did not match up with the quality of the system's information obtained at medium and high magnification. The exact cause of this error is not yet known but is suspected to be related to minimal pixel displays of object's in the infrared. Another method to determine the object's actual distance is with a known altitude of the object. Whenever the object is near the ground or passing between known objects then the actual distance can also be determined using the object's known altitude and the azimuth of the object relative to the camera and aircraft. This method is the most accurate because any errors in the object's size and angular size are eliminated.

The best determination that could be made of the object's actual path is shown by the brighter of the three light blue lines in Figure 4 of this appendix. This figure is a Google Earth image of the northwest coast of Puerto Rico. The airport that is seen in the image is the Raphael Hernandez Airport. It is a joint civil-military airport located in Aguadilla, Puerto Rico. This is the airport that is seen in the video. The top of the page faces west and the right hand side of the page faces north. The dark blue aircraft icons are the actual location of the aircraft with the camera as verified by both the thermal video system's latitude/longitude values and locations as supplied by radar from the Pico Del Este radar site. The numbers next to the aircraft represent the time in Zulu (aka Greenwich Mean Time) hours. A corresponding UFO (UFO represents the unidentified flying object and is not meant to indicate any other quality about the unknown craft.) location is on the map for the same time. The UFO locations marked in red are exact locations of the object at those times due to accurate altitude values being available. The UFO locations marked in orange represent approximate locations of the object to within about 500 feet. The UFO locations marked in yellow with a time value next to them and the darker light blue line connecting them represent a “best guess” of the object's location based on the previous path of the object and its known direction from the aircraft. This blue line ends at a question mark that represents that uncertainity and also is a possible point of origin of the object. The object's route does raise the question of the possibility that its origin could be the same as its final destination or its origin could be up to one mile farther to the west as is shown in the other two light blue lines. Those lines connect UFO locations that are also possible routes taken that are more westernly. The higher level of uncertainity in the yellow colored UFOs is believed to be due to the thermal video system being in operation at its lower magnification level.

The object's path is one that approaches the island of Aguadilla from the ocean. Its exact origin is unknown. It crosses the airport runway once it comes over land and then re-crosses the airport runway on its way back out to sea.

4.0 Speed of the Object

What is the energy source that propels the object in this video? The movements made by this object require some type of power source. The object transverses about four miles during the video and during that process changes direction from a southward direction to a northerly direction. No type of propulsion is evident from the infrared video yet some form of propulsion is required for the object to maintain and vary its speed, change directions multiple times, and move in and out of the water. The source that propels this object is not evident.

The speed of the object is most accurately determined during the latter half of the video when the object's location can be more accurately determined as discussed in Section 3.0. The calculation of the object's speed is straightforward as distance/time. The time between measurements is provided by the thermal video system's clock and the location of the object and its distance traveled is determined by the latitude/longitude locations provided by the video system. The speed of the object was measured every eight seconds. The main error is that the latitude/longitude values are in degrees, minutes, and seconds so that the location is rounded to the nearest second, therefore the accuracy is to within 0.5 seconds (maximum rounding error) of a degree. With eight seconds between speed measurements, the error due to rounding could equate to 51 feet from the object's true location which could result in an error in the object's speed of up to 4 mph.

10.5281/zenodo.7837470

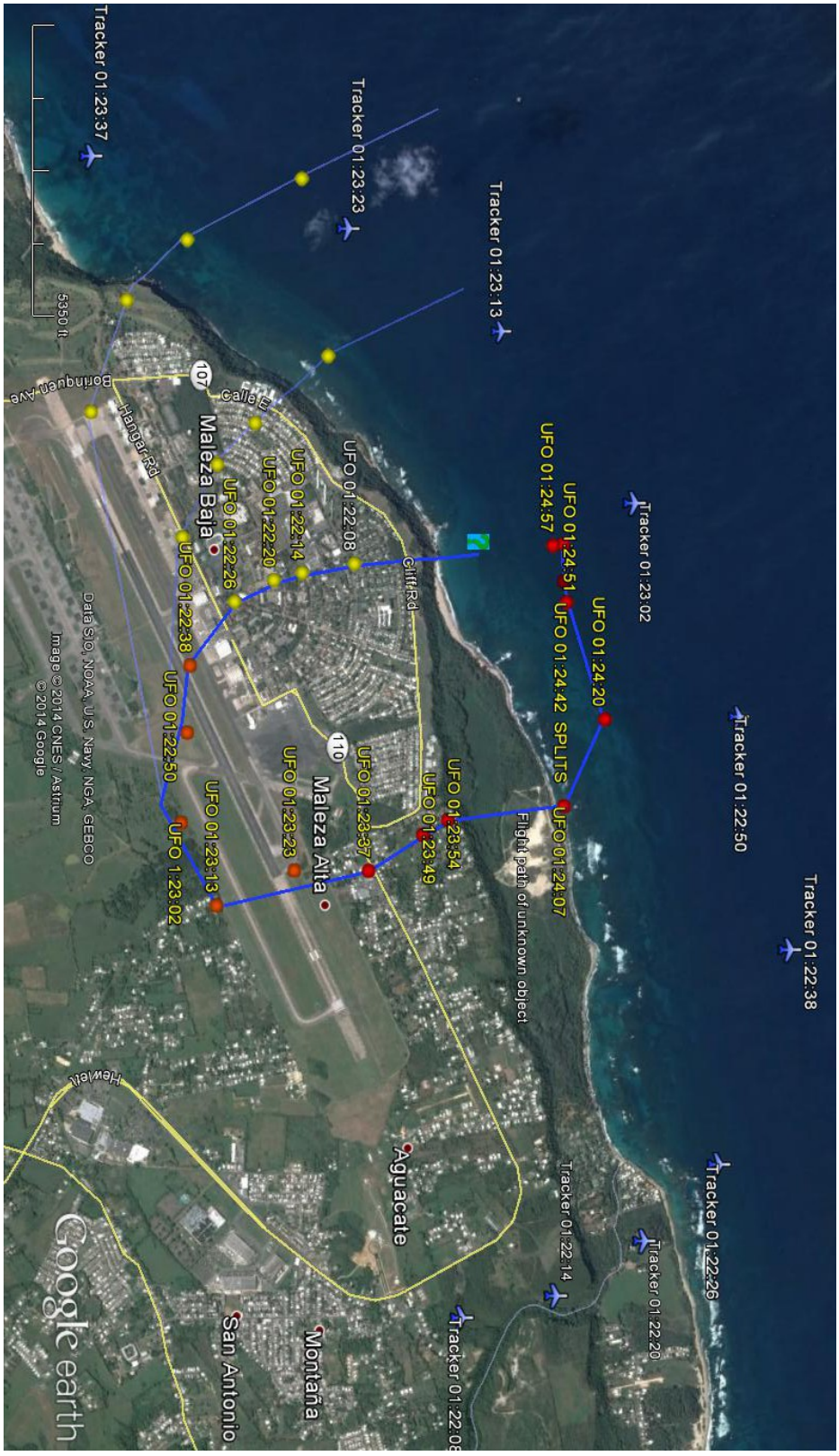


Figure 4: Possible Paths taken by Object

Table 2 shows the time of the latitude/longitude measurement, the distance traveled since the last measurement, and the calculated speed of the object. Although the speed of the object is fairly constant and normally varies from 70 mph to 110 mph, it is clear that the object slows and speeds up during this portion of the video, which again indicates some type of power source should be present. Some of the speeds shown in the table are noted as being through water.

ZULU TIME	DISTANCE TRAVELED	SPEED
01:23:21	.3753 km	105 mph
01:23:29	.3448 km	96 mph
01:23:37	.2735 km	76 mph
01:23:45	.2459 km	69 mph
01:23:53	.2623 km	73 mph
01:24:09	.3211 km	90 mph
01:24:17	.3409 km	95 mph *
01:24:25	.3179 km	89 mph*
01:24:33	.3072 km	86 mph*
01:24:45	.2141 km	60 mph**
01:24:53	.1784 km	50 mph**
01:25:01	.2459 km	69 mph

* Speed under water.

**Speed through water and air.

10.5281/zenodo.7837470

APPENDIX H

Modeling of Object

Introduction

The amount of data provided in the IR video this study is predicated upon is extensive. In most situations that is a desirable feature; however, when faced with a complete unknown it tends to hide aspects that may have been obvious if there was less data. Combining data by bundling multiple items into one is a feature provided by modeling. The data reduction obtained generating the model permits a more efficient utilization of the data and allows some aspects of the object to become obvious. Additionally, the thought that goes into determining a model tends to highlight aspects not otherwise noted. All aspects determined will be listed in the conclusion of the appendix.

Although it is philosophically possible to define a subjective[1] reality where anything dreamt of by the observer is equally real, scientists define existence as objective. Objective reality defines reality as that which does not require the participation of the observer. Effectively that means that science is the end result of observation and measurement.

In essence this appendix is attempting to define an object conforming to what is seen in the video while also obeying the laws of Physics; therefore, taking the physical world as real, the appendix is also asking if the object is real. One of the characteristics of a real "object" is its mass or more accurately its "invariant mass"[2]. As was stated in Appendix H, shape can be defined as the characteristic surface configuration of the invariant mass. Therefore a defined mass also implies an invariant shape. The difficulty in determining these objectives in the video supplied is, it does not show mass; it shows heat.

Another problem encountered when looking at unknown objects in an IR video is the difficulty in "seeing" all shades of the hot and cold areas of the object and in differentiating them from the background. The images provided are what is termed 8-bit grayscale. Grayscale indicates that the images are provided in various shades of gray. An 8 bit depth indicates that each pixel will have one value out of 256 (2^8) possible shades (intensities) of gray. More will be said about this later in this document. Although the shades are difficult to distinguish using only the eyes, the computer has no problem distinguishing them. That differentiation is provided by the "Surface Plot" function in the "ImageJ" program. That function will be used extensively in this document.

Various views of the object will be considered in the document. The most obvious way to see both hot and cold areas of the object is to look at the object in front of something else that was also warm but not hotter than the hot portions of the object. In that case an outline of the cold portions could be seen as a white shadow over the background heat while also seeing an outline of the hot portions. In a sense this is similar to seeing a shadow of the object, al la Lamont Cranston when he is in his Shadow identity. It is also possible to infer portions of an outline from its effect on its environment. Different views will be presented in an attempt to obtain clues to its shape.

It should be noted that the best this appendix can provide is a model of the object. It will be a model that fits the aspects seen; but it is a model and not the object. As such, it can only have validity in the subspace of reality that is described by the aspects used to create it. Expanding the model beyond that subspace would be highly speculative and wasteful of time and energy.

1.0 Reality of the Object

The first step in defining the shape of the object in the video is to determine if it is a real object or is it just some odd juxtaposition of heat rays. That is accomplished by determining if it has mass. Since the

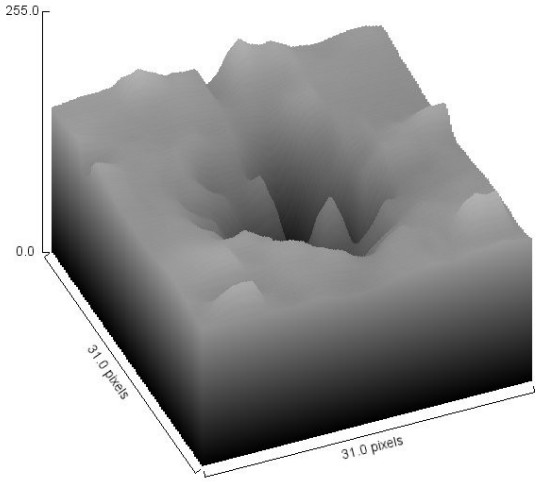


Figure 1 - 1: Frame 3769 - Surface Plot

object in the video can't be weighed to determine its mass, a less direct indication has to be used. Happily one such indication was described in Section 2 of the "Water Transit Appendix J". In that document it was shown that in Frame #3769 a splash can be observed when the object enters the water. That splash is the effect of an external mass displacing some of the water mass. It was also noted in that section that the video does not show a normal picture of the world. It is IR and shows a heat picture. Therefore a determination had to be made as to what a splash would look like in terms of heat rather than mass. A splash is taking a volume of water and drastically increasing its surface area. Since both evaporative and radiative heat transfer are proportional to the volumes surface area, a splash provides a means to allow that volume of water to become a "little" cooler. Little is in quotes because the change is very small and is basically invisible to the viewers eyes but not to the FLIR system and to the computer.

The "Surface Plot" tool in "ImageJ" provides a three-dimensional view of the intensities of pixels. It therefore converts the heat variations in the IR frame to height variations with (in its default operation) the lighter (cooler) pixels being represented as hills and the darker pixels as valleys. Figure 1 - 1 is the surface plot of a small area around the object in Frame #3769. The cooler areas representing the splash are seen as raised areas around the upper right corner of the plot. Although only an indirect indication, this figure indicates the object in the video has mass and is therefore a real object with some constant characteristic shape or surface configuration seen from various angles in various frames. It is also known that the shape may not be possible to infer from the views seen in the video.

2.1 Initial View

Although not seen often in the video, in this view the object is seen to present itself in front of a building window in an oblong or slightly triangular shape in Frame #2616. This is shown in Figure 2.1 - 1. It is agreed that this figure is not particularly sharp but the general two dimensional shape can be seen. A red circle was placed around the object to outline its location.

A better view of the object can be seen in the Surface Plot view in Figure 2.1 - 2. It shows a much more detailed picture of this view of the object. In the IR pictures the object in both of the frames seems to be moving to the left with the hot area leading the colder area. In the surface plots it can be seen that although there is a hot area in lower right, there seems to be a cooler area behind it. Additionally, in terms of heat, the trailing cold area shows an almost cone shape getting cooler as it goes back but with circular warmer waves around the cone. There also looks like there may be a hot area above the cone to the front. Although the "cone" shape is interesting, there are two items that must not be forgotten: this is heat not mass; and this is only one view of the object.

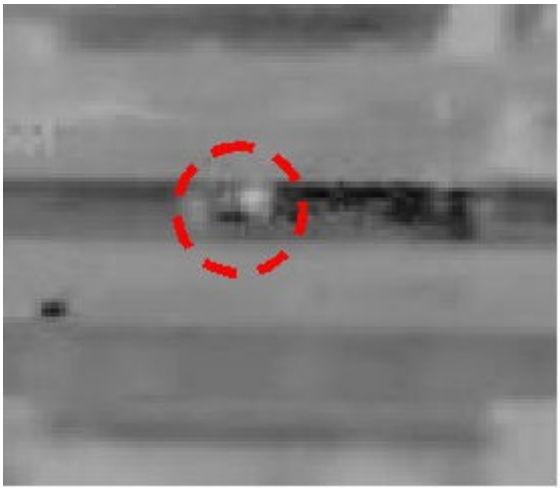


Figure 2.1 - 1: Frame 2616

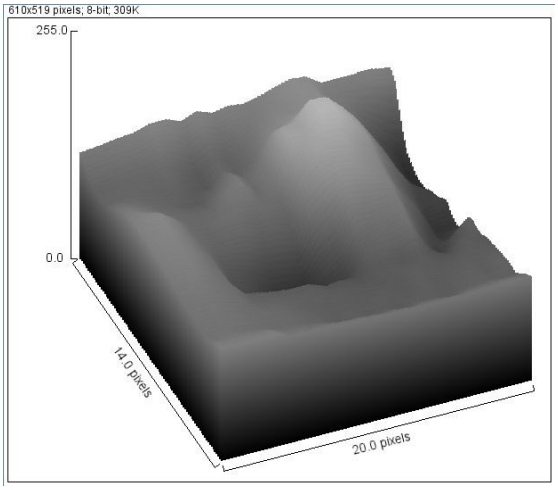


Figure 2.1 - 2: Frame 2616

There is an additional item of interest seen in Figure 2.1 - 2 that will have to be checked in later views. There does not seem to be any heat being transferred from the unknown object to the air surrounding it. That indicates a lack of turbulence surrounding and trailing the unknown object. It almost looks like the object is slipping through the air with minimal friction.

2.2 Second View

The most common view presented in the video is something that looks spherical. Frame #1240 was chosen to represent this shape. It and the corresponding surface plot can be seen in Figures 2.2 - 1 and 2.2 - 2. It should be noted the Figure 2.2 - 1 has been magnified to ~600% over the camera's basic magnification. Although this picture is a still, the hot (black) and (white) portions of the object can be clearly seen. As stated the figure shows a roughly

spherical shape surrounded by a colder spherical portion. Additionally, the object seems to have – spokes of heat radiating out from the center to the outer edge of the colder section. Although the object is unknown, when seen from this angle it almost looks like it is banking in a turn. A quick look a the surrounding frames shows the object seems to be moving to the left. It also should be noted that what looks like a dark outline around the object is an artifact resulting from the magnification and the video compression. Although it took a long time for this author to notice it, there is also a definite similarity between Figures 2.2 - 2 and 2.1 - 2. Basically Figure 2.2 - 2 is the inverse of Figure 2.1 - 2. This is easily seen in Figure 2.2 - 3 where the elevations of light and dark areas have been reversed.

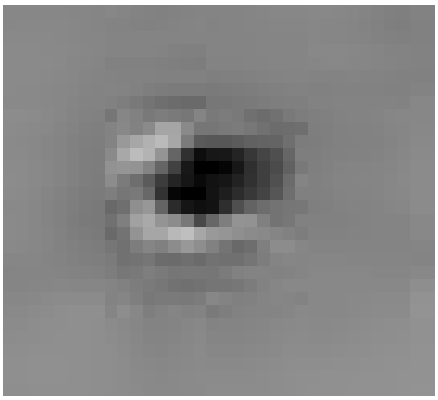


Figure 2.2 - 1: Frame #1240

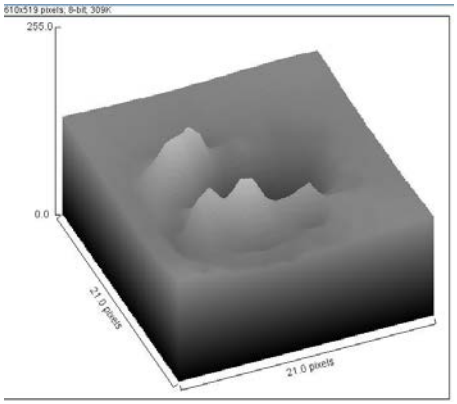


Figure 2.2 - 2: Frame #1240 Surface Plot

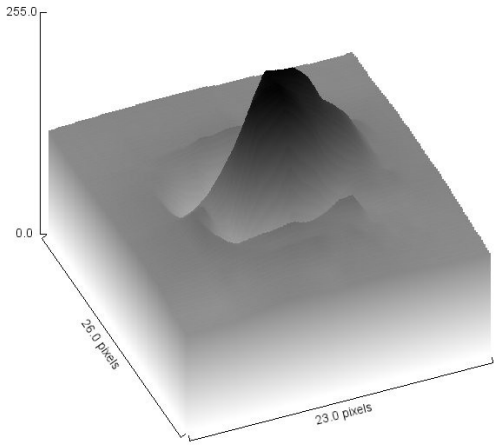


Figure 2.2 - 3: Frame #1240 Reversed Surface Plot

As in the previous section, there doesn't seem to be any heat being transferred to the air surrounding and trailing the object.

2.3 Third View

The third view to consider is one which is totally black. This can be an effect of a longer distance between the object and the camera or of the object itself. Frame #1194 is an example where the blackness of the object is not due to distance. It is observed in Figures 2.3 - 1 and 2.3 - 2. This view shows an almost dumbbell shaped object with very little (if any) cool

areas. The subject view also shows basically nothing outside of the black area. Unless there is a portion of the object that has almost exactly the same heat signature as the background, the shape shown is the outline of the object at this angle. Interestingly the object seems to be moving directly to the left and not in the direction of either its long or short axes. Also again no heat seems to be transferred from the object to the surrounding air.

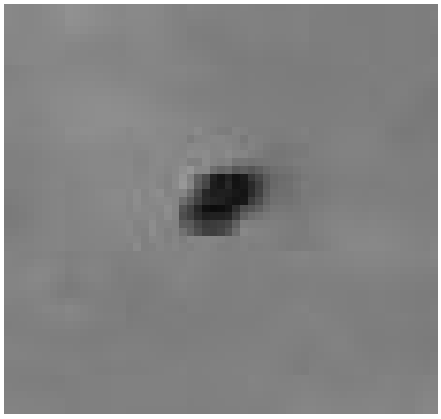


Figure 2.3 - 1: Frame #1194

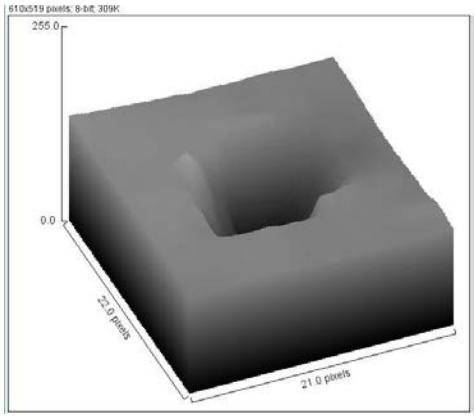


Figure 2.3 - 2: Frame #1195 Surface Plot

2.4 Possible Shape

Although not yet complete, it is possible to use the views in 2.1 through 2.3 as a start to determine a shape for the unknown object. Since it is hard to draw in three dimensions Figure 2.4 - 1 has been provided as a two dimensional view of the side of the object. The number at the base of the figure labels the location along the side in degrees. Additionally the label "Black" indicates a warmer area and the label "White" a cooler area. It is easily see that if one looks at the half labeled 0 - 180 degrees, the object will appear to be black in the middle with white at the bottom and going up the sides. Similarly, if one is provided with the half labeled 90 - 270, the object will appear as white in the middle with black across the top and going down the sides. Those 2 views therefore invert the object and reverse the colors. It should be noted that the size of the undulating curve is only meant as illustrative.

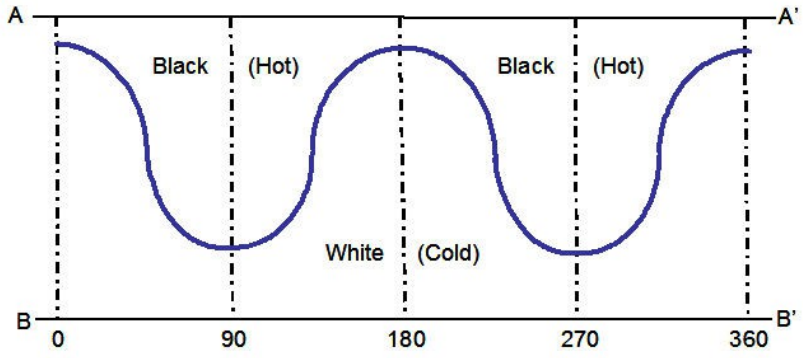


Figure 2.4 - 1: Expanded View of the Object Side

To obtain the object seen in Figures 2.1 - 2 and 2.2 - 2, requires shrinking line B-0, B-360 to almost a point and attaching the resulting sheet to the long side of an ovoid (acorn shape).

The result is illustrated in Figure 2.4 - 2. In this figure the dotted lines are only included to show the 3 dimensional nature of the object. Although this shape is indicative of some of the object's aspects, it is certainly not complete. At best this is a gross model of a completely unknown object.

Aside from the angles seen in many frames (particularly in Figure 2.3 - 1), the object shown in Figure 2.4 - 2 easily replicates the temperature outlines seen in Sections 2.1, 2.2 and 2.3. As indicated above, observed at an angle from the right replicates the temperature outline of Frame #1240. Rotate it a quarter turn around the B axis and it replicates the temperature outline of Frame #2616. Finally seen from the left it would replicate the temperature outline seen in Frame #1195. At this point the above is all that this model was created to do. The fact that it duplicates the temperature outlines is not sufficient to consider it the model desired in this appendix.

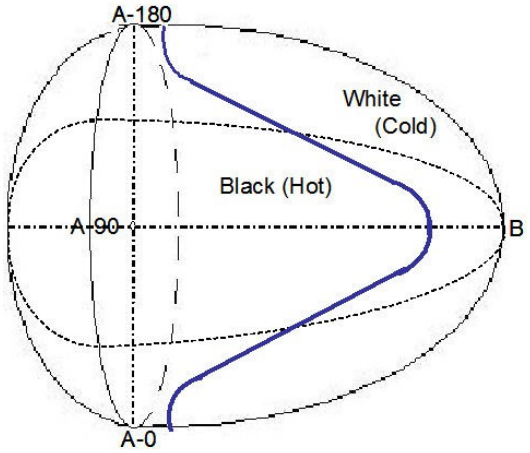


Figure 2.4 - 2: Ovoid

As many undergraduates have discovered, any attempt to fit a continuum to a finite number of points is very dangerous. That is basically due to the fact the mathematically there are an infinite number of solutions to any continuum when only discreet points are known. It also does not matter how many discreet points are used to fit the solution to. There always remain an infinite number of other solutions. Mathematicians call these problems, "ill-posed." Fortunately a Russian mathematician named Andrey Tikhonov provided a regularization procedure[3] that gave a iterative process for obtaining a particular solution. The fact that this appendix provides a pictorial model rather than writing an equation for it, does not eliminate the ill-posed nature of the problem. Unfortunately it does however eliminate the possibility of utilizing the above iteration procedure. Additionally there is no equivalent pictorial analog. The only available process is to demand that all transitions from solution to solution be accomplished by a continuous rotation of the object. Although that seems easy it necessitates a viewing consistency which due to reticule and background interference, is not completely provided in the video.

The lack of a viewing consistency is somewhat mitigated by the frame rate per second (approximately 29 - 33 fps) of the camera. That means each frame is approximately 30 m-sec in length. Although it is not known if the viewing angle of the object is changing due to a rotation of the object or the varying relative locations of the object and the camera, there seem to be long periods where the object presents views very similar to that seen in Frame #1240. Therefore the rotational speed is either intermittent, very close to zero, or

synchronous with the frame rate. The problem with accepting the coincidence of synchronicity is that there are areas where this view is seen to change quickly and the other views do not seem to have the same unchanging long stretches. It is therefore believed that the change is due to varying sighting angles possibly combined with transitory rotations of the object. This will be checked later in this section.

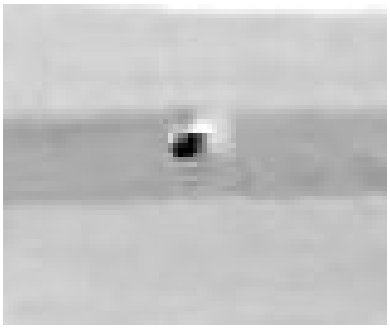


Figure 2.4 - 3: Frame #0775: Cropped & Lightened

Although Frame #2616 provides what is probably the best view seen of this angle of the object, it is not useful in looking for transitions to and from it. In this frame the object is viewed in front of a building window. The background in and around this frame is rapidly changing, making it very difficult to determine which effects are due to the object and which are due to the background. To solve this problem it was determined that Frame #0775 (Figure 2.4 - 3) is basically the same view as #2616 but with a more constant background

Looking backward in time from Frame #0775, Frame #0760 represents a time approximately 450 m-sec prior to that of Frame #0775. A cropped version of that frame is shown in the following Figure (2.4 - 4). Along with it, Figure 2.4 - 5 is a surface plot of the same view. As can be seen this view shows an object which is entirely black or hot. (This is similar to Frame #1194.) Therefore in 450 m-sec the object has transformed from one of the basic forms to another. Although not shown here there is no intervening frame that shows anything other than a continuous transformation.

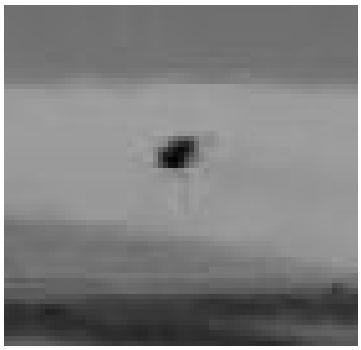


Figure 2.4 - 4: Frame #0760

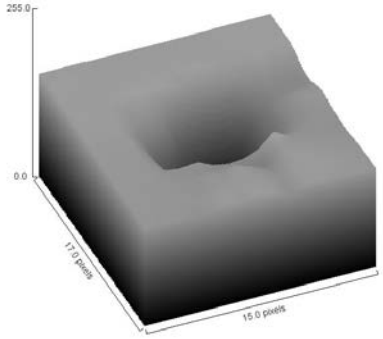


Figure 2.4 - 5: Surface Plot - 0760

Looking forward approximately 1 second from the time represented by Frame #0775 to Frame #0810 shows a second conversion to a view similar to that seen in Frame #1240. This

shows that the object seemed to rotate between the 3 basic views in approximately 1.5 seconds.

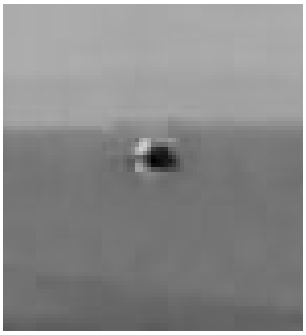


Figure 2.4 - 6: Frame #0810

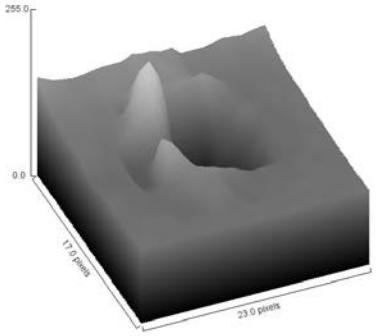


Figure 2.4 - 7: Surface Plot - #0810

Although it was determined above that that a rapid synchronous rotation cannot be occurring, that did not eliminate rotations entirely. It was left open that it is possible that in addition to varying sighting angles at least some of the changes could be attributed to slow and/or transitory rotations. Figure 2.4 - 8 has been provided to check the possible effect of sighting angles as the source of the above viewing changes. It shows the transformations discussed above in terms of the locations of the aircraft containing the camera and the target the camera is aimed at for Frames; #0810, #0775, and #0760. The lines connecting the targets and aircraft have been provided to show the approximate viewing angles for each frame. Although it is known the object is not located at the target location in any of these frames, it is believed the targets provide a reasonable approximation for checks such as this. It is easily observed that in this case the viewing change cannot be a attributed to variation of viewing angle. This therefore proves that the object does rotate.

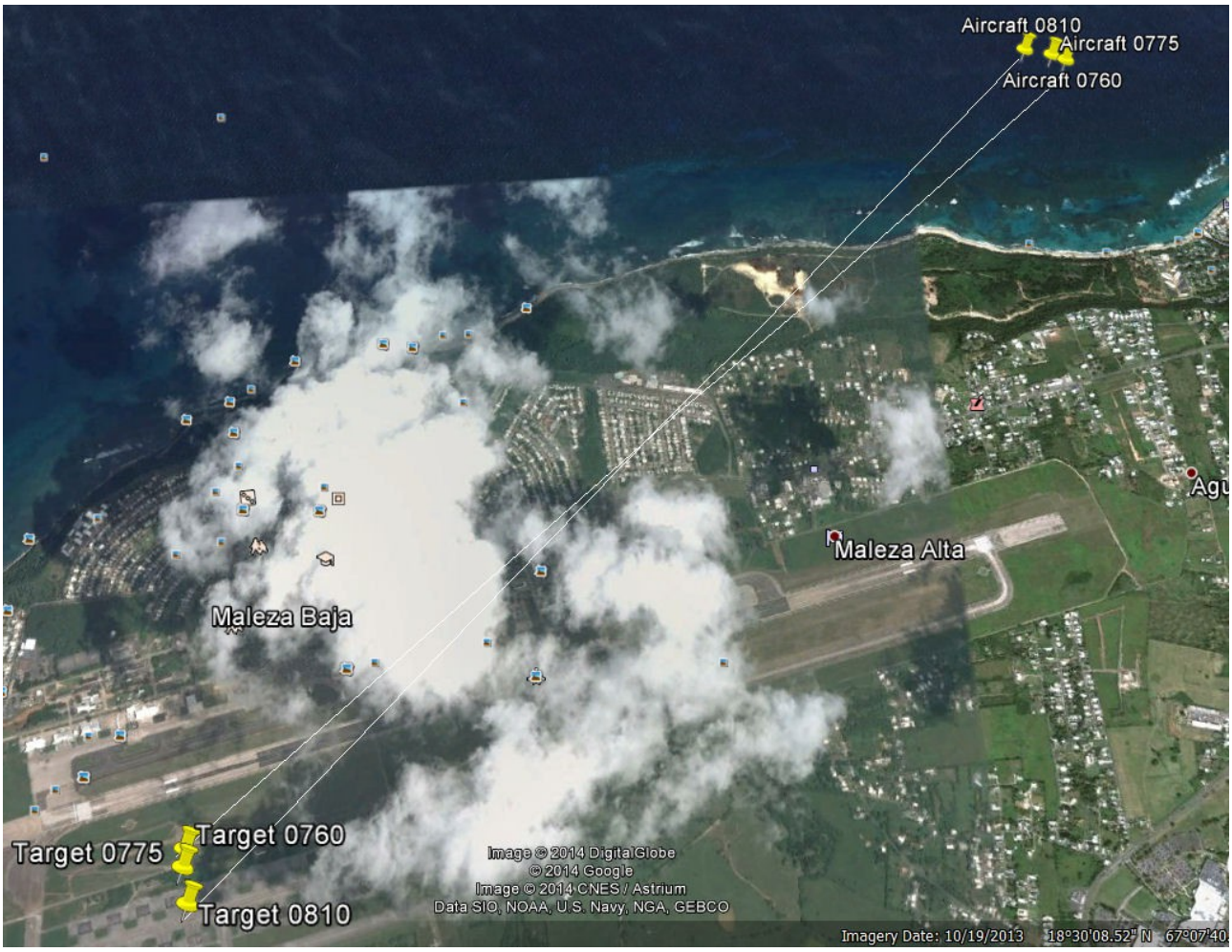


Figure 2.4 - 8: Relative locations of Aircraft and Target

2.5 Object Angularity

The problem with the shape discussed in Section 2.4 is that it assumes a completely smooth object. Since the video is entirely IR, that isn't a particularly surprising assumption. As has been emphasized, in IR one sees heat, not mass. Seeing an angle in an IR object does not necessarily indicate the object has an angle in that location. It indicates the heat source has an angle. In Section 2.4 a reference was made to angles seen in Figure 2.4 - 2 (the totally hot view of the object). It is seen in that figure that the hot area looks sort of like two offset overlapping squares. Even if there were no proof countering the assumption of a smooth object, it has to be questioned

There are, however, a few locations in this video where angularity can be seen directly. They are the times the object enters or exits the water. Concentrating on this entry period, each frame that shows that entry effectively provides a horizontal slice of the object. If the camera were looking directly downward, each of those slices would show the outline of the portion of the object which is located at the water level. However, since it is known than in all frames the aircraft is a distance off to the side of the object being viewed the camera never is looking

straight down at the object. It is aimed at an acute angle off of the horizon. Because of this, even the frames entering or leaving the water can only show an outline of the side of the object closest to the camera.

2.5.1 Entering the Water

Although Frame #3769 was used to illustrate the splash generated when the object entered the water, the last frame that didn't show any indication of a splash at all was #3758. Figure 2.5.1 - 1 is a cropped portion of that frame showing the object magnified to 400% over the camera's basic magnification. As can be seen, this view is similar to that seen in Figure 2.3 - 2. The object is almost all hot (black) and it shows a similar angularity. It remains to be seen if the angularity is real or an effect of the extreme magnification.

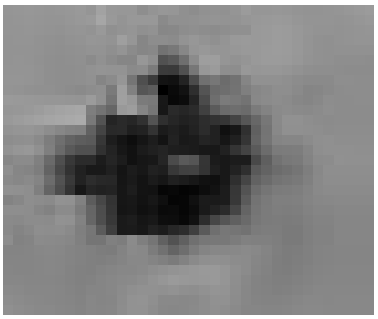


Figure 2.5.1 - 1: Frame #3758 Cropped and Magnified

Figure 2.5.1 - 2 provides a composite of Frames #3762 - #3768. It has been provided in an attempt to answer the above question. As previously stated, only the side closest to the camera in these plots should be considered as indicative of the object's shape. The back portion is heat from that portion of the object still above water. In these plots, the front of the object is found in the lower left corner and the back in the upper right. Since although the object may not be round, it has to be assumed that only the lower half of the left side can be seen directly. Additionally, in order to see the totally hot (black) area of the assumed ovoid, it has to be entering the water at an angle. In this case, the lower left should be entering the water first. Since the frame labels can be considered as labeling time the figure shows an object initially hitting the water in #3760 and sinking into the water as the numbers go up.

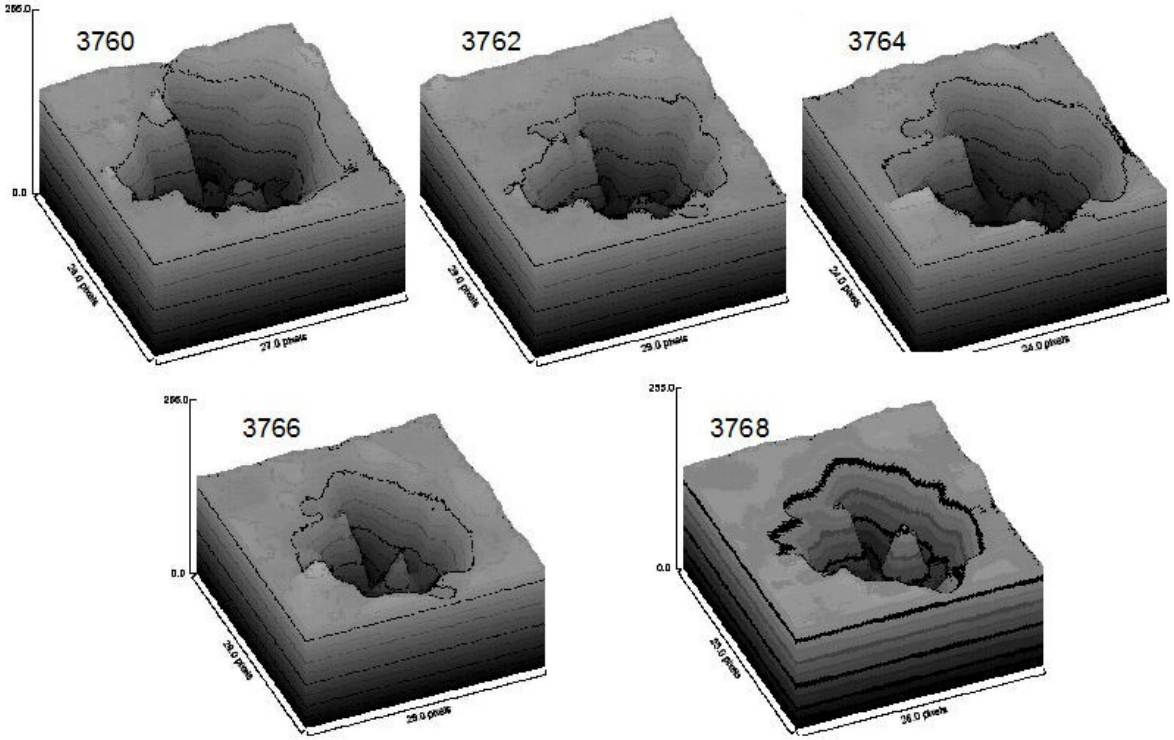


Figure 2.5.1 - 2: Surface Plots - Object Entering the Water

It is initially seen in #3760 that the lower left shows a sort of stair-step shape. Thus the angularity discussed above is the actual shape of the object and not an artifact of the magnification. Although there is no way to prove the following assertion, it will be assumed that the object is symmetric and that the stair-step shape also occurs in the back. It should not be forgotten that this is an assumption.

The second hint about the shape of the object is seen when looking at how the stair-step shape changes as the surface plots move forward. As time moves forward and the object sinks into the water, the edge moves in toward the middle and steps become less distinct. Basically this is exactly what would be expected if the general shape of this portion of the object was a dome.

Since the section of each frame shown in the surface plots was chosen by eye, the area covered by the plots is not constant. Due to this the writer checked the sizes by magnifying each object 4000x over the base magnification of the frames and counted the black pixels running along the center line. The result was that for each increase by 2 in the frame number there was a corresponding decease by 1 to 2 pixels in the pixel count.

2.5.2 Traveling through and Exiting the Water

There is a partial exit from the water in Frame #3912. There is very little information that can be obtained during this period. In addition to emerging under the frame reticle, due to molecular vibrational and rotational excitations, electromagnetic (EM) radiation is strongly attenuated by water. Although it is well known that visible light can penetrate water, the same is not true for the longer wavelengths in the EM spectrum. The attenuation of

electromagnetic radiation in water[4] for the longer wavelength portion of the IR spectrum is seen in log-log graph in Figure 2.5.2 - 1. Since the wavelengths used by FLIR lie in the ranges 3 - 5 and 8 - 12 micro-meters, it is easily seen that for any frequency in those ranges, the absorption coefficient is over 100 cm^{-1}. (A similar graph[5] specifically for seawater can be found in the Notes section of this paper.)

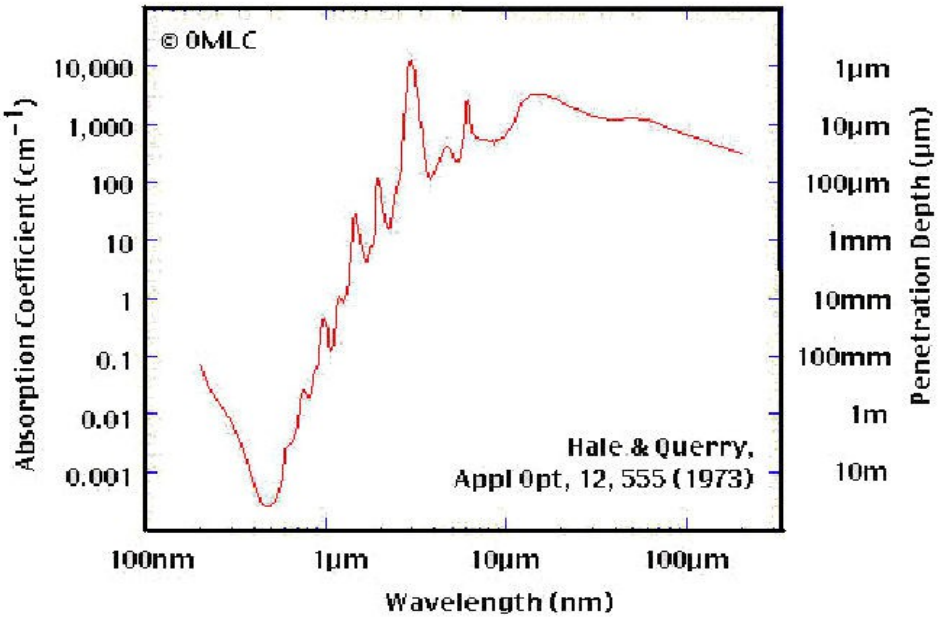


Figure 2.5.2 - 1

The usefulness of the absorption coefficient is seen in calculation the intensity[6] of the transmitted EM wave in water.

$$I(x) = I_0 e^{-\alpha x},$$

Where "x" is a distance in cm in the water, "α" is the absorption coefficient (assumed constant over the range), and I_0 is the initial intensity. With a coefficient of 100, the intensity drops by over 44 orders of magnitude in 1 cm and over 5 orders of magnitude in 1 mm). Essentially this means these frequencies do not penetrate water.

Although in essence, this means that a layer of at most a mm around the object will absorb virtually all of the IR generated, it doesn't answer the question of how it will affect what is seen in an IR video. Since the object is pumping heat into the surrounding water, it would seem reasonable to expect to see a sort of heat shadow of the object above the object and trailing it. Due to the depth of the top of the object while underwater and its speed that is not observed to occur. The speed obviously spreads out the heat but it is believed the depth is the larger reason. If the depth of the object were less than the wave size (peak to trough), it would break the surface as it moved and become visible as the water moved away from it. Therefore its minimum depth must be greater than the wave size.

While the object is underwater, there is additionally a competing thermal effect which can be seen in the video evidence as motion but not in the individual frames. It is a slightly cooler area which seems to remain over the object while it is underwater. It is believed by the writer that this is what is termed a Bernoulli Hump. It is basically a slight bulge in the surface due

to displaced water caused by the objects size and speed. The surface disturbance from a Bernoulli Hump is approximately given by[7]:

$$Y = W(d, v, h) \bullet S$$

where "W" is a scaling function and "S" is a shape function. In these equations: "d" is the objects diameter; "v" is the objects speed; and "h" is the objects depth. The shape function is a function of front to back location along the object and for this appendix will be assumed to have a value[8] of 0.8. The equation[7] for the scaling function is:

$$W = d^2 v^2/(8 g h^2) ,$$

where g is the acceleration due to gravity. Therefore the Bernoulli Hump increases with speed and cross sectional size and decreases with depth. Using a speed[9] of 82.812 mph and a diameter of 3 ft., the following graph for the surface disturbance (Y) was obtained.

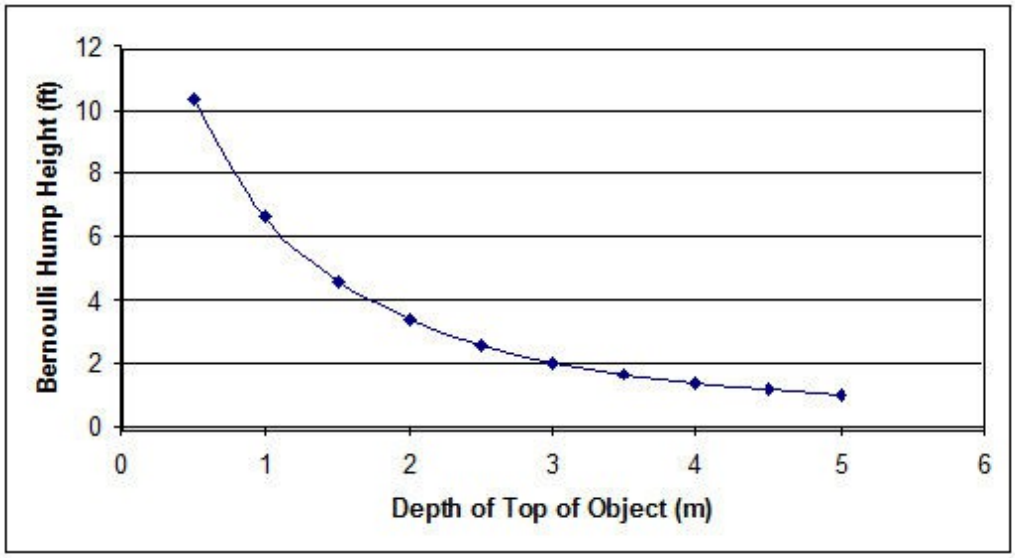


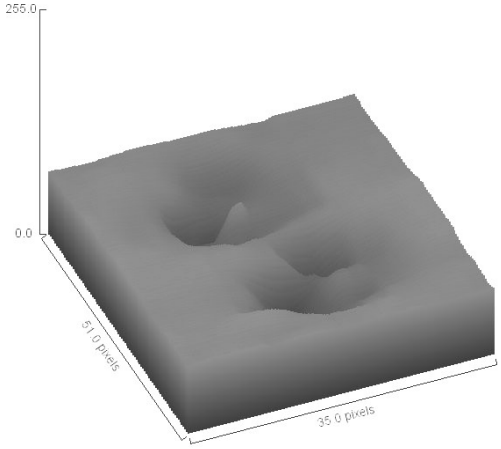
Figure 2.5.2 - 2: Bernoulli Hump Height as a function of Object Depth

The above figure shows that the Bernoulli Hump decreases with the depth of the object. Since we are assuming it is the expansion of the surface due to this bump in the water that is causing the decrease in temperature that we see in the video, the temperature change due to the surface expansion also decreases with the depth of the object. Additionally as has been said before, the temperature change is not visible in any single frame but its consistently coordinated movement is easily followed in the video evidence.

As per Weather Underground (www.weatherunderground.com), the average wave height (crest to trough) just off of the northern coast of Puerto Rico is 1-3 feet. Since it is possible to see some of the waves in the both the video and in single frames, the difference between the waves and the Bernoulli Hump provides a way to estimate the depth of the object. Specifically it indicates that the Bernoulli Hump height is less than 1-3 feet in height. Thus from Figure 2.5.2 - 2 for a height of <2 feet, the objects maximum depth is between 3 and 5 meters.

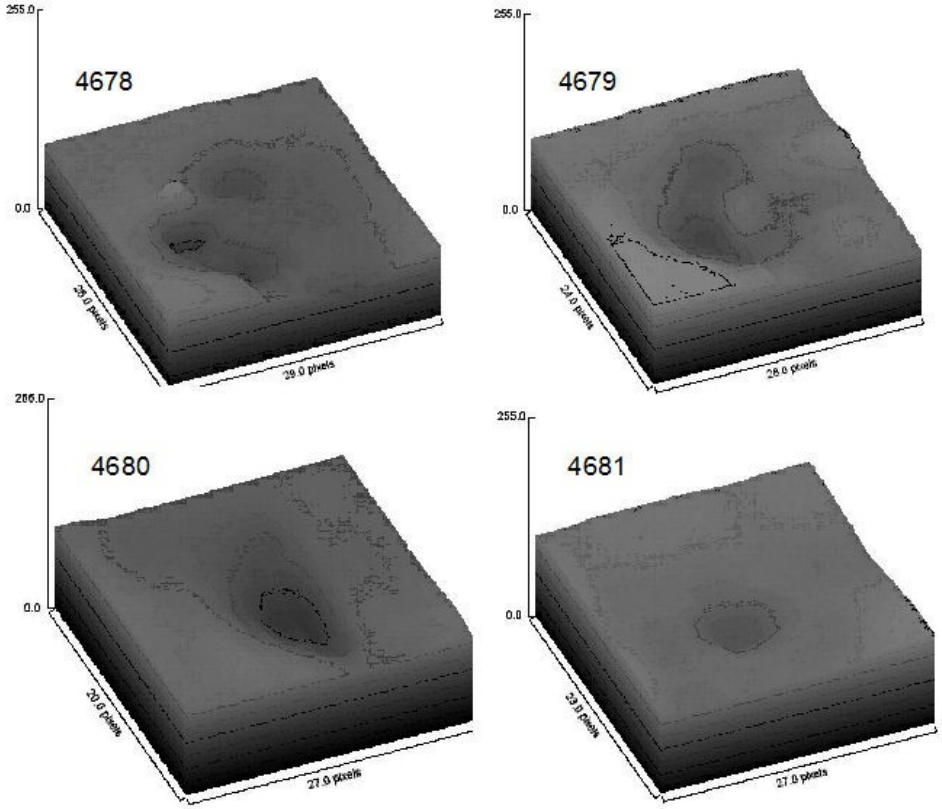
2.5.3 Second Entry

This water entry occurs after the initial object has divided into two objects. Figure 2.5.2 - 1 is a surface plot of Frame #4677 of the two objects prior to the water entry. The object on top is the one that will begin to enter the water 2 frames later. As indicated in this figure, the existence of the cooler (white) areas show that these objects bear a closer resemblance to a long end of the ovoide shown in Figure 3.4 - 2 than to the end view that was indicated in Section 2.5.1. Since the viewing angle is different this section may provide additional clues as to the objects shape.



. **Figure 2.5.2 - 1: Surface Plot - Frame #4677**

As in Section 2.5.1, Figure 2.5.2 - 2 provides a composite of Frames 3762 - 3768. It has been provided in an attempt to answer the above question. As previously stated, only the side closest to the camera in these plots should be considered as indicative of shape information.



.

Figure 2.5.2 - 2: Surface Plots - Object Entering Water Second Time

The difference between this and that observed in Section 2.5.1 is easy to see. The most obvious difference is at this point there are 2 objects. Their shape is smooth with none of the angularity seen previously and they seems to be thinner in one of their lateral dimensions. Finally the last portion entering the water is offset from the middle. The sum of these statements seems to indicate that at this angle the objects looks very much like the side or end of the long side of the ovoid chosen in Section 3.4 but showing differing lateral dimensions.

2.6 Final Shape

It has been shown that the ovoid shape discussed in Section 2.4 was relatively close to what has been determined. The changes that occurred started at the increased temperature end of the object. Seen end-on (Figure 2.3 - 1) the object seems to be angular and have unequal lateral dimensions. The angularity was shown to be a result of the object's shape and not an artifact of the magnification in Section 3.5.1. The unequal lateral dimensions was then shown to carry through the entire ovoid in Section 3.5.3.

There is however a conundrum in what has been found. Seen from one side the shape or shadow of the object is an oval. At least when entering the water, the other side of the object is angular. Obviously these two sides cannot be along the same dimension. They also cannot be directly along either of the lateral directions the would be seen when the cooler or white sections are observed. This only leaves an angle including both the long axis and one of the lateral dimensions. From that angle, the angularity can be observed on one side with the far

side being smooth. This, of course, means the assumption near the end of Section 3.5.1 that the angularity would be symmetric is incorrect. It also means that when seeing the angularity, one is also seeing a small section of the right hand side (long portion) and that when seen directly from the left hand side, the object would be an oval. This is shown in Figure 2.6 - 1.

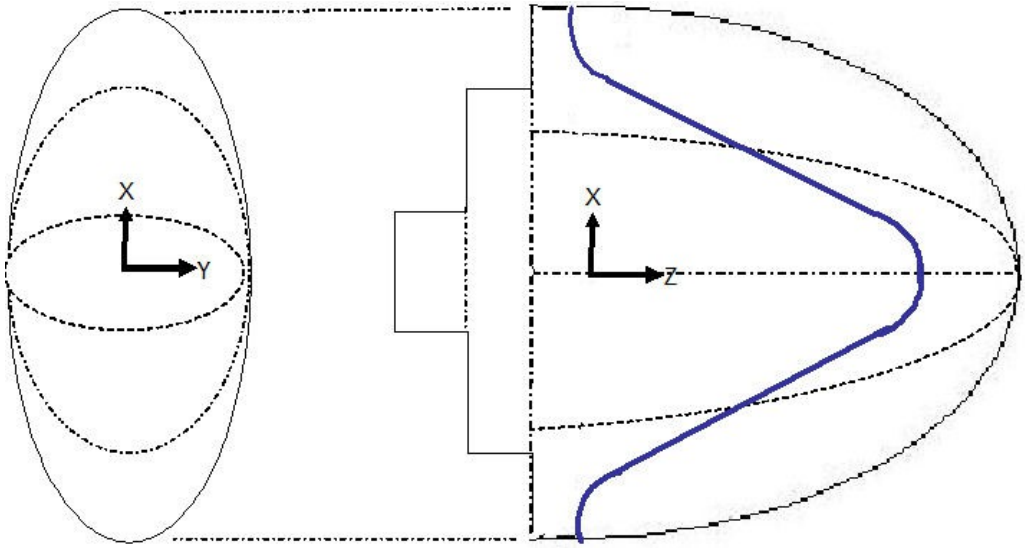


Figure 2.6 - 1

In this figure the back portion (possibly aside from the exact center) is black or warmer. The right hand image is being viewed in the negative y direction. The left hand image is being viewed in the positive z direction. A view at a 45 degree angle between the y axis and the positive z axis would angular on one side and round on the other.

3.0 Heat Transfer

It is obvious from the model that most of the object is hot or warmer then it's surroundings. That should raise the question of whether there is any heat being transferred to the surrounding air. Heat transfer essentially occurs via two different mechanisms; radiation and conduction. Normally a third mechanism, convection, is also stated. It however is just conductive heat transfer between two objects with a relative velocity between them.

In its simplest form convective heat transfer for a system where the wall temperature does not change is governed by Newton's law of cooling[10].

$$dQ/dt = H\ A\ \circlearrowright T\ .$$

In this equation: "Q" is the thermal energy transferred from the unknown object to the air; "H" is the heat transfer coefficient[11] (assumed independent of both temperatures); "A" is the unknown object heated surface area; and "↻T" is the difference in temperature between the unknown object and the surrounding air. Although this equation is easy to apply, we do not know the surface temperature of the unknown object or even its area, thus limiting the equation's usefulness.

In the present situation, since the fluid (the air) is forced to flow over the surface by the movement of the unknown object, the heat transfer is what is termed forced convection. The central concept used in forced convection is that of a boundary layer[12]. Any flow bounded by

a surface will develop a region adjacent to the surface, in which the flow properties are different from that seen an infinite distance from the surface. The primary cause of the boundary layer is friction.

The boundary layer is an important concept because it is the region in which heat transfer between the fluid (gas) and the surface takes place. It is known that the boundary layer will include both velocity and thermal layers. Since we have no knowledge of the surface conditions of the unknown object, this appendix will concentrate on its thermal properties. In a thermal layer, the temperature varies from a temperature T_o at the wall to the equilibrium temperature T_∞ at the outside edge of the layer.

The simplest type of convection is that which takes place in a laminar flow. Laminar flow is easy to predict and has very little fluctuation in it. Most situations begin as laminar flows and then later transition to turbulent flows. Laminar flow develops an insulating blanket around the object and restricts heat transfer. Conversely, due to the agitation factor, turbulent flow develops no insulating blanket and heat is transferred very rapidly. Also due to the same factor, turbulent flow is less structured and predictable than laminar flow. Structures called eddies dominate the flow. Since the driving force for heat transfer is the difference in temperature between the fluid and heat source, moving that fluid away from the source and replacing it with cooler fluid will carry off more heat. Turbulent flow therefore tends to carry off more heat than laminar flow.

It is noted in Appendix J that no wake was seen for the unknown object while it was traveling underwater. As in that appendix this lack of a wake was attributed to the unknown object being able to maintain laminar flow around it during that period. The effect being looked at in air is similar but not quite the same. In water turbulent flow produces pressure and shear waves that are termed wakes. Since the video in question is IR, those waves would have been seen as slight differences in heat. Neither they nor any convective heat transfer were seen during the water transit. While still looking for difference in heat when traveling in the air, the lower density eliminates the possibility that waves in the air could themselves produce heat that could be seen. Therefore the only heat to look for in air would be a trail following the unknown object and quickly dissipating into the bulk air temperature.

Since neither the unknown object surface composition nor the temperature are known, it is not possible to know if the air flow around it is laminar or turbulent. It is however known that due to expected conduction from the unknown object surface to the surrounding air molecules the air should carry off some heat and that heat should be noticeable in surface plots. Interestingly none is seen in any surface plots looked at. The reader is invited to inspect Figures 2.1 - 2, 2.2 - 2 and 3, and 2.3 - 2 in this appendix. It is therefore assumed that, although surprising, the air flow is probably laminar and that the temperature of the unknown object warmer areas is probably not exceptionally high. Thus any heat being carried away would dissipate so quickly as to not be noticeable in these plots. To check this, the writer used the "Transform Image to Results" function in Image J. The result of this function is a spreadsheet of the pixel values. Figure 3.0 - 1 is small portion of that spread sheet for Frame #0760.

154	155	156	156	157	152	154	156	157	156	157	158
156	158	160	160	160	165	163	161	159	158	158	157
159	160	159	155	152	153	146	139	141	148	152	150
156	154	149	141	134	109	100	94	105	126	140	140
153	150	139	122	88	62	37	33	51	115	134	141
153	136	102	77	52	31	18	31	53	105	131	151
157	128	68	33	13	6	11	47	76	108	134	161
161	135	74	35	12	4	20	70	104	113	131	150
148	125	79	45	16	13	31	79	119	124	144	158
155	158	152	150	134	137	137	149	168	153	155	150
147	145	140	145	138	134	129	126	148	144	148	142
155	152	143	152	152	155	149	137	160	156	154	140

Figure 3.0 - 1: Heat Trail - Frame #0760

In this figure heat is denoted by lower numbers. It shows the unknown object traveling to the right and the pink area is basically the outline of the unknown object. It should be noted that the author arbitrarily chose a cutoff value of 120 to distinguish the unknown object from the background. It is easily seen, there is no absolute outline for the unknown object. The numbers over 100 and below 120 and along the edge and represent areas which are partially unknown object and partially background. The interesting areas are those shown in orange. They are areas slightly warmer than the background and represent the heat trail of the unknown object as it moves through the air. It can be seen that there are also some areas around the unknown object that show a slight warming. The long axis of the object is contained in 8 pixels. Assuming the unknown object is 4 feet long, each pixel would represent about 6 inches and the heat trail only lasts 1 pixel length (about 6 inches) beyond the unknown object.

The reader is invited to compare Figure 3.0 - 1 with 2.4 - 4. In the latter figure it is seen the entire object is black with no specific area distinguishable. That isn't so in the above figure. In this figure it is easily seen the maximum heat (single digit values) is clustered near the center and falls off in all directions. It is believed that the smallness of the very hot area is the reason that overall the heat produced is relatively low.

4.0 Conclusion

This Appendix started by using various views of the unknown object to compile a model of it, During that process it was determined that:

- Since a splash was seen in Frame #3769, the object is physically present;
- In most of the frames the unknown object displays a smooth exterior shape;
- In some frames while entering the water some angularity was observed;
- In addition to its forward motion, the unknown object is observed to rotate;
- In relation to the forward motion, the rotation looked slow and variable;

- Assuming the hot and cold areas remain fixed on the unknown object, no relation was seen between the hot areas and the lead area (front) of the unknown object;
- The lack of a relation between heat and direction of motion eliminates most terrestrial propulsion systems;
- Only a minimal heat trail could be found following the unknown object.
- The air flow around the unknown object is likely laminar;
- With less than a mm of water covering the object, no IR radiation will escape;
- The wave size shows the object's minimum depth underwater to be between 1 to 3 feet.
- The Bernoulli Hump shows the object's maximum depth underwater to be between 3 and 5 meters; and
- The areas of the unknown object are not as hot as would be expected from a conventional aircraft or as cool as a balloon or plastic bag.

This is a surprising amount of information to be obtained from consideration of a simple model. Since these results are also all independent of the model, they could all have been (and some were) obtained without the model.

Notes and References

1. Subjective Realism is a world viewpoint in which the world is in the mind of the viewer.
2. Invariant mass is the portion of mass that is not a function of velocity. It is the portion of mass that defines shape. There are field quantizations which have mass but no invariant mass and there are mathematical constructs such as energy which is equivalent to mass. Those objects, however, do not define a shape.
3. Tikhonov, A; Arsenin, V; "Solutions of Ill-Posed Problems", John Wiley and Sons; 1977.
4. Hale, G.M., Querry, M.R.; " Optical Constants of Water in the 200 nm to 200μm Wavelength Region"; Applied Optics; **12**, Issue 3; 555-563 (1973): Plot obtained from data table provided in paper.
5. Wozniak, B,; Dera, J.; "Light Absorption in Sea Water"; Springer - Atmospheric and Oceanographic Sciences; (2007); Chapter 1; Page 4; Figure 1.2a
6. Electromagnetic rays interact with particles via discrete scattering. When energy is deposited onto the scattering material, the process is called absorption. The number of photons that experience an energy loss is proportional to the differential thickness of the scattering material and the number of photons incident on the material. The equation provided in this appendix is basically the number of photons left undisturbed after a distance x.
7. Stefanick, T.; "Strategic Antisubmarine Warfare and Naval Strategy"; Institute foe Defense and Disarmament Studies; (1987): Appendix 3; "Non-acoustic Means of Submarine Detection"; Equation A3-1. The assumptions used to create this equation were:
   - The ocean is infinite in depth and extent (the location of the object is far from the ocean's bottom and boundaries);
   - There is no surface tension at the oceans surface (the effect wavelength is large compared to surface tension wavelengths);
   - The ocean water has no viscosity (the boundary layer is small compared to the object's diameter);
   - The object can be approximates as an ovoid moving parallel to the ocean's surface.
8. ibid: Figure A3-2
9. Average underwater speed calculated in Table 3.2 of the Water Transit Appendix (Section 3).
10. Burmeister, LC; “Convective Heat Transfer”, 2nd ed.; Wiley-Interscience,; 1993; p 107
11. The heat transfer coefficient is normally defined by inverting Newton's law of cooling. Since that would result in a circular system, it is better to define it using the Nusselt number (Nu):
    $$H = k\,Nu / L$$
    In this equation "k" is the thermal conductivity of the fluid and "L" the characteristic length of the problem.
12. Anderson, J.D.; "Ludwig Prantl's Boundary layer"; Physics Today; **58;** No.12; pg42-48; (2005)

APPENDIX I

Alternate Speed Calculation Using Background Objects

OBJECT GROUND SPEED MEASURED WITHIN FRAMES 3769 THRU 3851

Abstract: During the specified frame range, the object was over the ocean and underwater for a subset of these frames. The speed was measured using the distance provided by the on screen video data, X (horizontal) pixel positions of the object in each frame and the X pixel positions of waves in the background which provided an angular rate of camera panning. These measures not only provide the ground speed but also evidence of object ground speed accelerations while underwater.

Method of Speed Measurement

First, the changes in the horizontal (the X) pixel positions from one frame to the next were derived by subtracting the current frame X position from the previous. Thus if the object moved to the left relative to, say the reticle, then the resulting difference would be positive. Consequently movement to the right would be negative. The background motion was always toward the right for all of these frames. To obtain the incremental change of the background, the X pixels of a selected background location were subtracted; previous frame minus the current frame – opposite to the objects incremental measure. This ensured that the background incremental measures were always positive since the background motion relative to the screen was always to the right.

Next, the incremental measures of both the object and the background can be converted to a horizontal angular rate by multiplying the degrees per pixel by each of those increments. If the object moved to left, relative to the screen, then its angular rate is faster than the angular rate of the background (i.e. a fixed location appearing to move to the right on the screen) – thus the angular rate of the object, relative to the fixed background, should be added to the angular rate of the background. This gives the angular rate of the object relative to a fixed background location which will enable a ground speed measure of the object. Figure 1 illustrates the method.

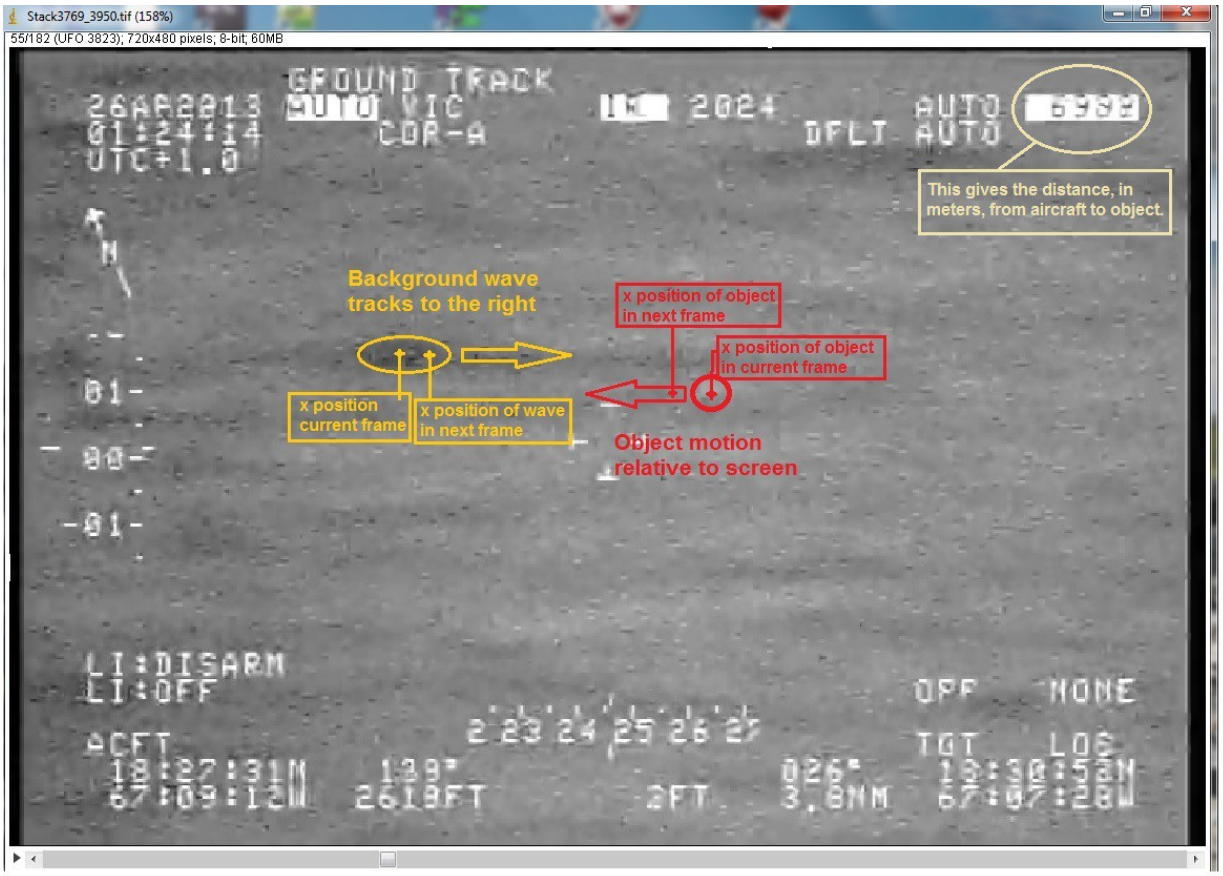


Figure 1 (Frame 3823)

Figure 1 is frame 3823 showing the object circled in red (difficult to see but present where indicated) and its relative direction of motion as the camera pans left. Waves, seen in the background, track right as the camera pans left. The full horizontal field of view at this magnification (2024) is about 0.3602 degrees. For 704 horizontal pixels, this gives about 0.000512 degrees per pixel. The background wave and the object can be seen in frames 3823 and 3824. The wave has moved about 16.33 pixels (an average) while the object has moved 5 pixels. Thus the angular increment for the wave is 16.33 pixels * 0.000512 deg/pix = .0084 deg change while the object angular increment is 5 pixels * 0.000512 deg/pix = 0.0026 deg change. What is the object's angular incremental change relative to the background? Since the object's relative motion to the left implies that the object is moving faster than the camera is panning to the left then we should add the angular changes; 0.0026 + 0.0084 = 0.011 degrees change relative to the fixed background.

Thirdly, we use the aircraft to target distance indicated at the upper right of Figure 1 to derive the ground speed of the object. This distance given in frame 3823 is 6938 meters (although not very legible in this frame, it is clear in immediately previous frames.) However, in frame 3824 the distance was updated to 6951. Under this circumstance, we took the average: (6938+6951)/2 = 6944.5 meters as the distance to the object from the camera. The object ground travel during frames 2823 to 3824 was 2*6944.5*tan(.011/2) = 1.33 meters or about 4.34 feet.

Fourth, we use the time increment from the start of one frame to the start of the next which is, essentially, the time increment for 1 frame. Because of the variation in frame rate, the on screen clock was used to count the number of frames in 1 second for specific sets of frames. In this case the frame rate was 32 frames per second. Thus the ground speed of the object based on movements measured from frame 3823 to 3824 was determined to be 4.339756 ft/0.031 sec or about 138.87 fps or about 94.69 mph.

Figure 2 depicts the moving average of object's ground speed, based on the above method, for frames 3769 thru 3851; 83 frames and 320 data points. That moving average includes sets of 5 frames.

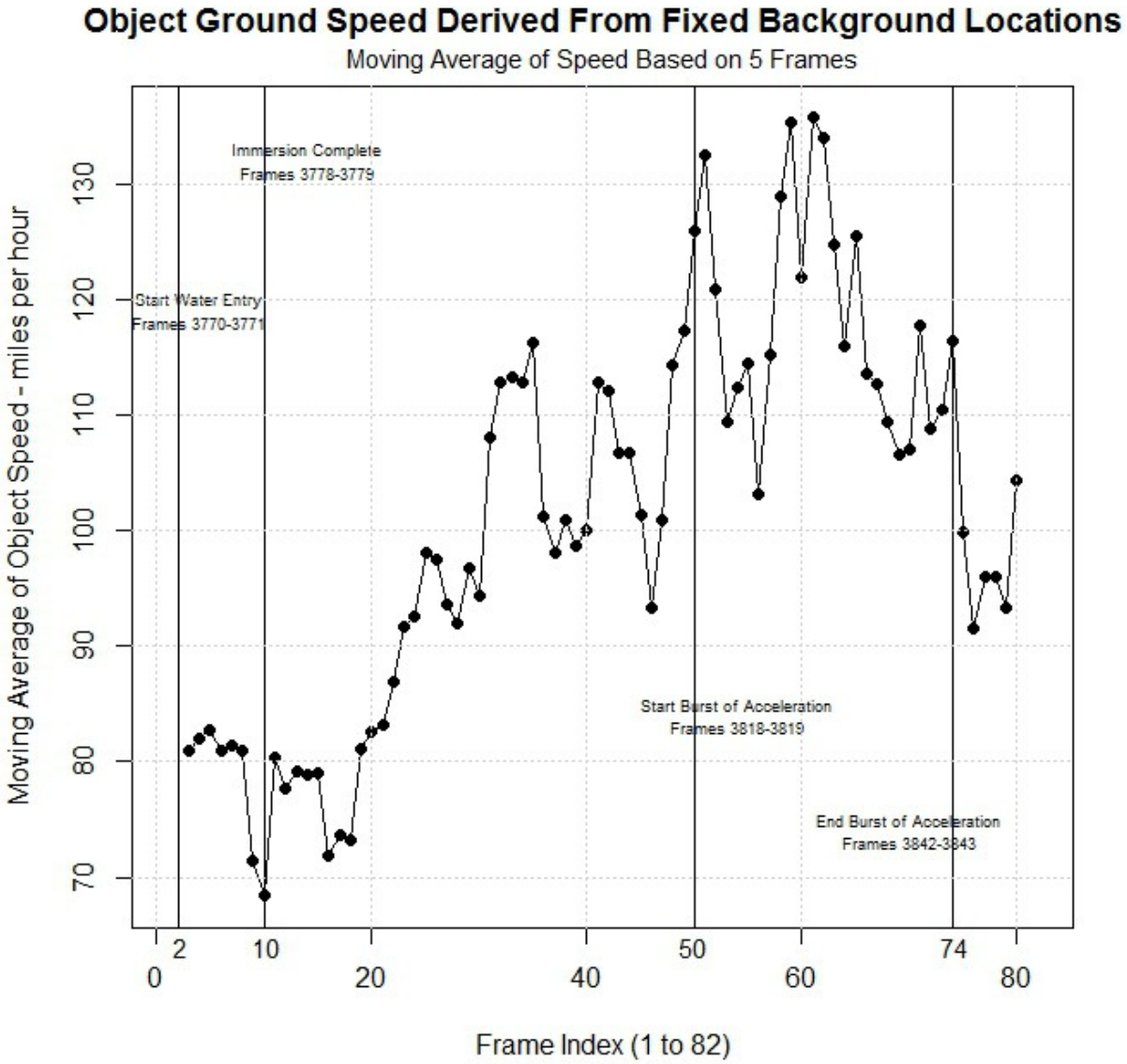


Figure 2 (Frame pairs 3769-3770 thru 3850-3851)

The difference between pixel locations for adjacent frames were used to determine incremental movement. Consequently pairs of frames are indicated instead of individual frames. Additionally, the frame index indicates the frame pair with less clutter across the base of the plot. The frame index represents frame pairs as follows; 1:3769-3770, 2:3770-3771 ... 82:3850-3851. Because each point represents an average of 5 frames, the plot does not start with 1 and end with 82. The methodology did have a fair amount of noise since tracking a wave across a sequence of frames did involve some estimates of location. Some frames had as many as 5 data points, tracking 5 different waves, while most others had 4, 3 and at least 2. The average standard deviation was 3.34 pixels per frame – an average noise level that is not too bad.

Viewing the specified frames of the video, the burst of acceleration has been determined to be real by this analysis even though the panning rate did slow which could have created the illusion of object acceleration.

10.5281/zenodo.7837470

APPENDIX J

Water Transit

Introduction

Although most of the video concerns the object moving through the air, there are portions where the object interacts with the ocean. These include approaching the ocean in preparation to enter it; entering the water; motion underwater; exiting the water; object division; and the transition period from water transit back to air transit. This appendix will examine each of these periods individually. After determining what is shown in the video for each portion and what is implied by each item, some discussion will be provided of the present level of Earthly science and engineering in these fields. A final section will also be provided continuing the results of each of the previous sections.

The basic difficulty in interpreting infrared (IR) pictures is our lack familiarity with them. We expect pictures to show the subjects mass and shape. IR pictures do not do that. They only show heat variations. Since we do not know what the nature of the object being filmed, we also cannot know how its heat would vary in any normal operation. However, although the object is unknown, its environment is not. The environment is a known; therefore, clues about the object can be derived from seeing how the environment reacts to it. Where possible this appendix examines the known to determine the unknown.

1.0 Preparation for Entering the Water

Since it is known that water is approximately 50 times more viscous[1] than air, a calculation of the speed in air before entering the water and its speed while in the water was made to see if there was any difference. It may be noted that, if the unknown object is piloted, it can expected that it may slow down some prior to entering the water to increase the time the reaction force from the water is applied thus reducing the instantaneous force. This calculation was done for a set of frames a short distance away (# 3700 - #3750) from that specific frame (#3769) in order to reduce any effect introduced by the period where the unknown object was actually entering the water. Since this 19 frame difference only translates to slightly more than 1/2 second, it is known that it can only be partially effective in eliminating any slowing down period.

The basic data for the frames chosen is shown in Table 1.1.

Frame	**3700**	**3750**
Latitude (DMS)	18 30 49	18 30 51
Longitude (DMS)	67 7 23	67 7 25
Time (H:M:S)	1:24:10	1:24:12

Table 1.1

The problem with the data given above is both coordinates and time are stated to within 1 second.

Since it is implicitly assumed that the unknown object will travel in a straight line during this period, the time and coordinates to use in calculating this speed are totals. Since any internal error between cells in this series will cancel, corrections have only been applied to the end cells. Those corrections were calculated using linear scaling. A check of the frames showed

that the first frame that showed the time of 1:24:12 was # 3734 and the last frame to show that time was # 3765. Therefore as shown below, frame # 3750 occurred at a seconds value of 12.52125 seconds.

$$X = 12 + (3750 - 3733) / (3765 - 3733) = 12.53125$$

Similarly the first frame that showed a time of 1:24:10 was # 3676 and the last frame was # 3701. This gives a seconds value of 10.96154. The total time is therefore 1.5597 seconds. The interesting result with this calculation is that if one had blithely used the 2 second difference determined by subtracting the given times the resulting velocity would have been approximately 28% lower than what will be calculated here.

Before considering a repeat of the above calculation for the coordinates, it is instructive to determine the possible maximum error that could have occurred due to their truncation. By truncating the coordinates of each frame the actual location is only known to a half second of degree for both Latitude and Longitude. Using 3963.191 miles for the equatorial radius of the Earth and 3949.903 miles as the polar radius, the radius of the Earth at latitude (L) of 18.5225 degrees is calculated as:

$R_1 = \{ R_E4 \cos2(L) + R_P4 \sin2(L) \} / \{ R_E2 \cos2(L) + R_P2 \sin2(L) \} = 3961.86$ miles .

Therefore the distance equivalent to a half second of latitude is

$$D(1/2 \text{ sec Latitude}) = \{(\pi/2) (R_1 / 90) (5280) / \{2 \times 3600\} = 50.71 \text{ feet} .$$

A similar equation exists for Longitude, but the radius used has to be (R_2), the perpendicular distance from a line connecting the poles to the specific Latitude location.

$$R_2 = R_1 \cos(L) = 3756.63 \text{ miles}$$

This results in the distance equivalent to a half second of longitude being

$$D(1/2 \text{ sec Longitude}) = \{(\pi/2) (R_2 / 90) (5280) / \{2 \times 3600\} = 48.08 \text{ feet}$$

Therefore every frame can be off by a maximum of 69.88 feet. Since the distance per frame is approximately 5 feet, the above possible maximum errors present the possibility of introducing spurious results. This could cause the distance between frames to vary from frame to frame. Therefore the velocity will also have to vary. In particular there will be instances where the object will stop for a few frames or even move backwards while instantly accelerating to high velocity values to account for other changes. Since it is known that with multiple frames internal errors always cancel twice the 69.88 feet is the maximum error introduced by the truncation of the seconds term in the coordinates regardless of how many frames are included. In the present case where the distance is 50 frames long, the total length is approximately 250 feet and the error bars would be plus and minus 140 feet. Therefore the correct values for the two ends must be calculated in this case.

The 49 second latitude seen on frame # 3700 runs from frame # 3690 to frame # 3706. The 23 second longitude value seen it runs from frame # 3685 to frame # 3700. Therefore by linear interpellation the coordinates of frame 3700 should be { 49.67, 23.94 }. Similarly the 51 second latitude seen on 3750 runs from frame # 3727 to frame # 3765. The 25 second longitude value seen on 3750 runs from frame # 3740 to frame # 3759. Therefore by linear interpellation the coordinates of frame 3700 should be { 51.62, 25.55 }.

Using the radius { R_1 } calculated above and denoting the coordinates of location 1 as { L_1 , Lo_1 } and location 2 as { L_2 , Lo_2 } the distance between 2 sets of coordinates is calculated from: $d = R_1 \cos\text{-}1 \{ \sin(L_1) \sin(L_2) + | \cos(Lo_1 - Lo_2) | \cos(L_1) \cos(L_2) \}$.

This equation with the above coordinates and radius of the Earth yields a total distance of 251.16 feet and results in an air-speed prior to entering the water of 109.72 miles per hour.

2.0 Entering the Water

In today's science, it is impossible to enter, leave and move through a fluid and not affect it. However, that seems to be the case in the video. Although the effect may be less than normally encountered, it is this author's opinion that the lack of a visual effect is basically due to our difficulty in translating a heat signature into the more normal mass picture.

Frame 3769 and those around it seem to show an object larger than 3 feet moving at over 100 miles per hour hitting and enter the ocean seemingly without creating a splash. Although present science knows ways to almost make the object almost invisible to the water and thus minimize the splash, eliminating it is not possible. Effectively a splash is taking a volume of water and drastically increasing its surface area. Since both evaporative and radiative heat transfer are proportional to the volumes surface area, a splash provides a means to allow that volume of water to become a "little" cooler. Little is in quotes because the change is very small and is basically invisible to the viewers eyes. This is seen in figure 2.1. In this figure, the red circle outlines the unknown object that has just hit the surface of the ocean and the red arrow indices the direction it is traveling in. As was stated above, even zoomed in no splash can be seen in this figure.

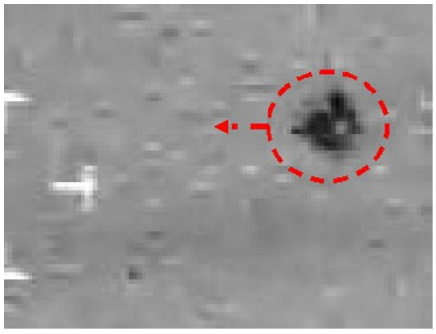


Figure 2.1: Frame 3769 - 300X zoom

The "Surface Plot" tool in "ImageJ" provides a three-dimensional view of the intensities of pixels of a non RGB or grayscale image. It therefore converts the heat variations in the IR frame to height variations with (in its default operation) the lighter (cooler) pixels being represented as hills and the darker pixels as valleys. The red outline in figure 2.1 was provided to allow a direct comparison of that picture with the surface plot shown in figure 2.2.

Although still small, the cooler areas representing the splash are seen as raised areas around the upper corner of the plot. It is believed these represent a splash rather than simply cooler areas of the unknown object since they do only show up in these plots where the unknown object is entering the water. By comparing the 2 figures it can be observed that the object in figure 2.1 is moving to the right and slightly down. This raises an interesting observation.

Rather than the splash being in front of the unknown object, it is trailing it and to the right. Since a front located splash cannot be found in this plot or any of the later frames, it is believed the splash has been caused by a portion of the unknown object more to the middle or back and the front of the unknown object is angled such that it sliced into the water with little or no splash.

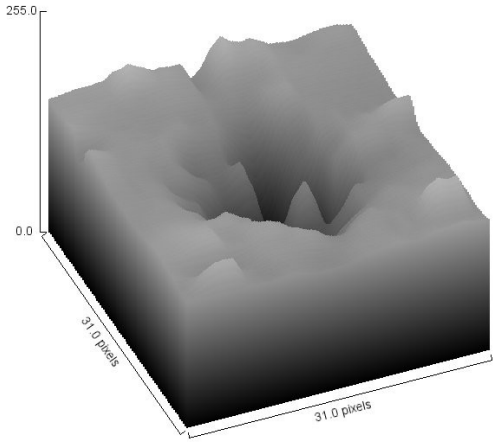


Figure 2.2: Frame 3769 Surface Plot

Although the discussion of the entry portion is almost complete, there is an additional piece of information that can be gleaned from the above surface plot. While it is understood that this plot is not showing a real hole in the water, it does allow a view of 1 slice of the unknown object. Since the slice isn't exactly flat, it isn't quite the same as the 3-d printer slices but given many slices it would be possible to reconstruct the top portion of the unknown object's warm sections outline. In particular the above slice show that in the unknown object contains a warm section shaped vaguely like a dumbbell. It also shows the forward portion of the warm area is not rounded but has some sharp corners. It may also be possible to outline cold portion of the top since they would rise up higher than the water. It is difficult to distinguish them from splashes. The end of the splash can be seen in Figure 2.3. At this point, only a very small remnant of the unknown object heat signature remains along with four low remnants of the splash.

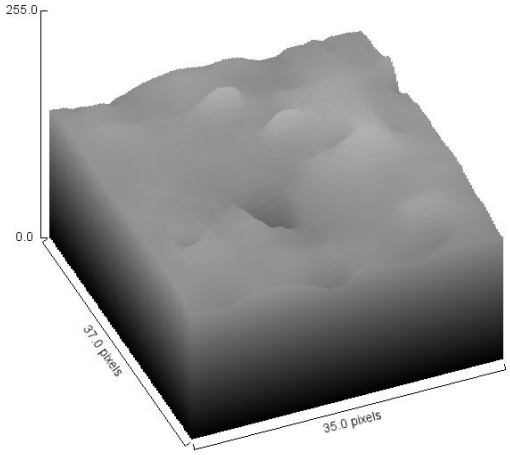


Figure 2.3: Frame 3777 - Surface Plot

3.0 Transiting the Water

During the underwater journey there are a couple of places where a dot can be seen indicating the unknown object is quite near the surface. Additionally, although the video does not show the object for most of its underwater period each time the object appears, the camera is found to be pointed almost directly at it. Since one of the witnesses specifically rejected the idea that the camera was locked onto the object, this implies that the object has remained visible to either the camera operator or the pilot or both. It further implies that while traveling underwater the unknown object has remained relatively close to the surface throughout. Since these assumptions essentially mean the unknown object is at an altitude of sea level and is placed at the target location printed on each frame, we can assume the target location as the unknown object location throughout this period.

If close to the surface it is possible to determine the object's speed while underwater. Since frame lengths are measured in the tens of milliseconds, it is understood that arguments can be made as to the exact frame number to use for the start and end of the underwater period. Frame 3769 was chosen as the start frame where the object can be seen entering the water and the end frame to be Frame 4560 where it starts to emerge. Although other choices would change the central results given below, any difference would be relatively small. The basic data from these 2 frames is provided in Table 3.1.

Frame	**3769**	**4560**
Latitude (DMS)	18 30 52	18 30 53
Longitude (DMS)	67 7 26	67 7 56
Time (H:M:S)	1:24:13	1:24:39

Table 3.1: Underwater Frame Span

Although it would be possible to correct these coordinates the same as was done in section 1, the frame span here (791 frames) is a lot longer than the 50 frames previously considered. As in that section the maximum error introduced by the truncation of the seconds portion of the coordinates is twice 69.88 feet over the entire span. Where that error was approximately plus or minus 56% of the total length, this error is only plus and minus approximately 3.5% of the total length. It is therefore not reasonable to search for the exact start and end coordinates. However, the time is a smaller number and has more of an effect on the result and should be determined exactly.

A check of the frames showed that there were 26 frames that showed the time of 1:24:13 with the first frame being # 3766. Linear scaling therefore indicates that frame 3769 occurred at a seconds value of 13.15385. Similarly there were 32 frames that showed a time of 1:24:39 with the first frame being # 4544. Linear scaling therefore indicates that frame 3769 occurred at a seconds value of 39.84375. The total time underwater is therefore 26.6899 seconds.

Since reality is most likely to be a constant underwater speed but not necessarily a constant direction, the most reasonable method is to calculate the total distance by adding calculated

sections of frames and determining the velocity from it with the time calculated above. The sections used were each 50 frames long except at the start and end. The initial section had 31 frames and the final section had 60 frames.

The error bars were determined first assuming the coordinate for those frames were each shortened and then elongated by a half second. The results for the above calculations are shown in Table 3.2.

Start Frame	End Frame	Distance (feet)	Dis. per Frame	Shortened End Frames	Elongated End Frames
3769	3800	96.170	3.10	152.904	69.881
3800	3850	217.43	4.35	217.43	217.43
3850	3900	279.52	5.59	279.52	279.52
3900	3950	217.43	4.35	217.43	217.43
3950	4000	217.43	4.35	217.43	217.43
4000	4050	192.33	3.85	192.33	192.33
4050	4100	192.33	3.85	192.33	192.33
4100	4150	217.43	4.35	217.43	217.43
4150	4200	192.33	3.85	192.33	192.33
4200	4250	217.43	4.35	217.43	217.43
4250	4300	217.43	4.35	217.43	217.43
4300	4350	217.43	4.35	217.43	217.43
4350	4400	192.33	3.85	192.33	192.33
4400	4450	217.43	4.35	217.43	217.43
4450	4500	217.43	4.35	217.43	217.43
4500	4560	139.76	2.33	209.543	69.880
Total		3241.69	<4.10>	3368,21	3145.39
Speed (mph)		82.812		86.044	80.352

Table 3.2: Speed in Water

As has been, it is believed that while underwater, the unknown object travels close to the surface. In our science, when an object travels on or close to the surface of water, it produces a wake trailing it. Although the wake equations will not have to be solved in this document, a small discussion of the mathematics of wakes should be included. Wakes are three-dimensional. They include the scalar problem of pressure waves and the two-dimensional shear problem. Shear refers to a material deformation that occurs due to movement of internal surfaces parallel to each other. Basically, water shear refers to the extra water being dragged along as an object moves through it. Effectively what is actually being moved is much more massive than the object itself. The equation used to describe this situation is the vector Helmholtz[2] equation.

As described above shear is basically a friction and like all friction it opposes motion and generates heat. In an IR image, the effect of the shear portion of a wake would be a dark "V" whose apex originates at the object. Additionally the pressure wave would add lighter lines following the same path to the wake.

The "stack" tool in the program ImageJ was used to look for any sign of a wake from the unknown object as it moved underwater. This stack included all images from frame 3757 through frame 4272. By animating them and going backwards and forwards it was possible to follow the unknown object's path while it was underwater. Figure 3.1 is one such still image during this period. The unknown object is the slightly whiter circle within the red circle. Although exceptionally hard to see in a still picture, it is easy to follow this whitish circle when the frames are animated. Since the object shows as slightly whiter than the ocean around it, it is actually cooler than the surrounding water but does not show any sign of a wake. It is, however, interesting since the unknown object showed itself as hot when entering the water and it is now located by a slight cooling effect on the water. This seems to indicate that not only is it not creating heat via friction with the water, it is also not transferring heat to the water via contact.

Figure 3.1: Frame 3781

The relative coolness shown is assumed to be a slight "hump" in the water at the location of the unknown object. This is similar to the same effect that occurs over submarines. The lack of any wake indicates that once the unknown object is inside the water, it is essentially invisible to it. As the object moves, water directly in its path flows smoothly around it in a shell and exits at the same point with the same energy as it had before the object arrived. The cool area observed would be the top of the shell where the "hump" slightly increases the surface area. Additionally, all water outside that shell would remain still. The word

"invisible" to describe this was chosen for a reason. Although this description considers particles of water rather than photons, it is completely equivalent to the problem of normal invisibility (if invisibility can be considered normal). Since the water outside the shell remains still, there is effectively no shearing force, and since the water at the shell returns to the location it was prior to the arrival of the object and has the same energy, there is no pressure wave. Hence, there is no wake generated. This movement does however take energy that would not normally be expended in movement through the air. That use of energy would be shown as a reduction in speed of the unknown object while in the water.

4.0 Exiting the Water

As has been discussed, the unknown object exits the water in or around frame 4560. Normally it would be expected that the act of exiting would bring water up with the object thus increasing its surface area and showing in the video as a white area surrounding the unknown objects hot section. However due to interference by the reticule none of this was visible.

Although it was impossible to "see" the unknown object exiting the water, it is possible to replicate the work done when investigating the preparation undergone before entering the water. As in that section an effort was made to reduce the effect of the period where the unknown object was actually emerging from the water, the calculations were done for a set of frames a short distance away from the exit frame. The results from these calculation are shown in Table 4.1.

Start Frame	End Frame	Distance (feet)	Time (Sec)	Speed (mph)
4570	4620	53.99	1.781	36.81
4620	4660	187.83	1.169	109.55

Table 4.1: Speed in Air upon Exiting

As was expected, near the exit location, the speed is significantly less than its normal air value. It was rather surprising to find the speed immediately upon exiting the water to also be less than that in the water. If this effect is real, it would seem the object has altered its path at this point to be almost completely upwards while exiting the water. Additionally, since the calculations occurred approximately 10 frames following the start of that period, the period must have extended for over the approximately 0.3 seconds it took for the 10 frames to complete. Although a specific acceleration value cannot be determined due to the lack of knowledge about the initial velocity or time, the expected strong acceleration between the initial section leaving the water and the section immediately following it is apparent.

5.0 Object Division

Following its exit from the water the unknown object appears to divide into 2 separate sections. Since this is confusing and difficult to understand this section will begin with a

description of what is seen in the video and the attempt to discuss the possibilities that are occurring.

The division seems to begin in frame 4627. The word "seems" was specifically chosen since at the point of division the camera operator has the camera at the long range zoom factor of 625. At that setting the unknown object is essentially a dot over the water. In frame 4627 the dot is starting to become elongated but two distinct dots cannot be seen. Additionally there is a period where the reticule hides the unknown object but the first frame in which this viewer can make out 2 separate dots is 4740. Interestingly in frame 4758, the upper dot (unknown object) seems to go back underwater and then re-emerges 6 frames later (4764). This apparently interested the camera operator since he then changed the zoom factor to 2625 two frames later. It should be noted that when the camera changes zoom factors there is a set of frames that are completely black.

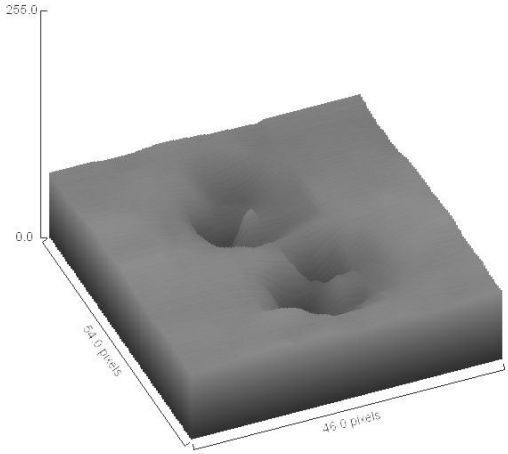


Figure 5.1: Frame 4677

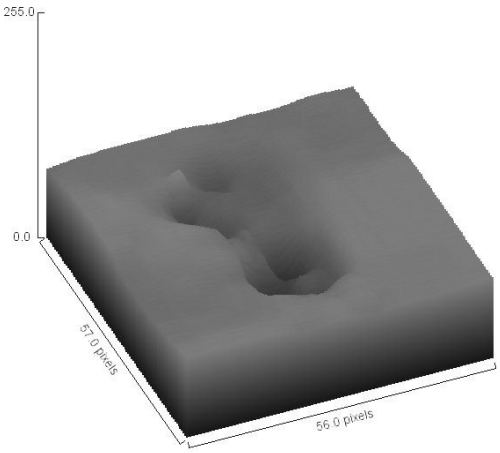


Figure 5.2: Frame 4678

It isn't until frame 4676 that an image of the unknown objects and the water begins to reappear. Interestingly the top unknown object appears to enter the water again starting at frame 4678. Figures 5.1 and 5.2 are surface plots for just before the top unknown object hits the water (5a) and just after it hits the water (5b). A slight splash in front of the object can be seen in 5b. The next 20 frames of the video shows the upper unknown object to be skimming along the top of the water; disappearing and reappearing a couple of times. The lower unknown object then evidently goes a little lower and begins to copy the first unknown object starting around frame 4788. Although the 2 objects can be seen to move together for many more frames, this discussion will be concluded at that frame.

The problem we have with discussing this section of the video is that it is not known if the unknown object actually divided or if there were simply 2 unknown objects that appeared from beneath the water and the emergence of the second had been hidden by the first. Although the second possibility makes more sense both possibilities will be considered.

The first item to look at is speed. We know there is something driving these objects. We do not know what is providing this motive power but it must exist. If a single object divided into 2 objects it has to be assumed that the "engine" driving the object also divided. That would seem to imply that after a division both object would travel slower than the single object did

prior to the division. A quick calculation was made between frames 4679 and 4990. The results can be found in table 5.1.

Title	Distance (feet)	Speed (ft/sec)	Speed (mph)
Average	680.77	68.08	46.42
Top Error Loc	795.63	79.56	54.25
Btm. Error Loc	577.00	57.70	39.34

Table 5.1: Speed of both unknown object between frames 4679 & 4990

Remembering that the final speed of a single unknown object after leaving the water was determined to be 109.55 mph, it is seen these results are significantly lower and seem to indicate that the objects have indeed divided their engines. It should be noted, however, that this is only an indication. It is possible but very unlikely that two independent unknown objects with exactly the same initial speed, decided to reduce that speed to this value at almost exactly the same time.

An interesting but unexplained oddity occurs during this period. Even though there is a period of time where one of the 2 objects was moving through both the air and water while the other was totally in the air, there was no difference in speed between the two seen. It would be expected that the object partially traveling through the water would be slightly slower than the object traveling totally in the air. However, the unknown object in the air is not seen to pull away during that period.

6.0 Comparison to Terrestrial Science

Although most of what has been described above could have been done as individual effects, We have not yet replicated all of them in a single object. The following two paragraphs discuss two such terrestrial objects. In each it is seen that in addition to their presenting an IR signature at odds with the what is seen in the video, neither can duplicate the ability to travel through the water without producing a wake. The section concludes with a statement of the present level of terrestrial science in the field of wakes.

Submarine missiles provide an example of objects that can leave the water, fly in the air and split into multiple flying objects. The Lockheed-Martin Trident II D5 missile[3] has this capability. It is launched underwater, pops up through the surface, accelerates off and divides into up to 14 independently targetable warheads. It, however, cannot first dive down into the water and after traveling a distance underwater re-emerge for the remaining portion of its travel. It is also much bigger than the unknown object seen and since it is a rocket, would produce a markedly different IR signature. It also doesn't really "swim" up through the water as a powered object. It is shot upward 30 to 40 feet through the water by compressed gas with the rocket essentially creating a "hole" in the water initially filled by the compressed gas. The movement of the "hole" and the water rushing back into it would easily be seen as a

wake behind the rocket. Finally at the surface, the movement of the holes and water rushing back combine to form a plume of water that follows the missile upward. The plume would be seen as a splash. At that point, the missile's rockets ignite.

Figure 6.1: Trident II Missile exiting the water

Since they have been in existence for over 20 years, a rocket driven supercavitating torpedo[4] should be considered. Although to the author's knowledge it hasn't been done to date, there is absolutely no scientific or engineering reason to rule out the possibility of building one that could be launched and as was seen in the video, fly in air prior to entering the water. Travel in the water and then reemerge into the air. In both the air and the water this object is simply a rocket. Supercavitation is only an effect that exists while in the water. It is an effect that occurs when the water pressure around the rocket is lowered below its vapor pressure[5] thus creating a bubble of air around the rocket. That allows the torpedo to essentially fly in the bubble while underwater. There are, however, some major problems with attempting to equate this concept with the unknown object in the video. The first is all supercavitating bodies produce compression waves at the front and strong two-phase wakes at the trailing end. The second is they also require very high speeds to maintain the cavitation bubble. The second is they are simply rockets that can fly underwater. They are bigger than the unknown object observed and as rockets, would produce a markedly different IR signature.

In both of these examples it was mentioned that the object under consideration produced a wake. That is not particularly surprising. It is simply a statement that the water reacts to an object moving through it. Although that seems like an obvious requirement, recent physics papers[6,7] have begun to question its validity.

Figure 6.2: Russia's Shkval Rocket Torpedo

Those papers and others employ the Transformation Optics (TO) procedure initially proposed at Duke University for electro-magnetic cloaks. That procedure makes use of the fact that both Maxwell's equations of electromagnetic (EM) theory and the Helmholtz equation are invariant under a coordinate transformation. Although not as exact as electromagnetic cloaks, these papers of a part of a flurry of theoretical papers recently published on acoustic and fluidic (water) invisibility cloaks. The above two referenced papers form a complimentary pair of views of invisibility cloaks in water. In the first one, by Farhat et. al., the water is invisible to the object[6] (the water doesn't affect the object - protection against Tsunamis, etc.). In the second, the object is invisible to the water[7] (the object doesn't affect the water). The latter paper envisioned using a meta-material[8] shell composed of parallel rows of fiberglass slats etched with copper to transport the water in a laminar fashion around the object

Although the paper by Farhat[6] et. al. was published first, in relation to this appendix the second paper[7] by Urzhumov and Smith is the most important in. Similar to the EM cloak, it "warps" the water around the object such that it attempts to preserve the streamlines of flow and the pressure distribution that would have existed in the absence of the object. Since it was known that simply steering the water around an object would tend to slow down the water thus causing a frothy wake, it was proposed that small piezoelectric pumps be placed in the shell to offset the energy loss. Consequently, the structure cancels the viscous drag force and prevents the onset of turbulence. However, the paper was published in 2010 and only shows that scientifically the shell is possible. Although it is believed that such a shell would be exceptionally interesting to the navy, as far as this author knows, to date there hasn't even been a proof of principle engineering design.

An additional advantage of the cloak envisioned by Urzhumov and Smith is that it makes the object essentially hydrophilic[9] It was experimentally shown by Truscott, Aristo, and Techet[10] that since there is no void (bubble) produced when a hydrophilic ball is dropped into water, it makes a much smaller splash than the more normal hydrophobic ball. There is, however, a relatively large vortex wave that spreads out from the ball. The splash for the hydrophobic object is a result of the bubble collapsing due to hydrostatic pressure and forming an upwards jet or water.

7.0 Conclusion

This appendix began with a short discussion of the difference between infrared pictures and visible light pictures in air and water. Specifically it was shown that in water, it can be very instructive to look at how the environment (the water) reacts to the external objects and how its heat may change due to that interaction.

It was determined that the first frame that showed the unknown object entering the water was # 3769. To provide a base or point of departure, the air speed prior to that frame was calculated using frames 3700 through 3750. The speed calculated was 109.72 mph.

Following that, the period of entering the water was investigated. It was seen in figure 2.1 that no splash can be seen by eye the figure. However as is seen in figure 2.2, the computer was able to see the difference in heat between the ocean and a splash as the unknown object hit the water.

The period of moving underwater was covered in section 3.0. It was shown in that section that the unknown object traveled at about 82.812 mph or approximately 75% as fast as it had traveled in air prior to entering the water. It was also seen in this section (figure 3.1) that the unknown object produced no visible wake as it moved through the water. The unknown object however did seem to slightly raise the water level immediately above it.

The exit of the unknown object from the water (frame 4560) was discussed in section 4. Interestingly immediately upon exiting (frames 4570 - 4620), the unknown object moved at a speed of 36.81 mph which is less than half of its speed underwater. This may, however be due more to direction of motion than an actual loss of speed. The speed then increases to 109.55 mph in frames 4620 - 4660.

Section 5 then discusses a division of the single unknown object into 2 unknown objects starting at frame 4627. After the division, the speed of each was calculated to be 46.42 mph indicating a true division of one object into two rather than the emergence of a hidden object from behinds the first object.

The following table shows the speed variation though the entire period covered by this appendix.

	Frames	Distance (feet)	Time (Sec.)	Speed (mph)
1. Speed in air	3700 - 3750	251.16	1.560	109.72
2. Speed underwater	3769 - 4560	3241.69	26.690	82.81
3. Initial Speed in air	4570 - 4620	53.99	1.781	36.81
4. Later Speed in air	4620 - 4660	187.83	1.169	109.55
5. Speed after division	4679 - 4990	680.77	14.665	46.42

Table 7.1: Speed Table

The interesting result of this appendix is as previously stated, although most of what has been described could be done as individual effects, a capability of doing all of them has not yet been demonstrated.

Notes and References

1. The dynamic or shear viscosity of a fluid is a measure of its resistance to shearing flows. In relative units, the dynamic viscosity of air at 20° C is 0.0198. The dynamic viscosity of 20° C sea-water is 1.08. Therefore sea-water is 50.46 more viscous than air at 20° C.
2. The vector Helmholtz equation is: $\nabla^2 \mathbf{F} + k^2 \mathbf{F} = 0$, where F is a vector function, Del-squared is the vector Laplacian and k is a scalar constant.
3. http://www.naval-technology.com/projects/trident-ii-d5-fleet-ballistic-missile/
4. The first super-cavitating torpedo was the Russian **Shkval** torpedo. Work began on that torpedo in 1960 and it was deployed in 1990s. It is reported to travel over 200 knots That means even if fired from ~3.5 miles away, the target has less than 1 minute to employ counter-measures. Recently there have also been (unconfirmed) reports of a new German super-cavitating torpedo capable of ~500 mph.
5. When the water pressure is less than the vapor pressure the water vapor remains in gaseous form.
6. Farhat, M;, Guenneau, S; et. al.; "Analytical and numerical analysis of lensing effect for linear surface water waves"; Physical Review E 77, 946308; 2008; 11 pages
7. Urzhumov, YA; Smith, DR; " Fluid Flow Control with Transformation Media"; Phys. Rev. Lett. 107, 074501; 2011
8. Meta-materials are artificial materials engineered to have properties not found in nature. They are assemblies of multiple individual elements arranged in repeating patterns fashioned from conventional microscopic materials such as metals or plastics. Unlike natural materials, meta-materials are able to reduce the "index of refraction" to less than one or less than zero.
9. A hydrophilic object is an object with a strong affinity for water. They seem to attract water Examples are objects with dissolve in water such as sugar cubes. A hydrophobic object is one which tends to reject water.
10. Truscott, T.T.; Aristo, J.M.; Techet, A.H.; "Dynamics of Water Entry"; arXiv:0810.1888
[physics.flu-dyn]; http://arxiv.org/pdf/0810.1888v2.pdf

APPENDIX K

Estimated UAP Temperature

Introduction

Since we do not actually have possession of the object seen in the video, determination of the principles employed to create its motion remain a mystery. That, however, does not mean we can ignore this subject. The object is seen to move making multiple direction, altitude, and speed changes. Some source is supplying the energy needed to do that. There should be waste heat produced. This appendix provides an approximate calculation of the waste heat seen in the video. In this appendix:

- Section 1 provides a pixel based approximation to the objects temperature; and
- Section 2 provides a determination of the appropriate heat equations for the object and integrates them with the results of Section 1.

Section 1.0

Temperature measurements were approximated to estimate the heat distribution of the unknown object. The range of temperatures of the object, found by the methods detailed here, were from 10^{o} F below ambient air, 69^{o} F to 70^{o} F, thru 105^{o} F or higher. A single frame, 1251, was used for all the pixel value measurements to avoid frame to frame temperature range adjustments that may occur with the infrared (IR) or thermal imaging equipment. It should be noted that among the 5,000+ frames of video containing the unknown object, the temperature distribution appears to change. A complete study has not been done to include a determination of any correlation of the presence of cooler areas of the unknown object to the higher temperatures – this could be IR artifacts.

1.1 Pixel Value to Temperature Relationship

In an ideal world, we would have access to an equation such that given a pixel value, 0 to 255, the equation would produce a limited temperature range represented by that pixel value produced by the IR hardware and software. However, analysis of the various frames indicates that the temperatures associated with the 256 different gray shades of pixels is periodically recalibrated to the temperature range in each frame. Without the software algorithms used in the thermal video processor, the temperature of the 256 different gray shades must be determined by using objects of known temperatures in a given frame. Frames were selected where known objects such as roads, pasture and animals, were used to associate pixel values to their estimated temperatures.

Frame 1251 was used because there were three known temperatures that could be used to establish the temperature of the unknown object based on the relationship of temperature to the 256 pixel shades. An assumption was made that there is a linear relationship between pixel values and object temperatures within a given frame.This is represented in Figure 1-1.

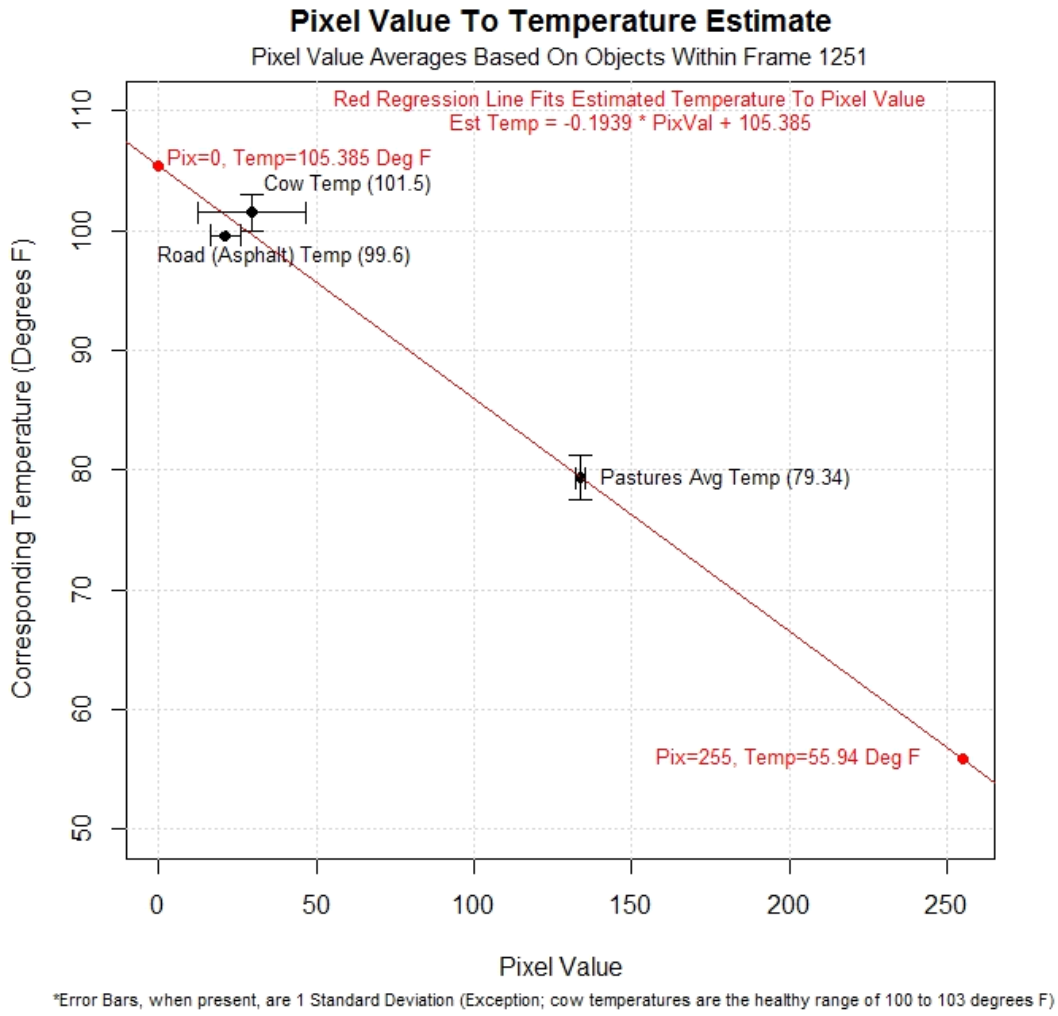


Figure 1-1

The average temperatures for asphalt roads, cows and pastures were found to be 99.6° F[1], 101.5° F[2] and 79.34° F[3] respectively. These temperatures were plotted against the average pixel value for the road, cows and an area of pasture seen in Frame 1251 (see Figure 1.5). A regression line, seen in red in Figure 1-1, is the best fit for all three points. Although regression is not usually used for extrapolation, a linear relationship between the endpoints of the temperature range is reasonably assumed here for estimation purposes. We can see, apparently for this frame using a linear assumption, the IR equipment used a temperature range of 56° F to 105° F to adjust the pixel values to temperature. All temperatures colder than 56 are mapped into pixel 255 while all temperatures hotter than 105 are mapped into pixel 0. The equation for the regression line provides an approximation of temperature with t being the temperature in degrees F, p the pixel value used to obtain the temperature estimate t:

$$t = -0.1939\ p + 105.385$$

It can be seen that each pixel represents an incremental change of 0.1939 degrees F given our stated assumptions.

1.2 Unknown object Temperature Distribution

Using Equation 1-1 we can take every pixel value seen to comprise the unknown object and convert them to temperatures. Figure 1-2 is a 3D false color representation of the unknown object temperature.

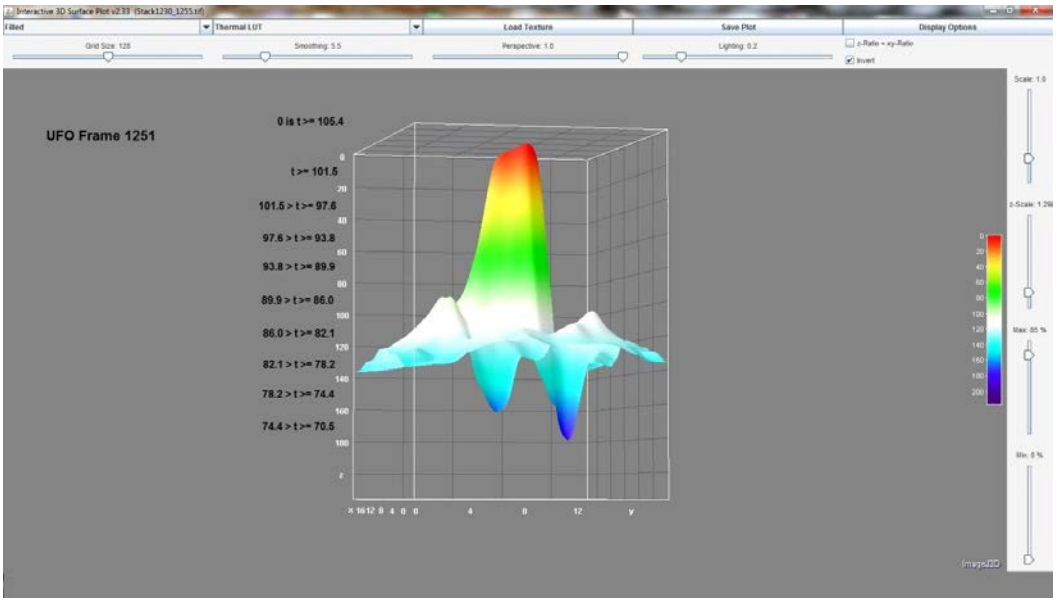


Figure 1-2

This 3D image was produced using the ImageJ (version 1.45 S) Interactive 3D Surface Plot. The temperature ranges are given in between each z axis pixel value. Red represents the hottest, temperatures 101° F and up, and blue the coldest at 74° F and below. Note the smoothing is set fairly high to remove pixelization.

Figure 1-3 depicts the hottest and coldest locations of the unknown object.

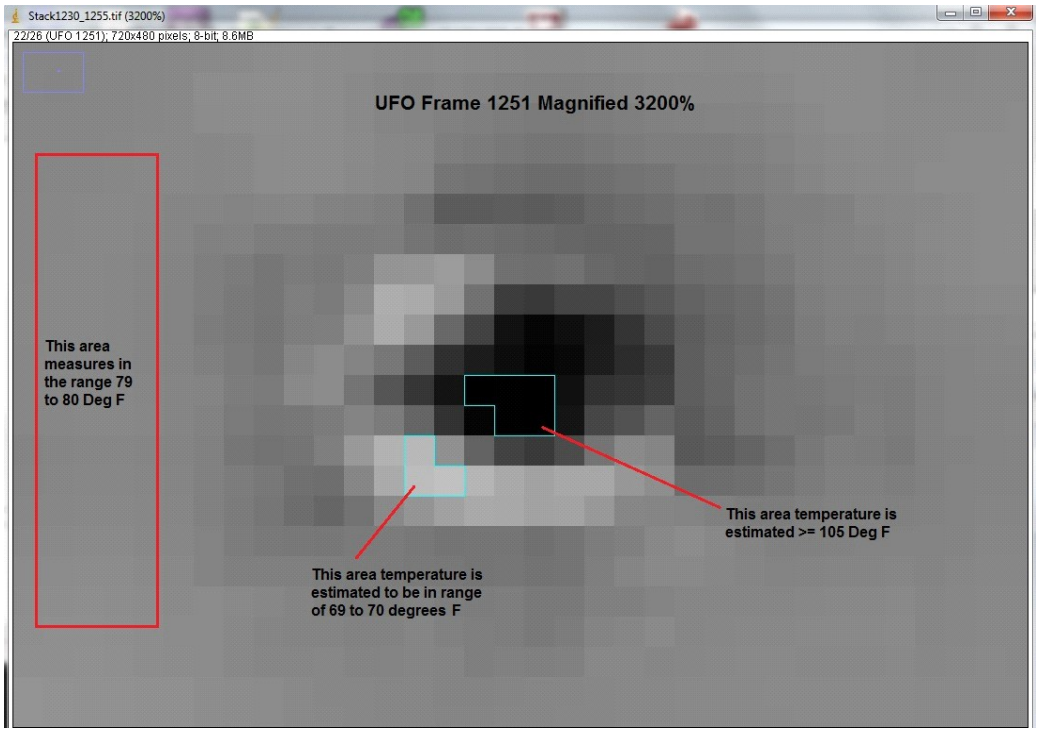


Figure 1-3

It is usually the case that the hottest (blackest) locations are in and about the center of the unknown object while the coldest are usually around the edges. It has not yet been determined whether the cooler (white) pixels are possibly thermal imager artifacts due to high differential temperatures. The red rectangle, non unknown object pixels, are in the 79 to 80 degree range and corresponds to the pasture in the background.

Figure 1-4 is profile of temperatures along the pink line seen in the figure that cuts through the center of the object. This graph demonstrates how the hotter part of the object is usually in its center zone although not completely symmetrical. It also shows how the infrared system detects the heat of the object as a contrast against the ambient temperature.

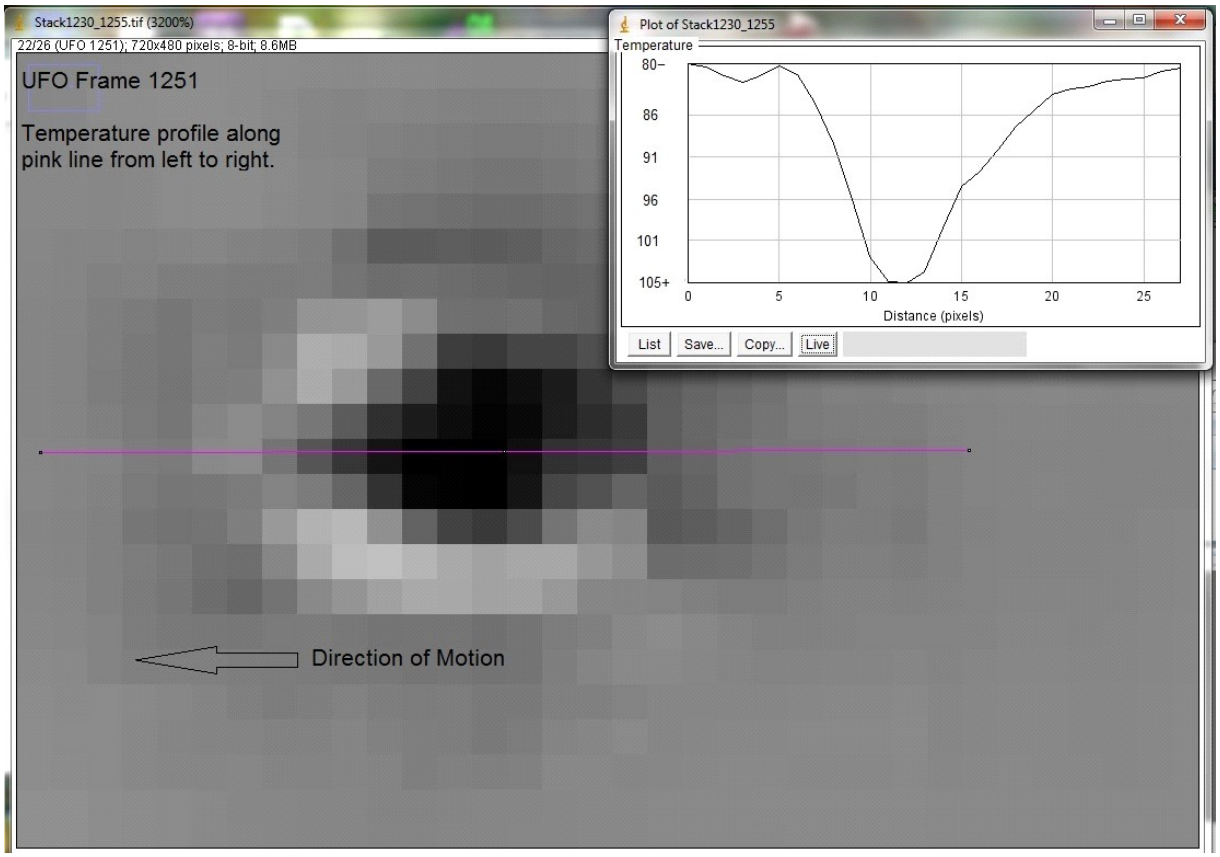

Stack1230_1255.tif (3200%)
22/26 (UFO 1251); 720x480 pixels; 8-bit; 8.6MB
UFO Frame 1251
Temperature profile along
pink line from left to right.
Direction of Motion
Plot of Stack1230_1255
Temperature
80–
86
91
96
101
105+
0
5
10
15
20
25
Distance (pixels)
List
Save...
Copy...
Live

Figure 1-4

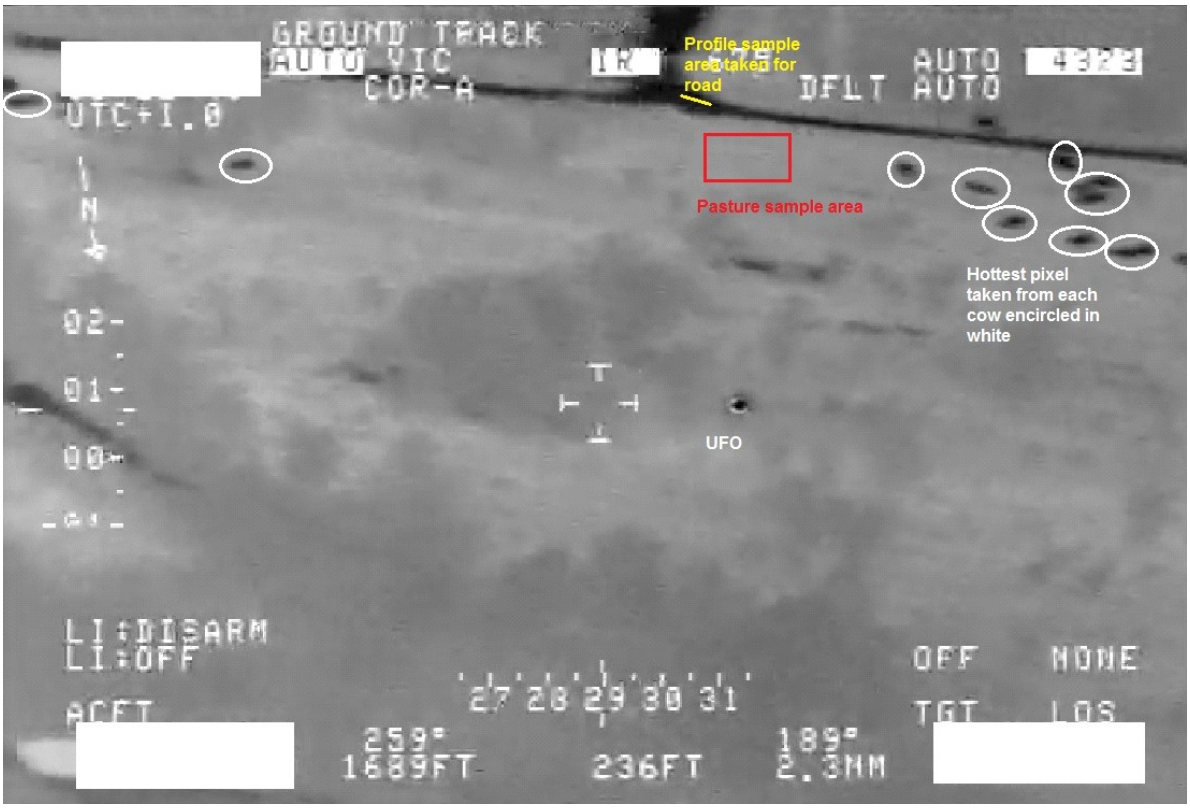


Figure 1-5

Figure 1-5 was created from Frame 1251. Within this IR frame is the object labeled as UFO, cows in the upper right and upper left quadrants, trees/grass throughout the frame, and a road that runs along the upper part of the frame.

The average (21.07 on a scale of 0 to 255) and standard deviation (4.73) of pixel values of the road was obtained from all 24 pixels along the yellow line seen on the road. ImageJ provides the average and standard deviation of all selected pixels in a profile selection. A Google Earth view of the area pictured above, shows what appears to be an asphalt road – so asphalt temperatures were assumed for the given time of day. These temperatures can be determined based on the maximum temperature during the day, the amount of cloudiness, and the length of time since sunset.[1]

Each of ten cows, as indicated, were selected within a rectangle and the lowest valued pixel was chosen to be representative of the temperature. An average (29.5) and standard deviation (16.94) of the pixel values were then derived.

All pixels within the red rectangle were selected to be representative of pasture. The average(133.59) and standard deviation(1.49) of the 242 pixel values within the rectangle was provided by ImageJ as a matter of course.

The unknown object seen in Figure 1-5 was magnified in Figures 1-2, 1-3 and 1-4.

1.3 Sources

1. American Concrete Pavement Association; http://www.pavements4life.com/qds/environment_1heatisland.asp; last accessed 11/10/2014
2. "Animal Heat." Encyclopedia Britannica. Chicago: Encyclopedia Britannica, 1965:A 965.
3. Remote Sensing of Environment 89 (2004) 467–483

Section 2.0

Forced convection is the heat transfer mechanism occurring when a fluid is forced to flow over a hot surface. Although it sounds different, there is actually no difference between the above definition and the heat loss of the object seen in the video. In this case the motion used to transfer the heat is motion of the object itself through a quiescent volume of air.

In this case, the heat transfer will be a function of many variables. The only information source available for this investigation is the video itself. Therefore everything is predicated on that video. It should be stated at the outset that convective heat loss depends greatly on source shape. The object's shape is believed to be spherical. It is possible that this assumption may not be correct, but a shape has to be used.

As stated the information source is a video. That means we are seeing individual static snapshots at different times. There are a couple bits of information that are immediately obvious in this video. The first is, the object does not seem to be getting any hotter as it flies around. Therefore if the object is generating heat, it must also be expelling it as it moves. As the object moves we can see a heat trail following it.

2.1 Pixels and Distance

Since the frames are basically showing the same picture (albeit at slightly different locations) over and over again, we really have only one picture. Since the video runs at 30 frames per second, each frames is approximately 33 milliseconds long. It has been estimated that the object is approximately 4 feet long (See Appendix G). Since it has been shown that it is also 8 pixels long on the average, we can say that each pixel covers approximately 6 inches. If the object is traveling at X mph, in one frame, at any point in the frame it will travel a distance in feet shown by the following forumla:

$$(D / Frame)_{obj} \approx 0.033\ (5280\ X / 3600)\ .$$

Therefore the approximate number of pixels moved by any point on the object per frame is:

$$N \approx (D / Frame)_{obj} / 0.5\ .$$

2.2 Heat Equation

The heat equation describing the diffusion of heat through the air is:

$$\dot{T} = \alpha \nabla^2 T .$$

Although we are assuming a sphere, we are also seeing a tail directly following the object. Therefore the above equation can be simplified to one spatial dimension.

$$T_t - \alpha T_{xx} = 0 .$$

In the above equation, the subscripts are denoting partial derivatives with respect to the subscript. The initial and boundary conditions for this equation are:

IC: $T (t=0) = T_0$
BC1: $-k T_x|_{x=L} = h (T - T_1)$ (The vert. line is for "evaluated at")
BC2: $T (x=0) = T_0 \quad \forall t$ ($\forall$ means "for all")

There is also a boundary condition at infinity but it would be superfluous.

This equation can be solved by separation of variables, but it is easier to just use a source[4,5] that has already solved it. (For any interested reader the complete solution methodology can be seen in reference 5.) These references use an electrical analogy to obtain the following thermal response function:

$$T_0 - T_{air} = (T - T_{air}) \exp \{ - h 6 t / (\rho D Cp) .$$

In this equation:

D is the diameter of the sphere;
V is the flow velocity of the air;
Cp is the specific heat of the air at constant pressure;
ρ is the density of the air;
h is the Heat Transfer Coefficient

2-3 Application to Video Frame

Solving Equation 2-4 for "t" yields an expression that gives the time needed to reduce the temperature in the trail to some set value (higher than the air value).

$$t = \{ \rho D Cp / (6 h) \} \ln \{ (T_0 - T_{air}) / (T - T_{air}) \}$$

$$t = \{\text{Time Coef}\} \ln \{ \Delta T_{init} / \Delta T_{final} \}$$

Interestingly this result is not simply dependent on the bulk air temperature and the source temperature. It has a has a third temperature. This is a result of the resulting temperature being an exponential starting at the source temperature and falling to the bulk air temperature "**at infinity**". Therefore a solution ending at a finite distance is defined as a value that is close enough to be considered correct. That is the variable T with no subscripts in the equation.

To determine numeric results, the density and specific heat are treated as constants. The Engineering Toolbox values[6] at 300 °K is used.

It is obvious that the convective heat transfer must be dependent on the fluid removing the heat. Since convective heat transfer is governed by Newton's law of cooling:

$$dQ/dt = h A (T_{obj} - T_{fluid}) ,$$

That functionality must be found in the heat transfer coefficient (h). An approximate relation for it if found in the Engineering Toolbox[7] pages and is shown in Figure 2-1.

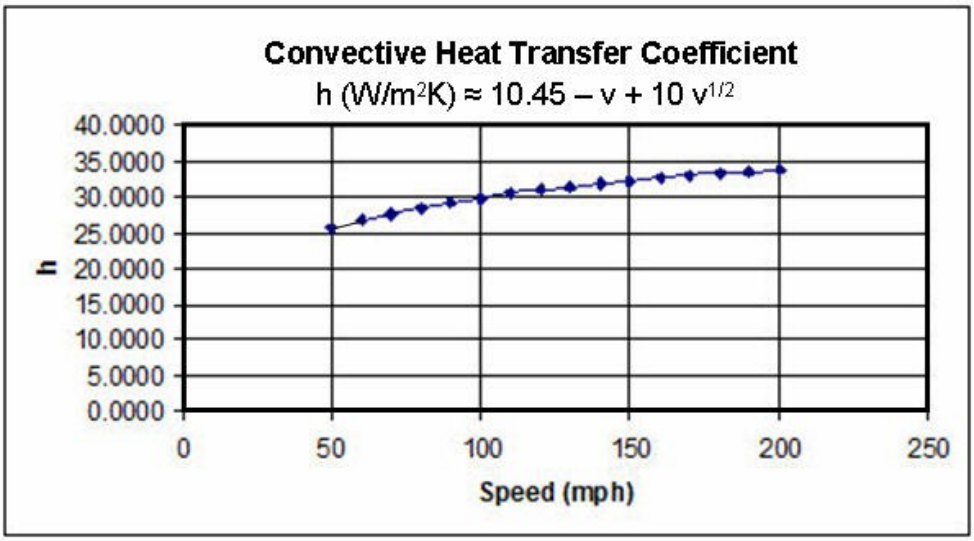


Figure 2-1

As stated above, the heat equation (eq. 2-5) requires a definition of an intermediate temperature close enough to be considered acceptable. Stated in this manner, that definition would be a complete guess. However in the present case, there is another way to look at this definition. It is how many pixels show the trail following the object. That distance was discussed in section 2-1. The results are shown in Figure 2-2 and Table 2-1.

V(mph)	h	Time Coef	Dis in 1 frame (ft)	Ln(X) 1 Cell	1/X (%) 1 Cell	Ln(X) 2 Cells	1/X (%) 2 Cells
50	25.5988	0.0098	2.4444	3.4002	3.3368	6.8003	0.1113
60	26.6824	0.0094	2.9333	3.5441	2.8895	7.0882	0.0835
70	27.6232	0.0091	3.4222	3.6691	2.5500	7.3381	0.0650
80	28.4509	0.0088	3.9111	3.7790	2.2846	7.5580	0.0522
90	29.1862	0.0086	4.4000	3.8767	2.0720	7.7533	0.0429
100	29.8441	0.0084	4.8889	3.9640	1.8986	7.9281	0.0360
110	30.4360	0.0082	5.3778	4.0427	1.7551	8.0853	0.0308
120	30.9707	0.0081	5.8667	4.1137	1.6347	8.2274	0.0267
130	31.4552	0.0080	6.3556	4.1780	1.5328	8.3561	0.0235
140	31.8953	0.0079	6.8444	4.2365	1.4458	8.4730	0.0209
150	32.2956	0.0078	7.3333	4.2897	1.3710	8.5793	0.0188
160	32.6600	0.0077	7.8222	4.3381	1.3062	8.6761	0.0171
170	32.9918	0.0076	8.3111	4.3821	1.2499	8.7643	0.0156
180	33.2939	0.0075	8.8000	4.4223	1.2007	8.8445	0.0144
190	33.5687	0.0075	9.2889	4.4588	1.1577	8.9175	0.0134
200	33.8184	0.0074	9.7778	4.4919	1.1199	8.9839	0.0125

Table 2-1

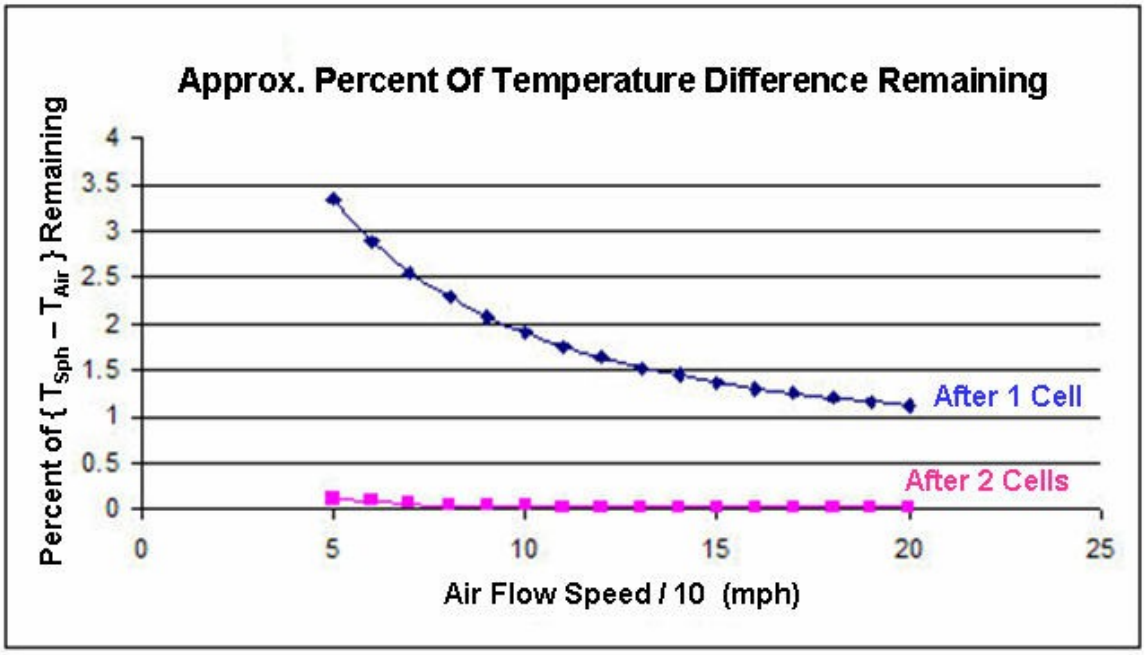


Figure 2-2

It is obvious from the above that the result for two cells is very close to zero. However the result for one cell is also quite good if the average temperature of the object is not greatly different from the bulk air temperature. Since it is possible to look at pixel values in each frame there is a means of obtaining an approximation to these temperatures.

The "Transform Image to Results" function in ImageJ allows the investigator to see the pixel values throughout any picture. Figure 2-3 is small portion of Frame #0785. The numbers depict the relative heat of each pixel. The higher the number the cooler the area represented by the pixel and the lower the hotter. Although the object is hotter than its surroundings, it is easily seen that the large distance between the object and the camera makes the heat outline difficult to determine. To help the reader, color was used to provide an approximation of the object. The cells with backgrounds that are various shade of blue are the colder areas of the object (lighter blue areas are warmer); those with a violet background are the hot area of the object; and the cells with yellow backgrounds are the heat trail being discussed in this document.

112	107	107	107	108	109	111	112	113	112	112	112	113	113	114	114	114	114
111	106	104	106	100	115	113	119	121	117	118	117	120	114	114	113	117	115
113	105	106	110	108	115	120	123	125	130	136	127	121	121	124	116	117	116
114	115	107	104	111	121	139	143	143	153	145	141	141	130	128	123	117	116
113	116	112	107	118	141	154	154	149	136	142	140	136	129	130	124	120	116
112	122	170	173	144	148	125	95	74	80	102	122	134	130	129	124	121	117
111	127	195	201	136	107	53	16	22	43	63	103	134	127	124	123	121	117
111	135	191	194	100	52	30	1	12	64	87	111	127	124	121	116	118	118
111	138	133	124	45	2	19	14	46	65	73	100	126	121	119	121	122	118
112	136	112	87	34	0	16	13	57	76	75	95	116	118	119	122	116	118
115	146	147	128	68	26	47	60	102	120	118	118	115	112	113	115	112	117
115	132	147	139	110	94	113	109	114	101	101	105	111	113	112	113	113	117
111	107	120	118	118	120	127	116	103	100	96	104	113	112	112	115	113	117
117	112	115	112	114	115	115	117	116	110	114	113	112	115	116	115	116	116

Figure 2-3

The outside box of numbers represents the background at the location of the object in this frame. Although many frames show a background value of approximately 150, this frame has the object within a warmer rectangle (average pixel value pf 113.58).

One of the problems with Figure 2-3 is it is difficult to see the shape of the object. Figure 2-4 is provided to help with that problem. This figure was generated using the "Surface Plot" functionality in ImageJ. In this figure colder areas are higher and hotter ones lower.

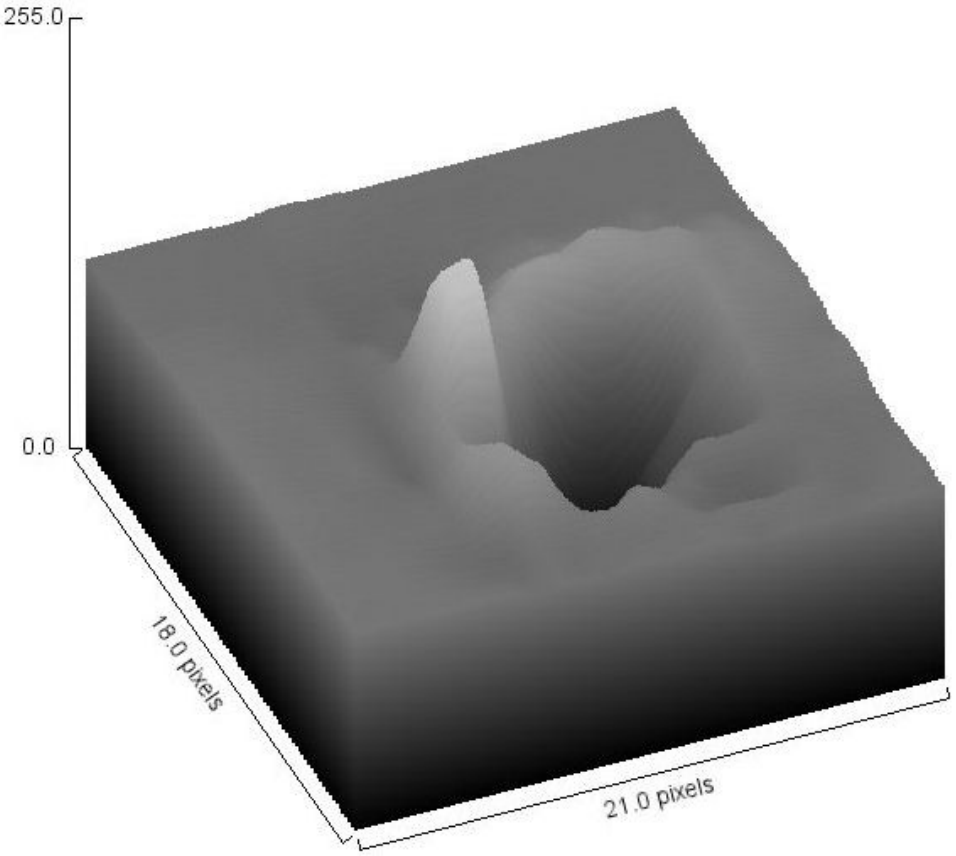


Figure 2-4

It is easy to see the coldest area of the object is in the front; it is a little cooler on the sides; and the hot area of the object is in the center. There is a small heat trail immediately to the right and a larger one near the bottom. This correspond to the yellow colors in Figure 2-3.

2.4 Temperature distribution

Most IR systems use some equalization variant to overcome the problem of distinguishing low contrast targets in dynamic scenes. The most common methods used are variants of histogram equalization. The problem faced in this investigation is that these equalization systems are inherently non-linear. They provide enhancement by increasing contrast in the dominating temperature range in a scene and decreasing it in the non dominating range. Additionally the histograms used to describe the scene in 256 levels of gray are functions which are unlikely to be straight lines. Therefore Equation 1-1 is at best a rough estimate of

the pixel-temperature function. It does however provide a realistic approximation. Applying it to Figure 2-3 yields Figure 3-1.

83.67	84.64	84.64	84.64	84.44	84.25	83.86	83.67	83.47	83.67	83.67	83.67	83.47	83.47	83.28	83.28	83.28	83.28
83.86	84.83	85.22	84.83	86.00	83.09	83.47	82.31	81.92	82.70	82.50	82.70	82.12	83.28	83.28	83.47	82.70	83.09
83.47	85.03	84.83	84.06	84.44	83.09	82.12	81.54	81.15	80.18	79.01	80.76	81.92	81.92	81.34	82.89	82.70	82.89
83.28	83.09	84.64	85.22	83.86	81.92	78.43	77.66	77.66	75.72	77.27	78.05	78.05	80.18	80.57	81.54	82.70	82.89
83.47	82.89	83.67	84.64	82.50	78.05	75.52	75.52	76.49	79.01	77.85	78.24	79.01	80.37	80.18	81.34	82.12	82.89
83.67	81.73	72.42	71.84	77.46	76.69	81.15	86.96	91.04	89.87	85.61	81.73	79.40	80.18	80.37	81.34	81.92	82.70
83.86	80.76	67.57	66.41	79.01	84.64	95.11	102.28	101.12	97.05	93.17	85.41	79.40	80.76	81.34	81.54	81.92	82.70
83.86	79.21	68.35	67.77	86.00	95.30	99.57	105.19	103.06	92.98	88.52	83.86	80.76	81.34	81.92	82.89	82.50	82.50
83.86	78.63	79.60	81.34	96.66	105.00	101.70	102.67	96.47	92.78	91.23	86.00	80.95	81.92	82.31	81.92	81.73	82.50
83.67	79.01	83.67	88.52	98.79	105.39	102.28	102.86	94.33	90.65	90.84	86.96	82.89	82.50	82.31	81.73	82.89	82.50
83.09	77.08	76.88	80.57	92.20	100.34	96.27	93.75	85.61	82.12	82.50	82.50	83.09	83.67	83.47	83.09	83.67	82.70
83.09	79.79	76.88	78.43	84.06	87.16	83.47	84.25	83.28	85.80	85.80	85.03	83.86	83.47	83.67	83.47	83.47	82.70
83.86	84.64	82.12	82.50	82.50	82.12	80.76	82.89	85.41	86.00	86.77	85.22	83.47	83.67	83.67	83.09	83.47	82.70
82.70	83.67	83.09	83.67	83.28	83.09	83.09	82.70	82.89	84.06	83.28	83.47	83.67	83.09	82.89	83.09	82.89	82.89

Figure 3-1

Although this figure is identical to the previous one, it now gives the results in terms of degrees Fahrenheit. Using the temperatures around the outside of this figure the average temperature of the background air is found to be 83.37 and the standard deviation is 0.55 degrees. Additionally the hottest point in the object is 105.39 degrees. The figure therefore shows an average maximum temperature differential between air and object of 22.02 degrees.

It was noticed in Figure 3-1 that there are locations in the air (pixel values of <80) where the temperature is less than the background air. It was initially thought that these cooler pockets may be examples of low pressure zones that always follow objects moving in fluids. The size of these zones are a function of the relative velocity of the object and the fluid, and the shape of the object. If the object is moving slowly and has a streamlined shape (canoes etc), the zone will be small but it will still exist. In the present situation although we do not know the object's shape, we do know the speed is relatively high. We therefore can expect that this zone may be sizeable enough to have an effect on the results found. Rather than make a molecular argument for the temperature-pressure relationship it is simpler to just state the Gay-Lussac gas law:

$$\text{Pressure} = k * \text{Temperature}$$

where k is a constant. Therefore a region of lower pressure is also a region of lower temperature. With very short heat trails this effect would be a slight cooling below ambient just before returning to the ambient air temperature. It could then also be the cause of some of the cooler pixels trailing the object.

2.5 Conclusion

The problem with assigning the temperature variation to low pressure zones is that variations with the same order of magnitude are seen to be occurring at areas away from the unknown object. This was particularly noticeable when the author looked at an area twice the size of the matrix shown in Figure 3-1 (28x36 verses 14x18). With the larger matrix the average

ambient temperature (outside rectangle) was calculated to be 82.99° F and the standard deviation is 0.5° F. Both values are slightly cooler than the ones calculated using the smaller matrix. That is to be expected since exponentials never actually reach zero. The interesting result is that around the large matrix, the maximum temperature value was fond to be 83.86° F and the minimum value to be 81.73° F. That results in a delta temperature of 2.13° F at a distance where it cannot be attributed to the unknown object. Additionally there is nothing at all seen in the picture outside of the unknown object (see Figure 3-2).

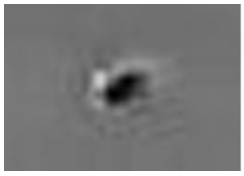


Figure 3-2

Since it is known that the maximum and minimum temperatures and related pixel values are:

	Temperature	Pixel Value
Maximum	105.39	0
Minimum	66.41	201 .

each integer pixel value equates to:

$$\delta T / \delta p = | (105.39 - 66.41) / (0 - 201) | = 0.198 \{ ° F \text{ per pixel} \} .$$

Therefore the temperature variation occurring along the periphery (2.13° F) is equivalent to 10.76 pixels and no source for this variation is known. Since the 2 degree variation with unknown source in the "ambient temperature" is approximately four times larger than the assumed low pressure zone delta temperatures, that assumption cannot be defended and must be discarded. Since the delta temperatures in the tail are approximately 3 degrees the assumption of a heat tail falling off exponentially remains.

A statement has to be made concerning the long heat trail that occurs at the bottom back of the object. Initially this looks like a much longer tail than what has been suggested. Since this tail begins approximately 2/3s to 3/4s back from the start of the object and not directly at the rear of the object, it is assumed the heat is not a single pixel location. It is believed heat is being exhausted along the object. Therefore although heat at any particular location is falling off backwards exponentially, that loss is being made up for by more heat being exhausted.

2-5 Notes and References

4. Bahrami, Majid; "Forced convection Heat Transfer"; Simon Fraser University; ENSC 388 (F09)
5. John H. Lienhard IV & John H. Lienhard V; "A Heat Transfer Textbook"; Cambridge TJ260.1.445 2000, 3rd Edition; Chapter 5, "Transient and Multidimensional Heat Conduction"
6. "Dry-Air Properties"; http://www.engineeringtoolbox.com/dry-air-properties-d_973.html
7. "Convective Heat Transfer"; http://www.engineeringtoolbox.com/convective-heat-transfer-d_430.html
8. The result is a value of 6.8054 for "c". This would indicate a very rapid heat dissipation.

10.5281/zenodo.7837470

APPENDIX L

Line-of-Sight Evaluation

10.5281/zenodo.7837470

Introduction

Some arguments have been advanced that the object could be a balloon and that the motion of the balloon relative to the background is an illusion created by the motion of the plane circling the balloon. This is incorrect. There are some frames of video having no background motion at all and the UAP can be seen changing locations relative to the background. Consider Frames 711 and 712 of Figure 1:

Figure 1

Figure 1 clearly demonstrates the intrinsic motion of the UAP and that the motion of the plane from one frame to the next contributes nothing to the difference in the location of the UAP. This, in itself, does not eliminate the possibility of a balloon since a balloon could have drifted into the frames due to its own motion.

The wind was out of the east at 8-13 mph.[1] Upper wind speeds were measured out of San Juan, which is 50 miles to the east of Aguadilla. At 8 pm local time the upper wind speeds from 400 feet to 3200 feet were similar and were out of the east northeast at 12 to 18 mph.[2] Given that eighteen miles per hour was likely the fastest speed of a balloon in Frames 711 and 712 then the distance from the plane could be no more than 1,250 feet considering the angular distance the object traveled within these two frames. (The calculation of this distance is detailed later in this appendix.) This 1,250 feet from the plane creates serious discrepancies with the aircraft-to-target azimuth readings[3] given by the on screen data. The discrepancy is illustrated in Figure 2.

[1] http://www.wunderground.com/about/data.asp

[2] University of Wyoming, Department of Atmospheric Science. http://weather.uwyo.edu/upperair/sounding.html

[3] This would be the compass direction in which the IR camera was pointed.

10.5281/zenodo.7837470

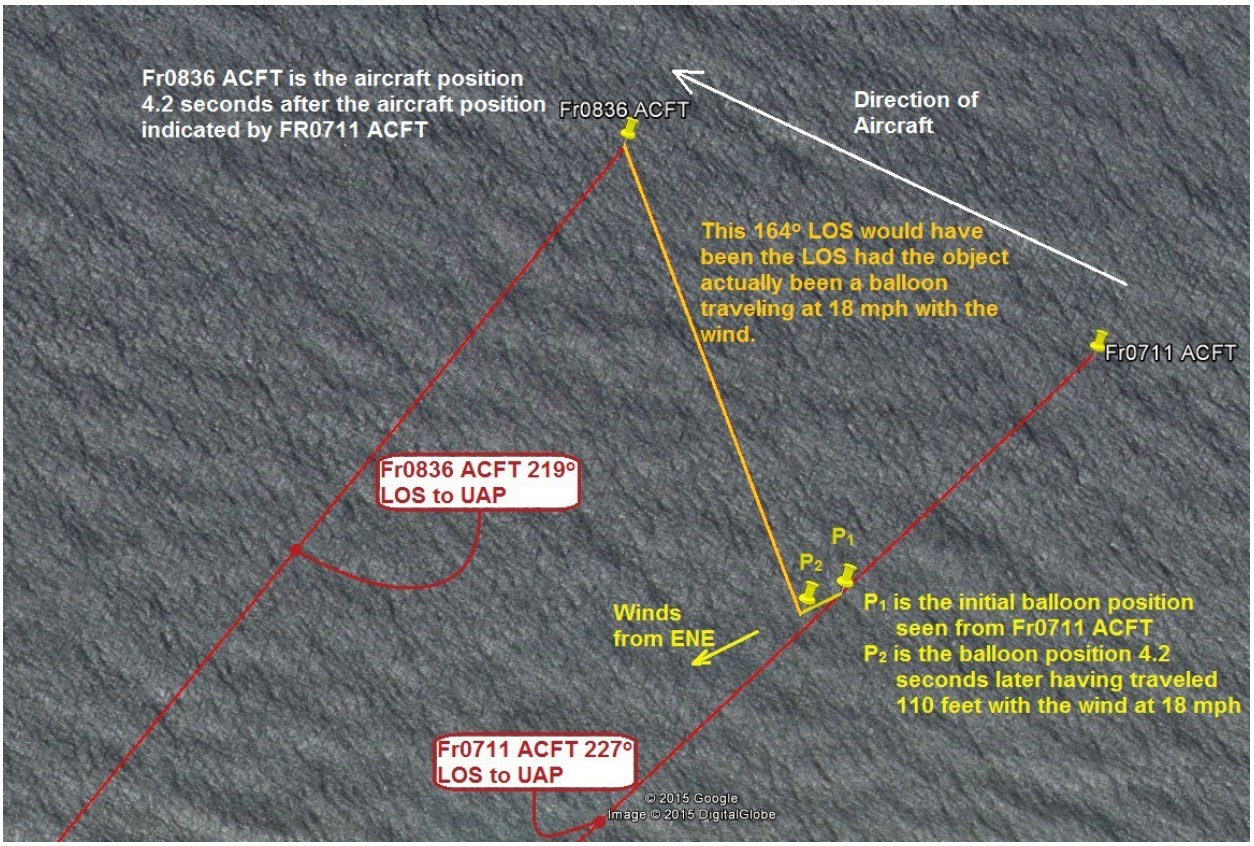


Figure 2

The first position (P_1) of a possible balloon is established along the line oriented at 227° azimuth given by the aircraft-to-target screen data seen within Frame 0711 (See Figure 3) and established at a distance from the aircraft position of 1,250 feet. The Frame 0711 on screen data indicated the plane position (Fr0711 ACFT in Figure 2) to be 18° 31' 13" N and 67° 06' 22" W. The second balloon position (P_2) was given by the distance a balloon would have covered in 4.2 seconds at 18 mph; 110.88 feet. The next frame, 0836, was arbitrarily chosen to allow comparison of aircraft and balloon travel distances. The 2nd plane position, specified by the yellow pin annotated (Fr0836 ACFT), is the plane location 4.2 seconds after the Fr0711 ACFT plane location. During this time the aircraft traveled a distance of 1504 feet along a WNW (295° azimuth) path which subsequently created a line of sight (LOS), from plane to balloon, of 164°. The actual azimuth to the target (UAP) for Frame 0836 can be seen as 219° (See Figure 4). This is a discrepancy of 55° (219° – 164°) between the actual target azimuth and the one calculated for a balloon.

10.5281/zenodo.7837470

Figure 3

The 227° bounded in red is the plane-to-target azimuth; the compass direction in which the infrared (IR) camera was pointed within Frame 0711.

10.5281/zenodo.7837470

Figure 4

The 219° bounded in red is the plane-to-target azimuth; the compass direction in which the IR camera was pointed within Frame 0836. There is a time difference of 4.2 seconds between Frames 0711 and 0836 (1/30th of a second per frame). Over that time, the plane tracked the UAP over an 8° degree azimuth change (227 ° – 219 °). The plane would have passed an object as slow a balloon creating the much greater azimuth change of 68 °.

How it was established that the balloon was 1,250 feet from the plane in Frame 0711 does need some attention. See Figure 5.

10.5281/zenodo.7837470

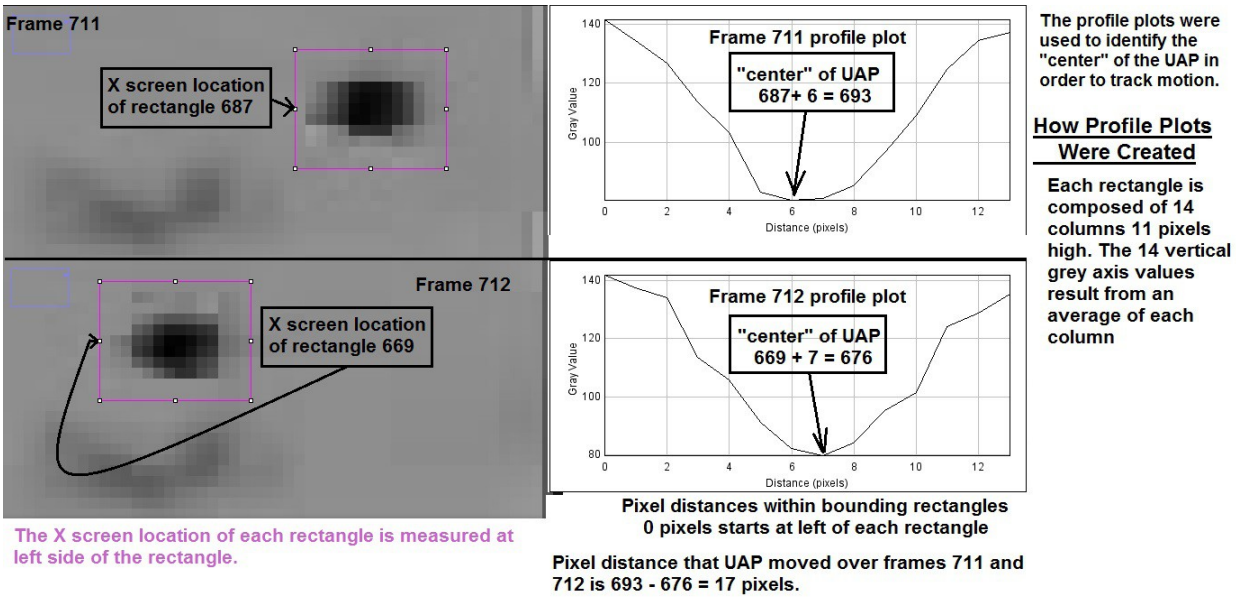


Figure 5

Figure 5 establishes that the UAP seen in the video moved about 17 pixels from Frame 0711 to 0712. The Field Of View (FOV) of the IR Camera was determined to be about 1.07 degrees at magnification 675 which amounts to 0.001483 degrees per pixel (see Appendix G for details on degrees per pixel). The UAP having moved 17 pixels implies that the UAP traversed 0.025211 degrees in 1/30th of a second. It was noted earlier the weather at the time had maximum winds of 18 mph winds thus inferring that a balloon, going with the winds out of the ENE, would have moved 26.4 fps * 1/30 = 0.88 feet. However, the trajectory of the UAP over Frames 0711 to 0836 was almost due south (188^{o} azimuth). The fact that the image is a two-dimensional projection of a three-dimensional area changes the path length of 0.88 feet as seen from the IR camera perspective. The angular change of 0.025211 degrees is not over 0.88 feet but rather 0.55 feet. See Figure 6.

10.5281/zenodo.7837470

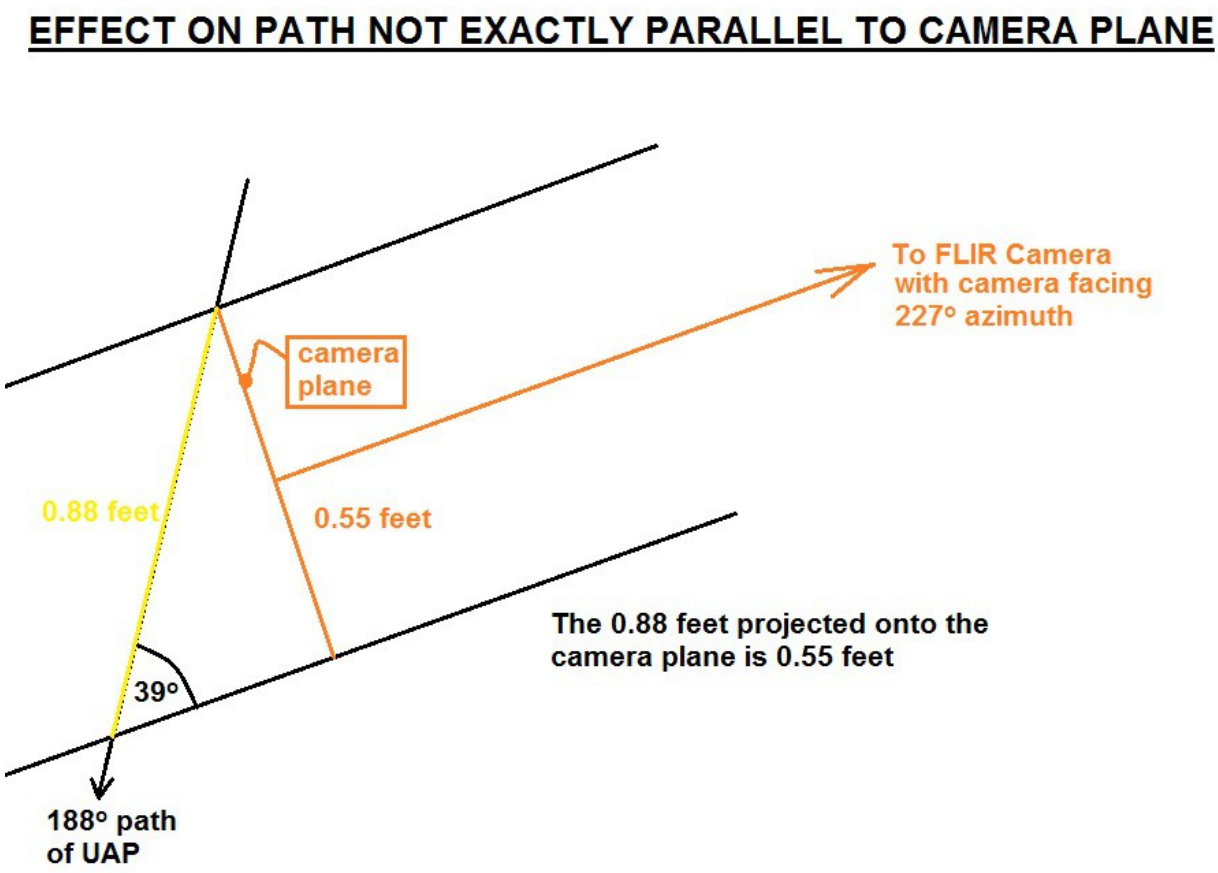


Figure 6

The angular change of 0.025211 degrees, from the IR camera perspective, must be applied using 0.55 feet. Consequently the distance a balloon, traveling at 18 mph, from the aircraft would have been 0.55/(2*tan(0.025211/2)) = 1250 feet.

Line-of-Sight measurements, angular size, and speed preclude a balloon from being a possible explanation.

FORM 30-MUFON FIELD INVESTIGATOR'S REPORT

7-16-2015…Version3-Hoffman/Turner

ANONYMOUS: yes [X] no []

MUFON CASE NUMBER: [74282] CASE TYPE: [CE2]	TODAY'S DATE: [01-29-2016]			BGE CERTAINTY PERCENTAGE: [29.4]
FIELD INVESTIGATOR: [#22647 Phil Leech S.S.D. #10834 Robert Powell D.O.R.]	DATE EVENT REPORTED TO MUFON: [Oct 2015]			OTHER CMS FORMS NEEDED [03]
SIGHTING DATE: [08-28-2013]	TIME OF SIGHTING: [21:40 hrs. 9:40 pm.]	DURATION OF SIGHTING: 5 min		
SIGHTING LOCATION (TOWN): [Ontario Canada]	STATE: [N/A] COUNTY: [N/A]	LOCATION COMMENTS: [event occurred on a dirt logging road] TYPE OF COUNTRYSIDE: [extremely remote wilderness]		
WITNESS NAME: [Three witnesses. All wish to be anonymous.]	WAS THIS REPORT SUBMITTED BY ANY ONE OTHER THAN THE WITNESS? [no]			
WITNESS ADDRESS (CURRENT): [wishes anonymity]	CITY: [wishes anonymity]	STATE: [wishes anonymity]	ZIP: [N/A]	COUNTY: [N/A]
	LOCATION OF WITNESS? (Car, outdoors, etc.) [Outdoors on a logging road.]			COORDINATES: [wishes anonymity]
CONTACT NUMBERS: HOME [N/A], CELL [N/A], FAX [N/A]	EMAIL: [N/A]	COMMENTS: [witnesses request anonymity]		CASE DISPOSITION: [Unknown]

1) **Synopsis:** There were a total of three witnesses in this case; the primary witness #1, witness #2 who was unwilling to be interviewed, and witness #3. All were males between 35-65 years of age and are lifelong friends. The primary witness and witness #3 agreed to be interviewed on video. Both of these witnesses request anonymity.

While on a hunting trip in an area that is considered extremely remote wilderness area, three hunters observed for about five minutes a large barbell shaped craft that came within a distance of 400 feet of their location. The craft had no seams and had two disk shaped ends that had a bar-like connection between them. There was an indigo plasma that covered most of the craft. The craft rotated slowly around its center while emitting an electrical spark like shower, always opposite of the direction of travel, but without a specific point of origin. There was electrical interference with the operation of the primary witness's cell phone, video camera, and a field radio.

2) **Location:** This event occurred in Ontario, Canada, at a location known to both investigators.

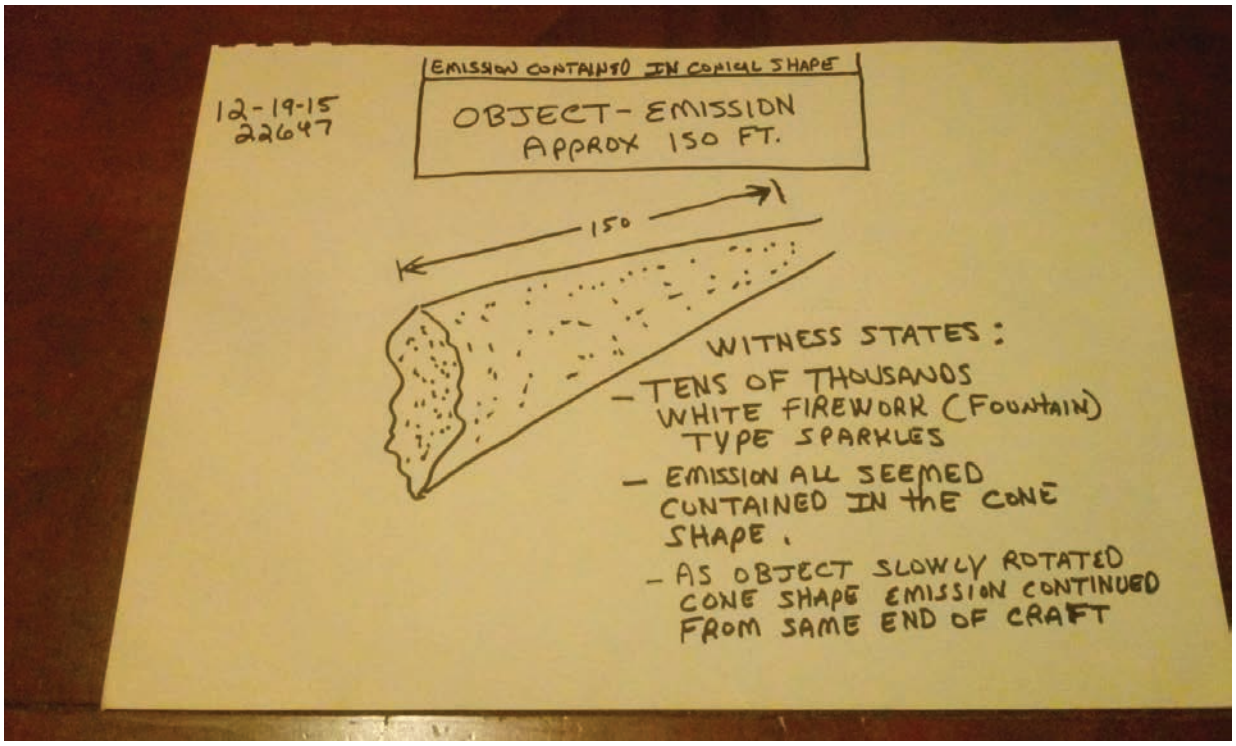
3) **Background:** The witnesses live in the state of Indiana. The investigation was a joint effort between Phil Leech based in Indiana and Robert Powell based in Texas. Phil met with the witness(s) in person twice. Robert and Phil will meet in person with the witness again in May 2016. The witnesses have desired complete anonymity but have shared information with the investigators. The only information that the investigators have not been able to obtain to date, is a copy of the video with its accompanying noise and the full paper written by the witness. The witness keeps the video camera locked up in a safe in its original state and is not willing to part with that information at this time.

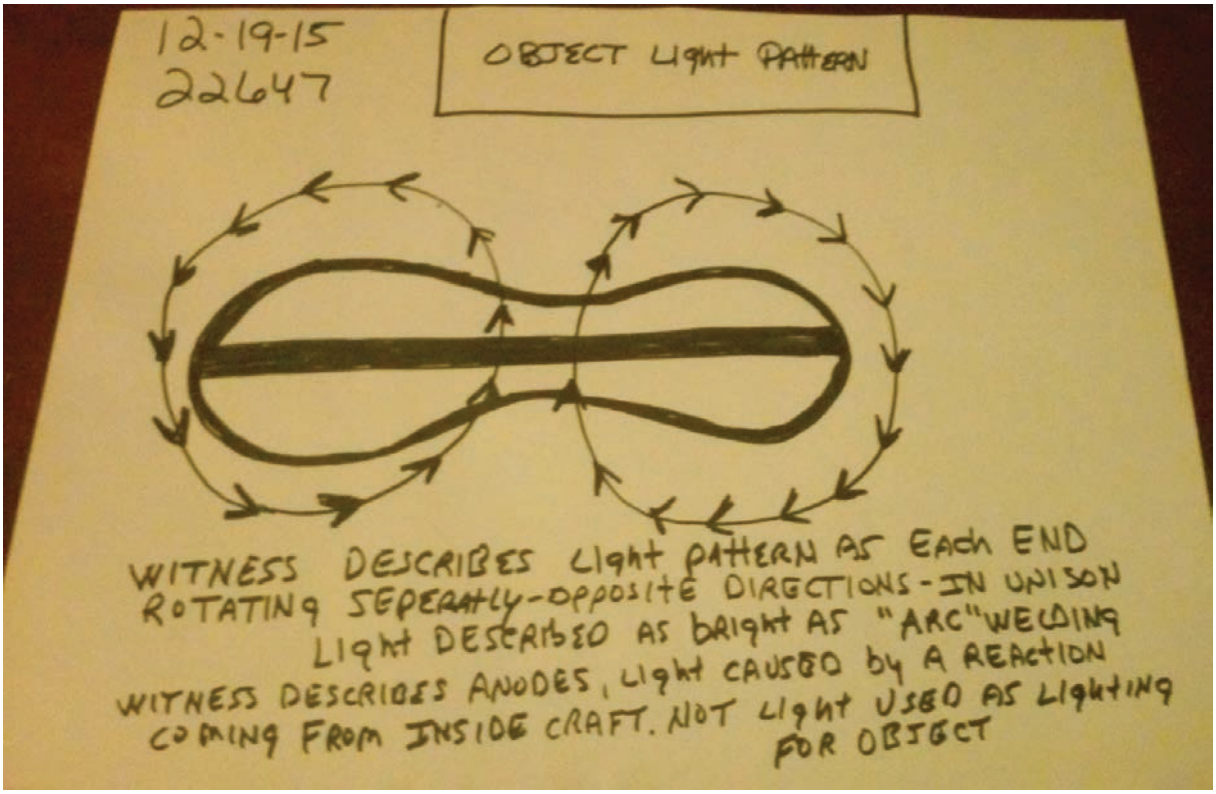
4) **Describe the object when first seen, at its closest approach, and when last seen. Discuss size and distance if known, direction, elevation, and angular size in each of those instances.** The primary witness to this event owns his own business which has contracts with the Department of Defense. This was easily verified by the witnesses based on the company's website and patents held by the primary witness that are available online at the U.S. Patent office website. The primary witness is of high intelligence , has an engineering background, and has written a very detailed description of this event. The witness has a sufficient science background to have made his own calculations of the object's size, its altitude, and he even tried to estimate the power required to create a plasma all around the object's hull. A copy of his 17 page description of the event is attached in Appendix B. A more detailed version of this report is held by the witness and he may release it at a later time.

Phil Leach met with the primary witness at his place of business on December 19, 2015. A copy of Phil's notes are attached in Appendix A. Phil met with the primary witness a second time on January 15, 2016, and this time was also able to interview witness #3. Phil did both these interviews on video using questions that Phil and Robert had put together. The video itself was taken at the primary witness's place of business by one of his employees due to concerns of anonymity. The full 46 minute video is available at: https://www.youtube.com/watch?v=etueh5IfZ28&nohtml5=False

The event took place on August 28, 2013, in a desolate area of southwestern Ontario on a logging road that is sufficiently remote that no cell tower coverage is available. The three witnesses had been hunting for black bear and were just reviewing video footage of their hunt when the UFO encounter occurred. The time was 9:40pm based on

the video camera. The three witnesses were proceeding north on a logging road when they saw a light approach them from the east. Initially they thought the object was a helicopter, but thought it strange that a helicopter would show up at night in a remote area. The light continued to approach and the primary witness realized that he could not hear any sound. He asked the driver to stop the truck as he grabbed in Sony Cybershot video camera. The camera would turn itself off as soon as the witness turned it on. He also tried his Motorola Droid cell phone but it would not turn on either and began going through a reboot phase. By now, it was obvious to the witnesses that they were not looking at a helicopter as the object was close enough to be clearly seen. It was a barbell shape with disks at each end of the bar. Bright yellow/white sparkles could be seen emanating from the craft and contained within a conical shape about 150 feet in length or roughly the same length as the object itself and opposite of the object's direction of movement. The sheath of the cone had a ribbon-look similar to the northern lights but a different color; it was more of a yellowish-blue to light green color. (See drawing below drawn by Phil Leech and agreed upon by the primary witness.) The object was also covered by a 12 to 18 inch thick indigo blue plasma and with lights on each disk that rotated in opposite direction of each other. The primary witness described it as an "optical eggbeater." (See drawing on next page.)

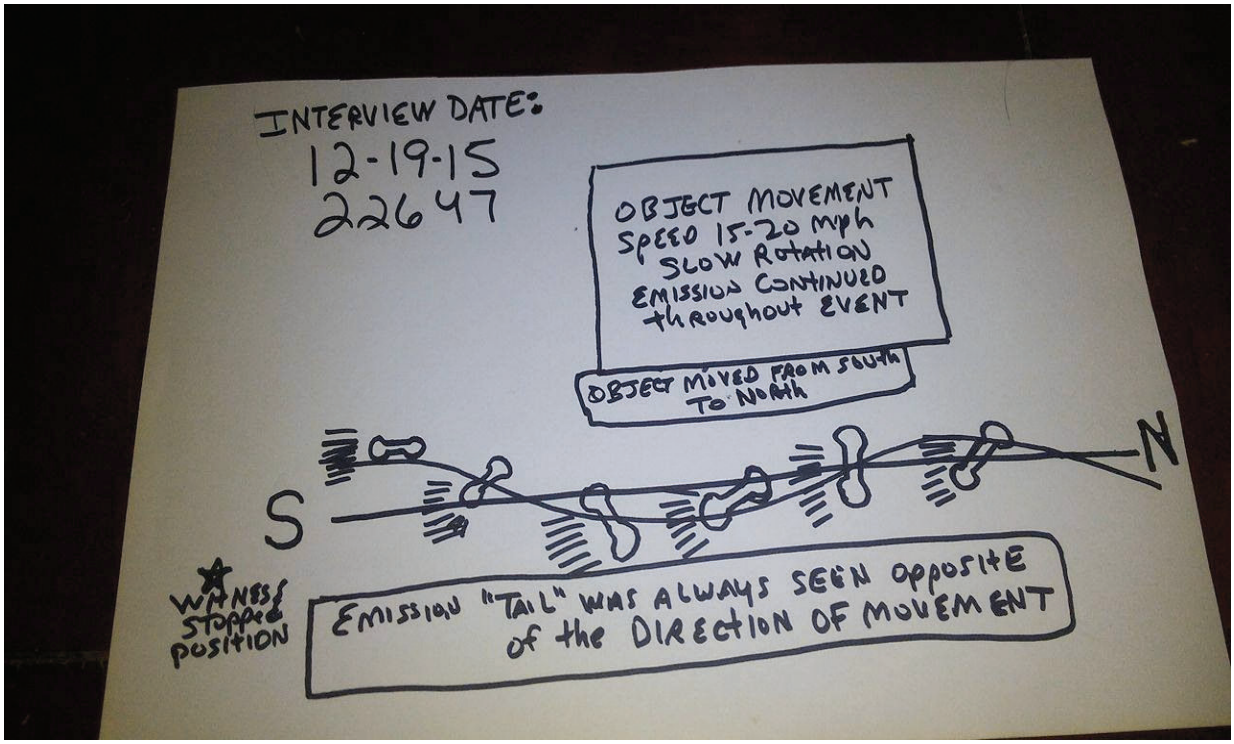




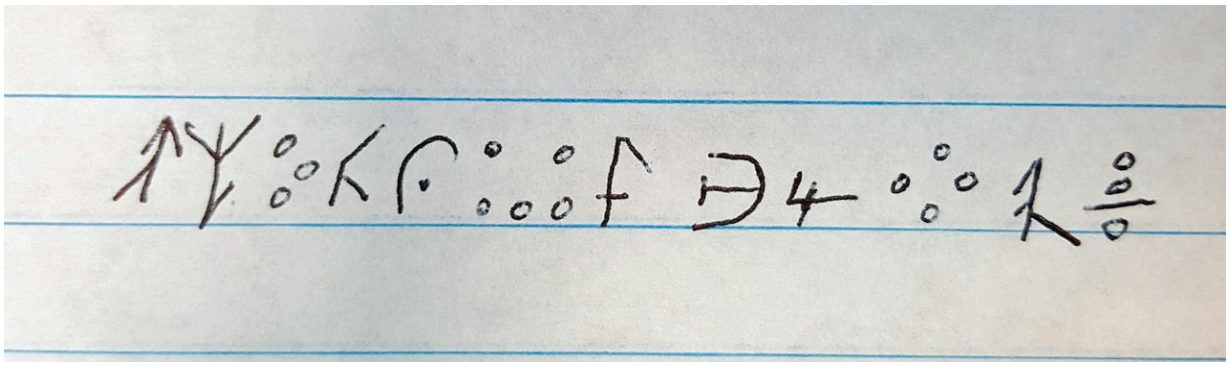
At this point in time, the primary witness estimated the object to be 400 feet in distance and 250-300 feet above the ground. He would later calculate the object's size as 170 feet across with a vertical height of 20 feet for the disks and 18 feet for the bar. He indicated this was based on his perception of distance to the trees as shown in his 'to scale' replication drawing on page 15 of his paper and the size of the object in his 9x scope. The investigators have not yet obtained the details of the calculations used by the witness to draw his conclusions for distance, altitude, and size of the object. However, the witness's estimate can be double checked using available information in his report. The trees in the rendition can be seen on the daytime photo of the area on page 16 of the witness report. The taller trees are believed to be white spruce and tamarack trees. These trees normally grow to about 60 feet, which gives the height of the treeline. Additionally a piece of information available is that the NIKON 3-9x 50mm spotting scope has a field of view of 11.3 feet at 300 feet as provided in the NIKON manual for their 3-9x 50mm scope. The witness indicated that the object's vertical height filled his scope at 9x magnification. At a distance of 600 feet, his scope at 9x would have a field of view of 22.6 feet. This matches up reasonably well with his paper that shows the objects vertical width at the disks to be 20 feet and a distance of 400-600 feet as described in his paper. This verification indicates the primary witness's estimate of an object 170 feet in length and 20 feet

in height is reasonable. Now bringing in the treeline height of 60 feet as a double-check, at 250-300 feet in altitude the object would be 4-5 times the height of the trees which would mean the trees are 4-5 times closer than the object or about 100-130 feet distant from the camera in the photo on page 16 of the witness's report, which looks reasonable.

While examining the object through his rifle scope, the primary witness could find no indication of a fuselage, doors, windows or even any rivets. The object appeared to be one solid piece. It was very shiny as the stars could be seen reflecting off the object. The witness described its hue as similar to beryillium. At about 9:44 pm the primary witness asked the driver to completely shut off the truck engine and lights. (It should be noted that although the object or its EM field interferred with the operation of the camera and cell phone, there was no apparent interaction with the operation of the truck's electrical system.) Once the truck was stopped the primary witness put his rifle on the truck to steady it. As he continued to observe the object, he noticed that it did not travel in a straight path but had a zig zag movement whose overall movement was in a straight path. (See the drawing below.)



During this time of detailed observation, the primary witness also noticed some type of lettering on the hull of the craft. He remembers 30 or 31 different shapes and drew some of them the next day. He thinks his memory of the characters drawn on the insert below is mostly accurate---he indicated a 7 on a scale of 10 with 10 being perfect recall. Witness #3 did not recall seeing any lettering on the craft.



Once the object had moved away from their position the primary witness turned his scope over to the other witnesses and tried to turn on his Droid phone but it was hot to the touch and the battery was drained. He then tried his Sony video camera and this time it stayed on. (The witness later surmised that perhaps the EM field that had created the plasma around the object was far enough away that it had dropped in strength sufficiently to allow the camera to operate. EM fields drop in power by the inverse square of the distance, so this is a reasonable assumption. As to why the phone battery drained but the camera battery didn't---we don't know.) He hit record and although his screen was black, he continued recording in case the camera was capturing an image. The video captured four minutes of data. At about this same time the witnesses noticed a second craft in the northeast at a distance of several miles and a third craft in the northwest. Meanwhile, the original craft that was much closer to the witnesses continued to recede into the distance. The primary witness discusses these other two distant craft in his paper and why he believes they are related to the first craft. The investigators in this case wish to concentrate on the craft that is up close since it is the more important piece of this event. Once the primary craft had receded over the tree lines, the three witnesses decided they should go find the fourth member of their hunting party who was alone and 2-3 miles from them. They called him using their Motorola radio but it was not operational. Once they reached him, they found that he had not seen any of the events that they had witnessed.

5) **Evidence-physical:** This event had various effects on electronics. Invoved during the event was a 2014 Dodge 4x4 truck, a Motorola Droid cell phone, a Sony DSC-TX1 Cybershot video camera, and a Motorola 10 watt two-way radio. Although not completed to date, it might be possible to make some observations regarding this event based on evaluation of the design schematics of each of these devices and examining how current loads created by various EM frequencies would "affect" or "not affect" the various electronic devices.

The Dodge 4x4 truck was not affected in any obvious manner. The truck's headlights continued to operate until they were turned off and there was no effect on the truck's motor. Although not in use at the time of the event, the truck's clock and its radio operated properly after the event.

Witness #1's Motorola Droid cell phone was in a reboot mode when the witness tried to first use it, as if it had been turned off, which it had not. The cell phone was put down and not accessed for several minutes. Upon the second access attempt the cell phone was hot to the touch and the battery in the cell phone had been depleted quickly. Once back at camp the cell phone was charged back up and remains in working order to this day. There had been several scientific apps on the cell phone including a compass app. There was no change to the usability of any of these apps which indicates that there was no permanent damage to the magnetic sensor or to the accelerometer within the phone.

Witness #1's Sony Cybershot video camera may had the most unique reaction to the object. Initially, the video camera would not turn on. (A determination of whether this camera has a current or heat limiting circuit build into it, needs to be made.) Once the object moved from a close distance of about 400 feet to a farther distance of about a ¼ mile then the camera began to operate. However, only its audio feature worked property as the video feature contained a large amount of noise. It may be possible, as the primary witness surmised, to extract some information from the video regarding the EM frequency being emitted by the object. Someone with knowledge of EM jamming technologies might be able to help. The battery life was at 41% just prior to the event and unlike the cell phone was not drained of power immediately after the event.

Witness #2 tried to use a Motorola two-way radio immediately after the object departed without success. Prior to this event this radio was in working condition and after the event the truck radio had to be replaced.

Although the electrical failures of some of the equipment on hand insinuates the possibility of some type of EM field, there was no "feeling of electricity" in the air by the witnesses.

6) **Evidence-evaluation:** The electronic devices are unavailable at this time. Witness #1 still has the cell phone and video camera. Witness #2 still owns the truck and has replaced the Motorola two-way radio. Because witness #2 is not willing to participate in the investigation, it has not been determined if the original radio is still in the witness's possession or was traded for a new work radio.

7) **Weather Information:** The witness's account was clear skies, a few clouds, upper 70s, Winds calm, 60 % Humidity. Data from the websites for Weather Underground Heaven's Above located 10 miles to the northwest of the incident show a temperature of 80 degrees, 45% humidity, winds out of the south at 3-4 mph, clear skies, and no moon. Astronomical Twi-light occurred at 9:34 pm, which indicates that there was already maximum darkness after sunset.

8) **Local airport, military base, space launch, MOA:** [N/A]

9) **Trace evidence including Radiation EM Field:** [N/A]

10) **Evaluation of photographs or video evidence:** The primary witness has the original video taken of the event. Portions of that video have been viewed and they show video noise while the video's audio is clear enough to identify comments made by the witnesses. As of May 2016, the witness has not provided us a copy of the video. His reason is that he believes that the EM frequencies emmanting from the craft can be discerned from the noise and he does not want to release that information.

11) **Related cases (MUFON, API, NUFORC):** [None]

12) **Researched Web Sites [by name and findings]** [N/A]

13) **Witness background:** The investigators in this case have verified that witness #1 is a scientist with an engineering background who owns his own company. He specializes in advanced technology working as a contractor for the Dept. of Defense. He holds over [redacted] patents soley in his name and he is also an aircraft pilot (small 4 seat style aircraft). During the entire interview process, it was very easy to talk with this witness; he was very collected in his thoughts; and he did not seem stressed while discussing the event.

After a detailed conversation with Witness #1, the possibility of what would be released to the public and after effects were discussed in detail.The witness stated that his position was the public needed to know what had occurred and that these crafts did exist.The witness's desire to further research into what occurred is driving the witness to reach out to others in the scientific community so as to find answers.
The primary witness's company employees a number of people and part of his reason for anonymity is the possibility that the loss of any DoD contracts would be counterproductive to his business and would also affect his employees.

Witness #3 is a business owner (farmer) who was also interviewed in this case. Witnesses #2 and #4, both business owners, declined to be interviewed and would not submit a written statement at this time. Witness #3 does not have the technical background as does the primary witness. Nonetheless, he was still matter-of-fact in his comments.

14) **Witness original CMS statement:** The witness contacted investigator Phil Leech directly and did not file a CMS report himself due to his desire for careful anonymity. As a result, there is no "original" statement from the witness in the CMS database. Phil has created a case for this file in the CMS database and is identified as case number 74282.

15) **Expert statement [if applicable]:** [N/A]

16) **Investigators' summary and conclusion:** This is one of the strongest and most interesting UFO cases that can be analyzed by an investigator. In this case, the efforts of Phil Leech the head investigator in the state of Indiana and Robert Powell, MUFON's Director of Research were combined in the analysis of this case. The strength of the case lies in the multiple witnesses that saw the craft at very close range and with one of the witnesses having a very strong scientific background. Because of the closeness of the object and the quality of the primary witness, there is no concern as to the misidentification of any known terrestrial aircraft. Its shape, its lack of sound, its large size, its lack of any known propulsion system, and its strange emission of sparklers eliminates any type of known aircraft. We are left with only three possibilities: (1) the witnesses imagined an event that did not occur; (2) a collusion by at least two of the three witnesses to make up the story and lie to the

investigators; and (3) an event that was real and occurred as described by the witnesses. Let's examine these three possibilities.

The first theory would be that at least two of the three witnesses imagined this event. We cannot necessarily include the third witness since he is not willing to participate in the investigation. If the witnesses imagined the event, it is amazing the amount of detail that the primary witness has recalled. This level of detail can be seen in his 17 page report. Additionally, the re-creations that he made of the event in terms of the distance to the object, the size of the object, its angular size in the rifle scope---all of these match up mathematically. So he would have "imagined" the story in a way that fits together perfectly. Also arguing against an imaginary event is the copy of the camera video where one can hear the three witnesses discussing the object as the event unfolds and the noise in the video. How did the noise show up in the video if the witnesses were "imagining" the event? An argument that the witnesses "somehow" imagined the event does not match the facts.

In the second theory we look at collusion amongst the witnesses in order to perpetrate a hoax. This theory eliminates the issues present in theory #1 because the noise in the video and the audio of the witness's discussion could have been faked. This theory also eliminates concerns with the exacting detail in the primary witness's report because it is explained as an intentional falsification. So what argues against this case just being a hoax? The strongest argument against a hoax is the financial, familial, and religious status of the primary witness. This witness has made his identity, place of business, and location of his home known to both investigators in this case. Both investigators have met with the witness in person at his place of business, which is adjacent to his home. There is nothing for the witness to gain financially by reporting this event and in fact, the opposite is true; the witness risks the loss of government contracts in a very competitive market where any excuse can be used to choose a competitor. Ask a presidential candidate or anyone else in the public eye the risks of going public with a UFO sighting. The investigators of this case can testify that this witness is already very well off financially as evidenced by his home, types of cars driven, the ability to go to Canada for a hunting trip, and the company he owns which clearly has state of the art electronic capabilities that this witness has used to try and model the object that he saw. The witness's family and their home is [redacted] It is hard to imagine that someone would perpetrate a hoax and then welcome investigators onto his family property. Lastly, the witness is an active church member in his community. This within itself does not mean that an individual cannot create falsehoods but it does argue against the likelihood. A secondary argument against the hoax is that two of the three witnesses were willing to go on video, although their voices and identities were hidden, and state what occurred. The video statements of the primary witness and witness #3 matched up with what the primary witness has told these investigators both in person, through phone calls, and via email. A hoax can never be ruled out with a likelihood of zero, but the likelihood of a hoax in this case is so low that these investigators (Phil Leech is a former law enforcement officer with training in interview techniques used to identify false statements.) do no believe it is a reasonable possibility.

This leaves us with the third possibility---the event occurred as described by the two witnesses. If this is the case then the object as described cannot be explained by any known aircraft. The qualities displayed by the craft that are unique and not present in other aircraft include the barbell shape, the ability of a large craft to move at a speed of only 20-30 mph without sound, the lack of any rivets, a contained sparkler/aurora type of discharge, and a plasma that surrounds the craft. Other than to state that there is no known technology to explain such a craft, no conclusions can be drawn as to the origin or purpose of the craft.

There are a number of additional investigative actions that can still be made related to this sighting.The circuitry schematics of the cell phone, the Motorola field radio, the Sony video camera, and the Dodge truck should be obtained and analyzed to determine what EM frequency and power level could cause different specific failures in some of the electrical equipment and a lack of electrical failure in the truck as was described in this report. The video camera output should be analyzed for any possible signature that might have been induced into the video by the EM field of the craft. A different camera of the same model should be used to try and re-create the same effect by exposing it to various EM frequencies and power levels. Samples of the soil in the area should be taken so that a determination can be made if there are any magnetic anomalies in the soil or any signs of the soil being exposed to ionizing EM which can be detected through the chemo-luminescence qualities of the minerals in the soil.

This case is a good example of a true unidentified flying object.

LOG OF MAIN INVESTIGATION TIMES

Date/Time	Contact Method	Activity	Notes/Comments
10-26-2015	Phone	Contacted State Director	Phil Leech contacted SD Stewart and explained the case. Stewart advised Phil to contact Robert Powell.
10-31-2015	Email	First contacted R. Powell	
11-11-2015	N/A	Closed initial case.	Unrelated case initiated witness contact.
12-19-2015	In person	Interview Witness #1	Two hour in person interview with primary witness.
01-15-2016	In person	Video interview of Witnesses #1,#3 from 7pm-10pm.	See Video Interview. Interview was at witness's place of business and video made by an employee.
Nov 2015 thru May 2016	Email, Phone, In person	Multiple phone, email, and "in person" contacts were made with the primary witness over the several months of this investigation.	Email / Text / Phone were used as a contact method, with the need of privacy as requested by witnesses involved this data will not be published

APPENDIX

[Place all photos and other exhibits here including caption remarks below the exhibit or figure]

NOTE: This section relates to any copies of photos, figures, screen captures, or drawings related to this case. All material must be included in this document and not entered into CMS individually. A text only copy of this report should be added to the Report's text box merely by doing a copy and paste. Graphics, photos and videos will not be added when you do this. This supports search within CMS.

APPENDIX A

NOTES FROM PHIL LEECH TAKEN IN DECEMBER 2015 WHEN INTERVIEWING THE PRIMARY WITNESS

Witness A - Reporting Witness - rear seat (middle) - business owner
Witness B - Driver seat (Indiana)
Witness C - Front seat passenger - business owner
Witness D - Seperate location from other witnesses and event location , did not observe anything. Picked up after event.

Witnesses are all between the ages of 35-50 , all male witnesses , all lifelong friends. Witnesses are all described by the reporting witness as " all who enjoy outdoor activities , fishing , hunting, etc.

Conducted interview with witness A - Dec. 2015 9:15 a.m. - 11:15 a.m.
Interview location - XXXXXXXX Indiana - [redacted]
Attending interview - Witness A / S.S.D. 22647 Philip Leech
Interview was not recorded
Interview Objective : Establish working relationship with Witness A
Determine Witness credibilty
Discuss the event in further detail , witnesses observation at time of event
Determine Witness A objective with MUFON reporting event / releasing event details to the public

Interview started with a tour of the business and proto-types currently being developed. Witness A shared some background business history.
Interview was conducted in a meeting room in the business.

Witness A credibility is rated high, with the known background of Witness A, reporting a event that would be counter productive to the witness himself and the witness's business.

After a lenghty interview in person and by telephone, witness has a clear account of the event and specific details surrounding the event.

Witness A has provided a white paper surrounding the event, also the witness has 2 patents that resulted from information derived from the event. This white paper was discussed. The witness only provided a small portion of the white paper, without any information that discloses the identity of the witnesses to the event.

*Obtaining further pages from the white paper would be one of the desired objectives

When asked - Why would you want to release this event to the public knowing there's a chance that this will result in the exposure of his name and business name being released by some outside person or organization other than MUFON?
Witness A replied, "It is important to him that the people know about these UFOs and they are real."

When asked about the witnesses' emotions during the event, Witness A was very impressed by the craft, the size, the amount of energy it would take for a craft that size to hover in place silently. Witnesses B - C were extremely scared during the event, using language to express their fear, and as stated in the white paper, Witness B - C, wanted Witness A to take a shot at the object. Witness A did have a high powered rifle in the vehicle, but did not agree to take a shot. Witness A states that as of the date of this interview both Witness B - C were still extremely scared the event occured and did not want to discuss the event with anyone, however during our interview Witness A did state that the witness that lived in Indiana might speak with this investigator or submit an account with a drawing of the event. Witness A stated Witness B (lives out of state) will not speak with an investigator, was still scared,and would not take a chance of the pubic finding out any names etc .

Witness account of event: After a planned event Witness A-B-C were traveling in a pick-up truck, dual seat, Witness A was seated in the rear middle seat position, Witness B was driving the vehicle, Witness C was in the front passenger seat. Witness A was the first to notice a reflection on the painted metal finish between the drivers door and passenger side door, looking back over his right shoulder he observed a very bright light approaching the truck from the right rear of the vehicle. Witness A then told the driver to stop the vehicle, which the driver did so, turning the vehicle ignition off, all 3 witnesses exited the vehicle and observed the object fly directly overhead somewhere determined to be a speed of 15-20 m.p.h. As the object flew over the truck it stopped and hovered in place. Witness A had a cell phone with him, pulling it out of his pocket he noticed the cell phone was going through the start-up program and he could not wait for it to start back up. Witness A put his cell phone back in his front pants pocket, and grabbed his video camera, which he stated would start then shut right off; this occured several times before he used the scope on his rifle to observe the object.
During this time the cell phone in his pocket became very hot to the touch and he had to remove it from his pocket, for fear of being burnt. Witness A told one of the other witnesses to try using the truck work radio, Motorola brand, this radio would not power up and was unusable.

After the object began to move slowly away from the truck's position the video camera Witness A had began working, however, there is no usable video , only information that was stored during the 4 minutes of video obtained. Witness A, using the scope on the rifle, noticed a slight movement with the object slowly moving left to right and moving in a straight line pattern. Witness A did state that the object was at first too large to observe the entire length of the object using the rifle scope. The object was about a 1/8 of a mile from the truck's stopped position before the

video camera started to power up and stay on, making it posible for Witness A to capture 4 minutes of video data. As the object started to move away from the trucks position, the witnesses got back in the truck and slowly followed the object, then noticing there was another craft,identical to the object they were observing hovering / slowly moving, this object was hovering then moving slowly just above the tree line.

Witness C noticed another object at a high altitude, moving quickly. Witness C stated it might be a satelite, Witness A stated that not a satellite,as he was familiar with them and this object was similar in color and shape as the other 2 objects. This object's high rate of speed enabled it to go from horizon to horizon quickly. Witness A states they followed the objects until the treeline and terrain blocked their view of the objects.

Witness D was still further up the road and at that point they decided to proceed to his location to pick him up. Once Witness D was in the truck they asked him if he had seen anything unusual in the sky, he replied he had not seen or heard anything in the area .

When Witness A was asked what he needs from MUFON, his reply was: he is needing an advanced radar specialist / advanced video audio specialist for further analysis of the 4 minute video with a desired outcome of getting embedded details in the video to better understand the technical details of the craft's propulsion system.
He believes he has captured on video, data that shows the energy / magnetic signature of the craft.

Witness A's observation of the craft details were very specific, this is expected due to the witnesses background. During the interview Witness A was very easy to talk to, very collected with his thoughts, did not seemed stressed when discussing the event. The witness was very knowledgable in many areas concerning the events details, and was very helpful in explaining what information he had with this investigator.

Because of the sensitive nature of the event and what this event could do to the witnesses credibility was discussed in detail, witness was assured that all attempts to keep all of the witnesses identification and business name from being associated with the report would be taken by this investigator.

During the interview the description of the object matched what was detailed in the White Paper. A few details were obtained that is explained in this report.

Object had what looked like unusual markings, these were black satin in color, not raised, but had more the look of being silk screened on the craft. The time used to determine the event was U.S. time zone.

The object was emitting a very bright lights, Witness describes as being "salty", when asked what that statement meant, he described the lighting as being as sharp and bright as the light a Arc Welder would produce while in use.

*There is no phone coverage in the area of the event. No phone towers in the area. Witnesses B-C, did not have cell phones with them during the event.

Truck radio - Motorola 10 watt job site type radio, * Info - a 10 watt radio will transmit 10 miles, rule used is 1 mile - 1 watt.

* This truck radio did not work during the event, Special Note - this radio had to be repaired after the event.

* Special Note - Witness A describes the movement of both crafts as slowly hovering and moving in a grid pattern as if looking for something. There was nothing that showed the objects were interested in them. However the witness did feel as if the occupants of the craft knew they were there and he felt as if he was being observed.

Witness A is a Pilot, normally 4 seat airplanes.

Witnesses Vehicle was a 2014 Dodge truck 4x4.

Witness A cell phone: During the event the cell phone kept going through the start up process, after returning the cell phone was put on a charger and had no problems re-charging. There has been no issues with this phone before or after the event. The witness still owns the cell phone, and it was shown to this investigator. The cell phone was owned by the witness 2 years prior to the event. There was no change to any programs, apps, etc. to the phone after the event.The event did not effect the truck clock and the truck radio did not have to be reset. As far as the witness knew there was no lasting effects to the vehicle or any repairs needed to the truck after the event.

* All of the witnesses stayed in the area for 4 days after the event. During this time they did not tell anyone locally what was observed, and no one in the area mentioned anything about it.

Emissions: Witness A states the object had a long trail of emission, more explained as ten of thousands of small lit particles, best described as those that occur during a fountain type fire work (see attachment of emission trail). Witness describes the lit sparkles as staying in the boudaries of the trail and not dropping to the ground. Stating they were similar to fireworks and each would sparkle for only a fast second. Emissions Trail was estimated by Witness A as being 150 foot in length.

There was no sound emitting from any of the objects during the event. Completely silent which intrigued Witness A .

No health concerns before or after the event with any of the witnesses. Witness A states that Witness B - C were terrified during the event and still very upset to the time of this interview. Witness A did not feel threatened during or after the event, more curious and wanting to remember details surrounding the incident.

Witness A states that there is one other witness (B or C) that might talk to this investigator or submit a account of the event.

All witnesses have talked to each other about the event and all have agreed they observed the same event occur.

Witness A phone details; Droid, battery charged daily, phone did power up and down during event, no apps or similar lost due to incident, phone did have numerous scientific apps installed, compass app was downloaded and still works properly to this day, there has been no quality of sound effected by event, no complaints of any kind from caller or receiver, battery life did not change after the event.

Witness A was asked if he would donate the cell phone that he tried to use to MUFON, currently he does not want to donate it.

Because of Witness A background he was able to notice details about the craft(s) that the normal observer might miss. This includes colors, object measurments, details that pertain to his background.

Witness A was intrigued by the way the craft was constructed, stating the craft looked as if it was made of one piece of molded metal, advising there was no seams, rivets anything that would be expected a craft of that size to have. Entire craft seemed to "flow" together in construction.

Object light emission: This was best explained by Witness A as being similar to what an arc welder would create.
* The areas the light was eminating from was best explained by the witness as the portal was not being used to create a light beam, it was more like the light emitted was from a reaction coming from the interior of the object.
* At each end of the craft the light patterns were rotating opposite directions but in unison.

Video camera used was a Sony DSC-TX 1 Cybershot. Battery life was at 41 % at time of event, this was observed by Witness A while using the video camera just prior to the event.

Witness A states that the craft looked like very shiny mercury, stating "The craft was so shiny almost mirror like, that if he was above it he believes that it would have reflected the stars or sky, and would have been very difficult to observe from above".

No enities were observed during the event.

Witness A stated that there was no feeling of electricity in the air, "no hairs on his body standing up" during or after the event.

Numerous questions were asked by this investigator regarding health, foods, water intake, stomach issues, bowel movement issues , sight, hearing , headaches, etc . Witness A advised that as far as he knew none of the above applied, there was no during of after effects other than Witness B - C were extremely terrified then and now.

Witness A has spent from the time of the event researching as much as possible about the craft and event. Using his background as a basis of his research.

Witness A is familar with blue plasma and what creates it, this is a basis he is using for his studies into the event.

Investigator Notes : 22647 Phil Leech

This case is of particular interest to this investigator, the witness is extremely credible, valuable information, details, etc were obtained by the witnesses. The witness seems sincere about releasing the event to the public. It was explained to the witness of the sensitive nature of the report and the possible issues that would arise once public, and how this investigator will assist him in keeping his identity secure. This witness understands what will come with this report being public and states, "This is information that the public needs to know." A good working relationhip with the witness was obtained, this investigator was invited to return anytime for further if needed.

******* Witness A - HAS AGREED VERBALY TO LET INV. 22647 AND MUFON USE THE WHITE PAPER AND RELEASE INFORMATION REGARDING THE ********* CASE AS LONG AS HIS FAMILY / CREDIBILITY / NAME / BUISNESS NOT BE COMPROMISED .

Further questions might include:

Will Witness B or C speak with a investigator or provide a detailed account of the event?

A large amount of the White Paper was not attached to this event, would Witness A be willing to provide further?

In the event this report goes public / national media etc. will the witness still cooperate when needed to provide answers if possible .

Is there video / photos of the area the event occured, taken by any of the witnesses before of after the event?

Would it be possible for a Investigator to go to the event site and take samples as needed per the investigation needs? Keeping in mind the witnesses desire for staying annonymous. This could be accomplished without the investigator identifying themselves to anyone while obtaining needed samples.

Can Witness A provide further papers on how distance, size, speed etc was calculated by him?

Get a copy of the repairs done to the Truck Motorola radio, and what was determined to cause the failure.

APPENDIX B

August 28 2013

Re: UFO sighting

Where: Ontario Canada

Witnesses:

As we pulled away from the hunting site I pulled out my Sony camera and started to play the hunt video for both of them to watch, witness 2 stopped the truck on the road for 5 min (I later realized that 5 min stop placed our timing perfectly for the next events to happen) and they watched a portion of it and we then continued to the pickup site for our other hunter still out in the woods.

9:40pm

We travelled the many miles distance towards the Highway on the old logging road which are more dirt paths in some places than prepared roads. As we came around a bend and were slowly climbing up a ridge line I noticed some unusual lights to my right flying low and slow initially thinking mentally it is really late for a helicopter flight out here in the bush.

The lights continued to approach us directly the windows were down and we heard NO SOUND from the craft in the sky and the lights were difficult to look at almost a salty to the eye's condition. I said "stop the truck" and I pulled out my Sony cybershot to video what we were witnessing.

I tried for a total of 30 seconds to get the camera to turn on but it refused to power up for more than 1-2 seconds and quickly shut off. Driver exclaimed "look it has a huge tail of sparkles or fire" and it did! the plume of plasma with tiny sparkles cascaded out the rear of the craft more than 150' behind the hull of the craft. The lights revolved around each saucer section in opposite directions kind of looking like the craft was an optical egg-beater. lights were vertically symmetrical on the hull above and below black strip portion in the center which immediately came to mind as an observation deck or portal. The lights seemed to be symmetric in color changing operation as they revolved around the craft. the craft was now directly in front of our truck at a distance of 400' and an AGL altitude of only 250-300', I was amazed by the sheer size of the craft with a feeling of "that thing is as big as a house" yet is moving effortlessly 25-30mph through the sky with no sound emitted. The craft was glorious with a prismatic almost holographic shiny metal luminous finish and a band of black around each end bell, the shape of a dog bone or barbell.

The entire craft was deeply covered (possibly 12-16") in a deep shade of indigo blue plasma reminding me of sights of many different development programs with high voltage/high frequency AC potential I have witnessed prior. I pulled out my Motorola Droid phone and it was going through a boot up almost like it had been switched off and then back on, I knew it would be at least another 45 seconds before it was operable. I went back to the Sony camera and it still refused to power up although I did get it to video 1.5 seconds before it shut off again.

Desperate to get a closer look at this amazing flying machine in front of me, I said to the guy's "there is no way it can shut off my rifle scope" so I pulled out my Remington 700 with its perfect 3x9-50 Nikon scope and hung it out the driver's side rear window to start my close 9x magnification observation of the craft still only 200 yds away!

Witness 3 was very excited and asked if I could shoot the craft? I said I'm not going to shoot something I can't identify! He said shoot it! JUST shoot it! In my mind at that moment I ran through the plausible outcome of squeezing off a .308 round at this magnificent craft and my tensions rose as I also realized in that moment that whatever magnificent technology laid before me was likely impervious to the primal on-slaught of a simple high power rifle and the end result could be far worse for our cause with my mind racing to the picture of my wife and kids back home.

The Driver witness 2 was also very excited with this sighting and used a myriad of different four letter words in describing features of the craft as it slowly moved through the sky in front of our truck.

The craft fully filled my scope at full 9x magnification I had to dial down the magnification to get a better view of the whole object at this short range. I studied every perfect attribute of the sculpted lines looking for any features that would allow me to identify it as something terrestrial or even advanced military yet nothing I observed looked like something I had ever seen before.

As a pilot I was confident I could find attributes of a common metal fuselage with bumped rivets or hardware exposed but none were found! The lines of the craft were as smooth as liquid metal mercury and I mentally noted that this thing was constructed as if it were forged as a single metal object with no parting lines or areas I could identify as manufactured with common technique.

I made mental notes of approximate dimensions of the various attributes and sections of the craft so I could later draw them. I counted the light positions that upon close examination did not appear to be lights at all but rather 6" diameter buttons on the side of the craft that shifted color through at least 16-17 colors of the rainbow.

I noted no lines in the craft supposing landing gear bay doors or exits the craft was seemingly one solid metal form of unusually high quality finish. It was easy to see stars above reflecting on a few of the features of the craft to my perspective location.

The black strips on the disks were ominously opaque and my mind raced to the scenario of someone or something was looking out the same black portal at me staring at them and just trying to soak up every last detail so that I could process it all later.

9:44pm

I stated "turn off the truck and lights let's get out so we can watch it", and I quickly stepped out of the truck and placed the rifle on the hood of the truck and continued to view the craft now from a very fixed position with the scope reticle placed upon the craft.

With the scope now in a fixed position on the truck hood I immediately realized the craft was not flying perfectly linear in its flight path but rather was flying a soft zigzag pattern in a straight line with a total time interval between full left and full right of approx. 10 seconds while maintaining constant altitude.

Viewing details of the craft now became harder since the craft was moving directly away from us and I was viewing through the plasma tail of the craft with the ionized air sparkle lights looking almost like I was viewing the craft through the foreground view of a common sparkle fountain firework device.

I told the guy's to have a look and both took a minute turn at viewing the craft from the rifle scope and commenting on what they were seeing.

As soon as I turned over the rifle scope I grabbed my Sony camera from my pocket and turned it on and amazingly it stayed on, I immediately hit record but to my dismay the screen was totally black yet I could visually see the craft now a full quarter mile away with perfect view with the naked eye. I continue to record and reached for my Droid phone and tried to power it up but it was hot to the touch and totally dead, the battery sucked dry by the craft I was observing.

We then realized that there was a second craft north east of our position at possibly 4-5 miles distance and it had the identical light flashing and tail as the closer initial craft we were continuing to observe.

After a few moments witness 2 commented that there was a third craft and pointed North-west and we observed a similar lit craft at incredible speed moving up from the horizon line directly over our heads.

I commented that that craft is going incredibly fast and I estimated the altitude at greater than 150,000 feet since there was no sonic boom or noise on any kind accompanying its immense speed.

Witness 2 commented that it might be a satellite and my reply was "there is no way that is a satellite" it is way too low and is going way to fast. I have studied satellites with my telescope at home many times and the lights of this thing looked just like the craft we have up close.

That fast mover covered the sky horizon to horizon in 40-41 seconds as was later determined by comments in the audio of the camera still recording.

We continued to observe the other craft for a while before I said man we have to go find our other hunting partner he is probably scared to death since much of this happened not too distant from his position.

We all got back into the truck and I continued to watch it and I watched until the craft disappear into the tree line as we were driving the last 2-3 miles to the other hunter's position. I continued to look for the craft out the windows when we got to high ground but never saw the craft again.

I asked witness 2 to call to his partner on the high power Motorola jobsite radio in the truck and he attempted the call but got no response.

10:05pm

We arrived at the other hunting site and asked him if he saw anything weird in the sky and his reply was no so we started our way back to camp to share all the exciting news.

I tried to again power up my Droid since we were close to Highway and cell phone service but it was totally dead, (I would not get it to power up till later that night after plugging it in to charge for 10 min and it performed fine after the event with no lasting issues)

10:30pm we arrived back to the camp before the other hunting party returned and we off loaded our gear from the truck to begin a long night of hunting celebration and pictures and additional video.

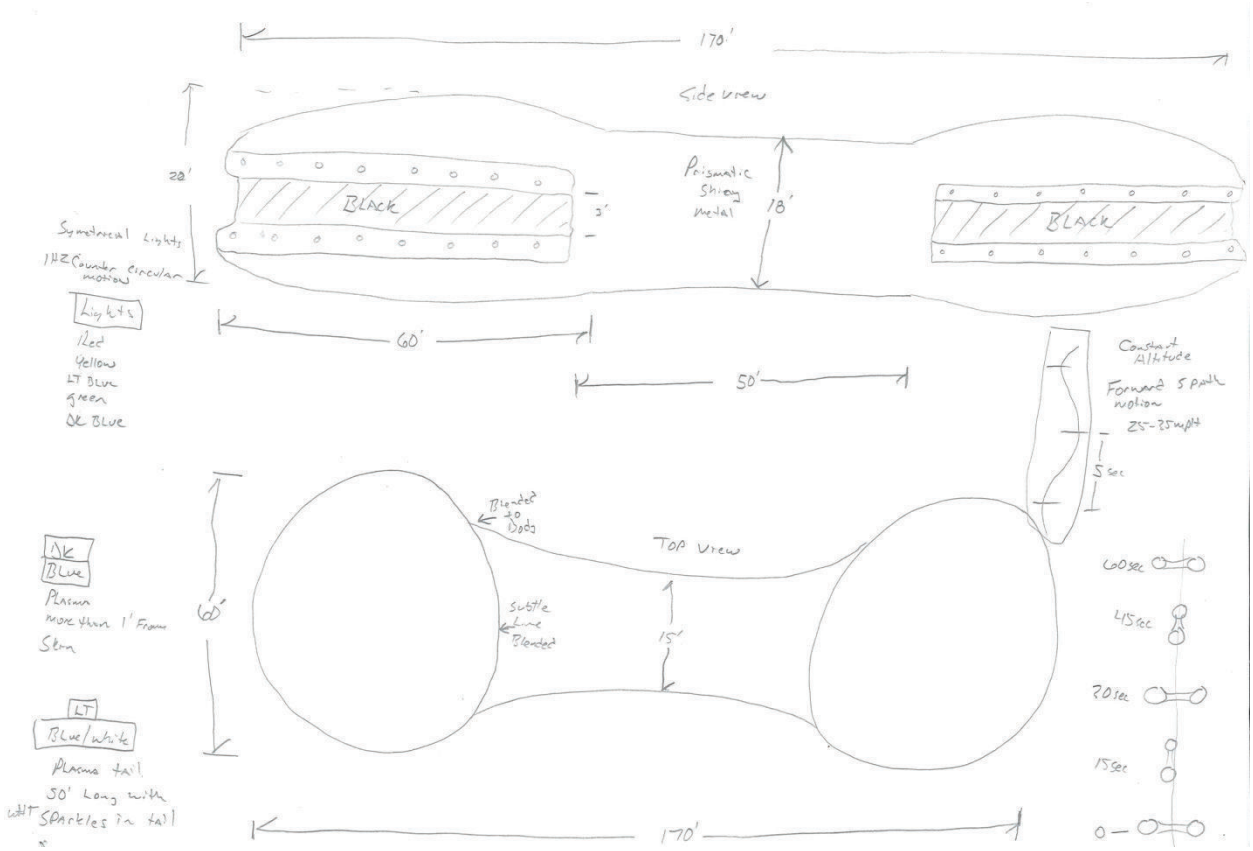
The other Hunting party showed up and we were sharing stories of the hunt when Witness 3 loudly chimed in ”Hey did any of you guy’s see any strange lights or anything in the sky?” many from the other party laughed and said what like a UFO?

I smiled and looked at witness 2 he smiled back, I translated that smile as knowing it would take us a lifetime to process the events of the night and we may never discover the full truth of who or what we happened upon late at night in the darkness of a Canadian wilderness.

Aug 29th

12:20pm

I put the finishing touches on sketches and drawing details and penciled notes on my experience/feelings/emotions while in bed thinking of all the technical details and advanced technology I had witnessed first-hand, these sketches and details of the nights experience were the basis of the events you just read.



August 29-Sept 5th

I have pondered the specifics of my experiences and typical of any scientist continue to boil down the known facts from the unknowns and process the balance of the details trying to harvest anything possible from the experience.

My day's slip into nights with sleep depravity plaguing my very being pondering this event. I awake at nights with deep thoughts of attempting to understand the means by which this craft could have flown electrically and silently.

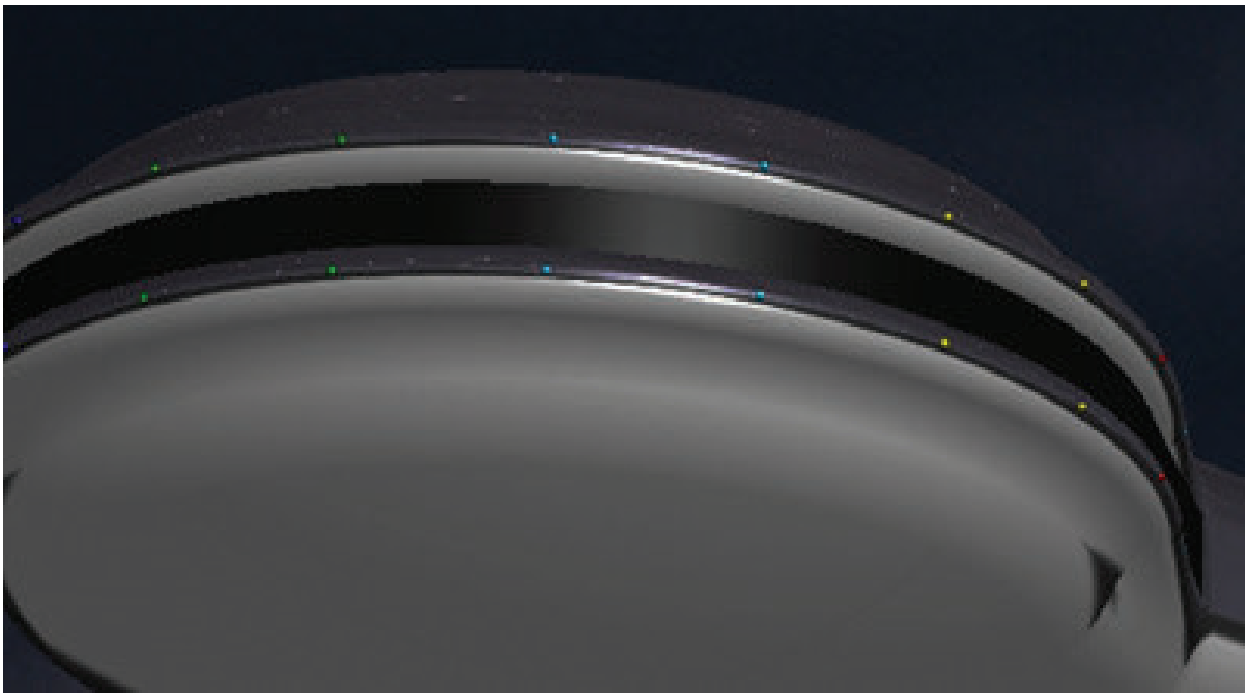
Facts based upon my observance:

1. This craft was not an airplane, helicopter, or lighter than air blimp.
2. This craft was huge with dimensions estimated at 170’ x 60’ x 20’
3. This craft did not fly with typical propulsion jet engines/propellers/rotors etc.
4. This craft had an immense high frequency AC electrical field about it.
5. The lights around the disk portion of the craft were operating in synchronous form
6. The craft had a very thick deep indigo blue plasma field close to the hull
7. The craft emitted no noise, we were in a 30dba ambient environment yet it was dead silent even up close
8. Craft was constructed of a metal that looked like polished bismuth yet silky smooth lines
9. Craft had several locations on the hull beam with small unusual markings almost hieroglyph
10. Craft travelled in a slight s zigzag pattern with an approximate 10 sec interval
11. Craft was very slow spinning on its center axis with approx. 1 min interval
12. Black center section of each disk was totally opaque with no reflections
13. Metal of the craft on the topside was very reflective as I could see stars reflected from above
14. Post process of the video from the camera netted a white noise screen with a perfect pulsation function that is timed to the revolution of the lights from the disks at roughly 1 sec interval. I believe this to be a poly phasing of two immense high frequency ac fields polarized differently.
15. All light emitted from the craft was of diverged coherence in property, similar to a laser beam striking a divergence optic.
16. All light colors emitted from the craft were of pure color almost pristine in singular wavelengths. Similar to grating tuned laser optical resonators where color stability is incredible.
17. I noted 16-17 colors emitted from the positions on the hull however each light position emitted in synchronous all colors a light position that was previously red might be blue next than yellow then green etc.
18. Light colors emitted were not power balanced; predominant colors were white, yellow, red green.
19. Plasma tail was conical in shape and light blue/white in color with white/yellow sparkles and was visible more than 150’ behind the craft.
20. Flat Black opaque area on the disks were bordered with a short lip on the top and bottom
21. Craft disks had a mostly symmetrical cross section with perfect blending to the rectangular shaped center beam area. There were no visible blend lines to the disk section
22. Light colors on the exterior worked in groups of four
23. Electrical field of the craft had to be high frequency AC since I did not feel anything or have my hair standing on end even at very close proximity to the craft of possibly 400’
24. Electrical disturbance was great enough to scramble operation of cell phones and cameras and powerful jobsite radio that typically worked up to 20 miles away to home base, yet did nothing to the truck engine or lights of the late model 4x4 truck as it approached us.

My theory and opinions of plausible positions from points above.

1. Craft could have been an advanced military vehicle, however unknown manufacturing methodologies would have to have been implemented to construct a forged in one piece type of fuselage of exotic metals as was witnessed.
2. These dimensions were estimated based upon the width of the craft as it passed directly over the road of known dimensions directly in front of the truck in perfect un-obstructed view.
3. No noise in a very low 30dba ambient background level means it was not using fossil fuels for propulsion, scale of the vehicle and even a rudimentary assessment of the vehicle mass would place it in the 10's of thousands of horsepower to hover or move at slow speed. The quietest propulsion solution known would have been at least 80db
4. Recent developments at with 4mhz magnified resonant high voltage generators produce a similar noise free blue plasma arc, recently a 160 watt 4mhz 200,000v test system in our facility produced only 3 square inches of plasma area coverage with the following ohms law equation of (200kv x 800ua into 250Mohm = 160w)
   Assuming dimensions of the craft as is shown, surface area is just over 3.1 million square inches of surface area or roughly 1 million times the surface area of our 160w test device this would net a minimum of 160MW (160 million watts) to cover the craft in 4 mhz resonant plasma. This amount of power is 33% of the 478MW nuke power plant in Fort Calhoun Nebraska the smallest fixed nuclear plant in the US. This plant which covers a footprint area of 24 times the size of the craft described. Unquestionably this craft was the highest power density vehicle I have ever even imagined.

5. Lights around the disk portion of the craft are assumed to NOT be lights but rather anodes or cathodes to the power supply of the vehicle drive system and they emit light based upon interaction of the high voltage and frequency tension to the adjacent air. Blue plasma field was very evident around the metal portions of the craft but less prominent around the black opaque strip portion of the vehicle. Anodes changing colors could be the relative phasing of multiple sources of a poly phased array of anodes wrapping the vehicle and the interaction of the air relative to current over voltage and frequency similar to the effect of plasma vacuum laser tubes tuned with: gas mix content and vacuum level vs. voltage/frequency and current to create specific wavelengths of light in the plasma. However the potential tension voltage must be astronomical to allow such an event to occur at ambient air pressure!



Close up of the 3d Cad renders of the craft

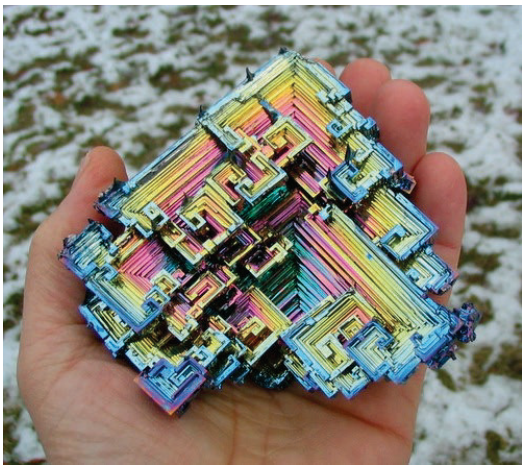
Another possibility (albeit a stretch of theoretical sciences)is the vehicle charges the upper half differentially to the lower half and uses diffuse yet intense coherent light to manipulate (steer) the field power between the upper and lower portions of the vehicle for thrust and steerage control.

6. Deep Blue indigo is the natural color of high tension high frequency in an air environment thus the position of “Must be result of AC high frequency field generated current”

160w of 4Mhz resonant plasma

7. I had taken an ambient noise level of the wilderness area while setting in my tree stand that very evening using a calibrated correction enhanced App on my Droid phone confirming the nominal nighttime ambient level of 30dba

8. The exotic metal Bismuth used on a previous high voltage test program came to immediate mind as soon as I peered upon the craft with the 9x50 scope at a range of less than 200yds. The craft glistened with an almost prismatic/Holographic coloring and had a very polished surface. Bismuth has many unique Diamagnetic properties lending it an automatic inclusion into the various theorems for control and manipulation of high field energy systems.

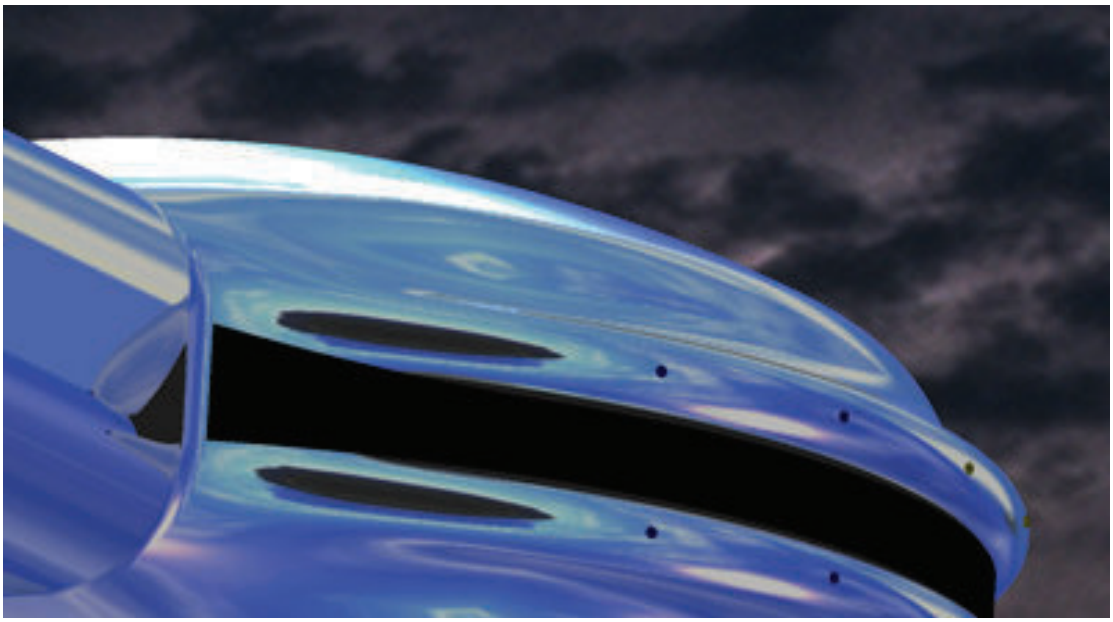


Bismuth crystalline form

9. None of the glyphs or markings were readily recognized to me, being familiar with many language formats the marking appeared to be unique

10. This zigzag pattern was not initially recognized until I moved from the truck to outside the truck resting the rifle and scope on the hood of the vehicle. This solid fixed position along with the ability to settle the scope reticle on the craft allowed for the determination of the slow zigzag pattern witnessed.
11. Craft was in a constant slow spin I recognized this characteristic early on even when the vehicle was out to the right of the truck before it reached the road since my view of the craft lights changed from one to two initially and as soon as I was able to view the craft for minutes at a time it became very evident the craft was slowly spinning on its central axis at approximately 1 rpm.
12. Black strip appeared to be a viewing portal or similar observation deck area. This area was totally opaque with no light emitted and or reflected while areas of metal immediately adjacent were highly reflective and in fact it was easy to see star reflections from the sky above in the metal even inches away from the black opaque surface of similar incident angle.
    I had the strange feeling during observation that possibly I was also being observed, could have been just a passing thought but I have had the feeling prior under completely different circumstances.

13. The night was mostly clear with just a few clouds and I could clearly see stars reflected off the top side features of the vehicle such as the lip areas near the black opaque strip portion of the disk. There was no doubt if the vehicle passed over me directly I would likely have seen my reflection as if peering into a mirror, or if have flown over it I would have seen a perfect reflection of the starry sky above.



Highly reflective surface with blue plasma surrounding the hull of the craft

14. Further post processing of the captured minutes of video will determine if there is any embedded points of fact or data, the native video image is completely blacked out however since the camera is a high resolution HD device I believe there is the ability to comb from the device with reasonable resolution accuracy the frequency of the objects power source(s) and any phase or frequency beating between them.
    Significant effort is being placed into that element of research on the captured HD video signal and should produce some data however value of that data or understanding of that data is still yet to be determined. While the picture is almost value less (pure noise and interference) the perfectly synchronous effects displayed in the video noise tells me I have captured details of the crafts electrical secrets and having seen the video over and over with post processing I believe the secret to the electrical system frequency and phase operations are captured into the noise of the video. Anyone who has watched the video and I point out the perfectly timed synchronous effects and the scrolling vertical hum bars of interference to contain some of the secrets of the crafts electrical propulsion system.
15. All light emanated from the craft had diverged coherence properties. Colors were singular in wavelength white was unbelievably white in a perfect color balance. Coherent diverged light produces a “salty to the eye’s” condition to me, and having had years of experience in a myriad of different laser technology programs and coherent Ndyag SHG laser development in the early 90’s it was easy for me to determine the light was coherent in nature however very divergent in property. Not a laser beam, but a wide angle laser flood light!
16. 16-17 colors were visible from the emanation points around the craft hull, they did not blink together or random but in a very synchronous programmed perfect relationship in a counter relationship in flash and position and color to the opposite disk of the craft.
    Colors were not power balanced, the colors light power as was visible to my trained eye were white predominate by a factor of 2-2.5 over red then green then yellow then pink then many shades of blues and purples which were almost invisible to the naked eye but visible through the Nikon 3x9x50 scope. Assuming white to be a combination of multiple primary colors it would make sense that it had significant light power to the fundamental primary colors experienced otherwise. To the naked eye white red and green were significant and the eye and the brain translation almost missed the other fundamental frequencies of color.

17. Various Fundamental colors that were obvious to me were in approximation:

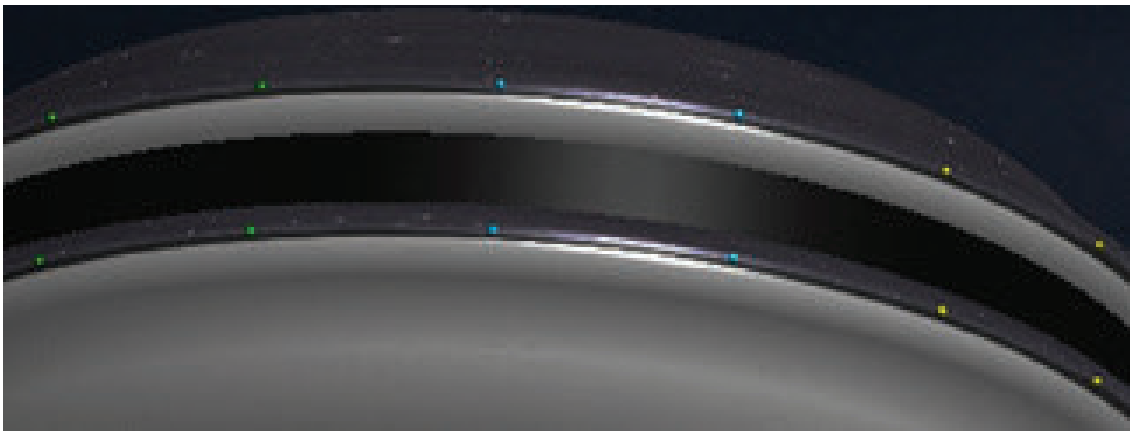
    Near IR 750nm
    Deep red 680nm
    Red 660nm
    Yellow 575nm
    Deep Green 500nm
    Blue 495nm
    Deep blue 465nm
    Near indigo blue 450nm
    Very Indigo blue 410nm

18. Light power balance was obvious to even the naked eye where white was very strong green next red next and followed then by blues and indigo.
    Through the rifle scope I could see many (16-17) fundamentals colors and as soon as I pulled my eyes from the scope to view without enhanced magnification I essentially only saw white, red, green, yellow and very faintly blue.

19. Tail cone emission of the craft was never changing in color it was always light blue/white in color conical in shape but when the craft was almost directly moving away from our observation point the rearmost shape of the cone was constantly changing in circular form, almost variable in changes with no rhyme or reason to pattern that could be determined even with viewing the craft for 30-40 seconds no apparent pattern was obvious. It reminded me of the rifts and waves of the northern lights when they are bright.
    Inside the tail but not outside of the conical form of white were tens of thousands of sparkles almost as if points in the tail were energy modes with the air ionizing from power similar to a high power pulsed laser similar to a Continium NDYag focused to a point in the air and striking the air to a spark yet no noise exited the craft with that happening even 400' away from our view! All of my previous experiences with striking the air with extremely high density laser power were at very low frequency, is it possible that the higher frequency fundamental of this craft was capable of striking the air to full ionization discharge without making a noise in exactly the same methodology as the 4mhz magnified plasma test system we built would arc the air without any acoustic output?? Very interesting to say the least and one that will consume my thinking for months to come…

20. Unsure of why the need to have the protrusion in the body of the vehicle where it met the black opaque area, it seemed beyond the perfection of the other contours of the craft where everything seemed to have a goal of incredibly high finish and blending of surfaces to perfection. My opinion is it likely has a technical or structural requirement thus the reason it was there.
21. Never have I observed a piece of evidently manufactured technology that so much effort to make a perfect blended body structure so obvious. Every line blended perfectly into the next there were no points on the craft that I observed and thought oops! This vehicle was obviously engineered for true perfection, how could one build such a magnificent structure? It looked as though it was forged of one perfect crystal of Bismuth, is that even possible given the conditions of gravity and the magnetic pole of the earth or whatever planet this thing came from… I afforded myself precious minutes of observation of the vehicle almost as if it were the first car or plane I had ever seen. Truly a hotrod of the comics in my minds eye!

22. The lights or anode/cathode positions on the lips of the side profile seemed to work in groups of two up and two down together. This feature was less visible with the naked eye but very evident when viewed through the Nikon scope.



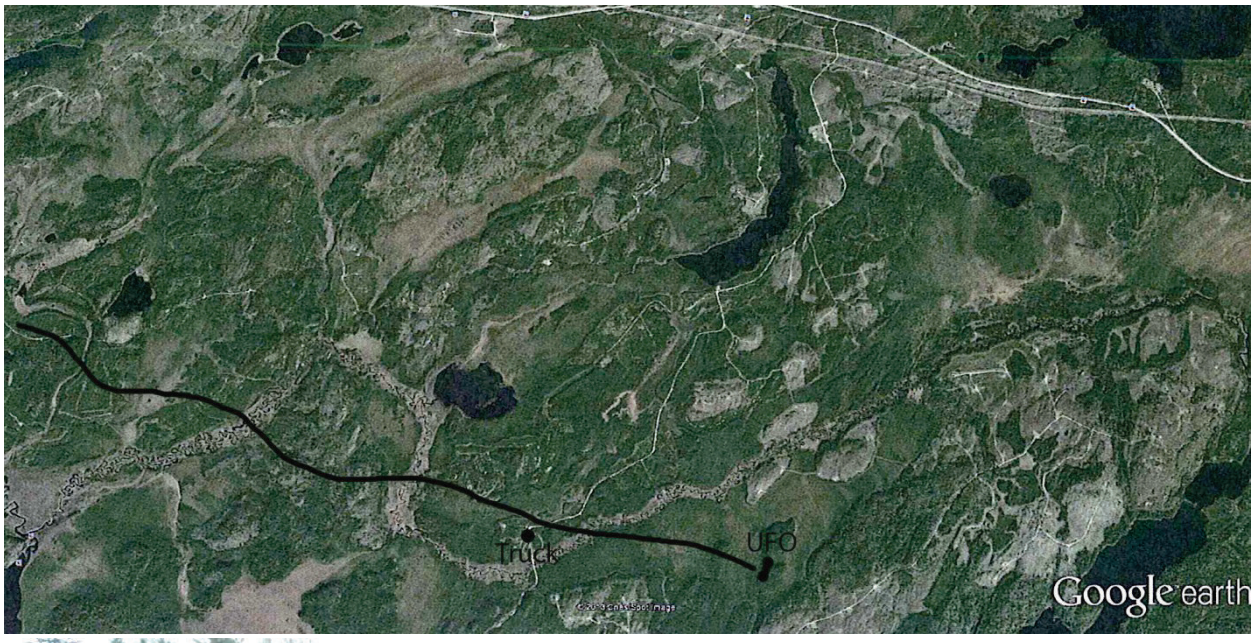
23. At the closest distance we were a paltry 400-450' from the giant vehicle and never once did I feel anything physiologic or even have the hair stand up on my head or arms. Seeing the amount of plasma present on the craft I was immediately certain it was of high frequency AC or high frequency AC Poly-phase in nature. No van de graf DC field obvious this thing was operating well past one Mhz of electrical frequency. I have built many 100khz and even 400khz resonate tesla coils in my lifetime and this was nearer to our recent 4-6Mhz devices than of lower frequency. The fact that there was so much energy radiated and yet not one noise or streamer spark I was immediately convinced this thing was way high frequency of resonant oscillation.
Understanding tesla coil concepts and limitations how does one build a 160Mw resonant coil? The electrical factors are self-limiting conductors needed to step up 160Mw of electrical power are Gigantic meaning the electrical requirements for a typical LC resonant primary of this scale are outside the vehicle scale as was visible to my eyes??
Primary conductors of the scale for such incredible currents would have to be of superconducting properties or the losses would surely mount to catastrophic electrical failure of the proportions this earth has never seen previously. Our largest to date high energy discharge in a critically conditioned test amount to discharge of 10,000v at current of nearly 500,000 amps for an incredibly short burst time and it literally arced a piece of 4/0 stranded copper into nothing… Literally missing from this earth, transposed to a gigantic x-ray burst and a blast of sound that somewhat deafened me for a week. The end result captured in a single frame by one of the three cameras used for documentation was a blue plasma ball only 18 feet in diameter. We had calculated at one point the weight of electrons in this very short nearly 5Gw blast to be in the ounces. The power of this vehicle was not too distant from this level of energy on a continuous basis! Surely impressive to any and all well studied in the arts of electricity.

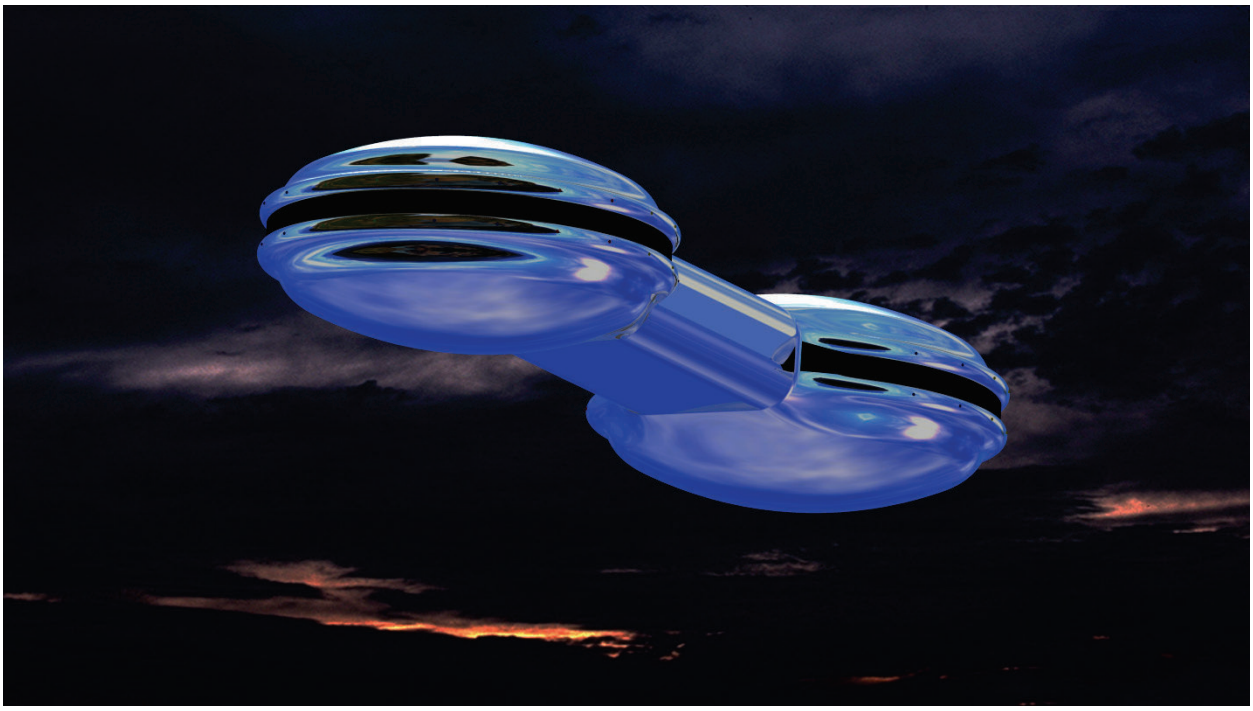
24. No question the ability to scramble my Sony HD camera and relatively new Droid phone at ranges up to ¼ mile away is very impressive. While we will never know if the truck would have died had it been running when the craft approached us at the nearest distance (closest distance to the truck running was approx. 1/8 mile I don't doubt for a minute the craft had enormous EFI/RFI/EMI pouring out of it in every direction.
    Apparently the engineers of this craft were un-concerned with the effect on bio's in close proximity to their revolutionary propulsion systems and I'm sure accounted for good faraday shielding to protect the brave inhabitants of this cosmic hotrod from the nasty byproducts of a vehicle that apparently has the power onboard of a miniature sun.

In Benediction:

While the contents of this amazing event and observation surely might sound far-fetched and a stretch, I can assure you that I have lost significant sleep this past week and likely more to lose in pondering the most amazing experience of my natural lifetime to date.
I will ponder and contemplate the what-if's and the can you imagine if's of the event for years to come, hoping to one day have a chance to view again or if the stars align take a ride in this cosmic hotrod witnessed on one unexpected night in a Canadian wilderness.

Craft drawn in 3d CAD inventor to replicate features/dimensions and scale of the vehicle


Truck
UFO
Google earth



CASE INFORMATION

Source:	MUFON-CMS
Case Number:	51269
Log Number:	US-10022013-0015

VALLEE RATING AND CATEGORY

Case Type (Vallee Classification): ?	FB1
Category Rating:	1 .
Category Change Notes:	.

STAR TEAM INFORMATION

Star Team Case:	No
Star Team Manager Comments	Class V-FB-1-1 10/02/13 22:23 cdst rjl

CASE ASSIGNMENT

Witness Caution:	No
Witness Caution Comments	
Report Assigned To (Primary Investigator):	State Director / Morgan A. Beall (FL)
Report Assigned To (Secondary Investigator):	------
State Director Comments: to the FI assigned	

CASE COMPLETION

Investigation Status:	Completed
Report Completed By:	State Director / Morgan A. Beall (FL)
Case Disposition: ? ⇐ Click for a list of **Disposition Definitions**	Unknown - UAV ⇐ This menu will be activated when **Completed** is clicked in the **Investigation Status** menu.
Report Approved By:	State Director / Morgan A. Beall (FL)

PHOTO ANALYSIS OF REPORT

Photo Disposition:	
Photo Analyst's Notes:	

FOR MUFON USE ONLY

Temperature (Farenheit):	78 F
Wind Direction:	NNE
Wind Speed:	8 Mph Kph
Ceiling:	Clear

SUBMITTED BY

Title:	Witness
First Name:	Chris
Last Name:	[redacted]
Country:	UNITED STATES
State (USA):	Florida
County (USA):	Sarasota
Street Address:	[redacted]
City:	Venice
Zip/Postal Code:	34293
Phone - Home:	( ) - -
Phone - Work:	( ) - -
Cellphone:	( ) - -
Email - Primary:	[redacted]
Email - Secondary:	
Anonymous:	Yes

EVENT

Observed the following:	☐ Light(s) ☑ Object(s) ☐ Orb(s) ☐ Entity ☐ Abduction ☐ Crop Circle ☐ Animal Mutilation ☐ Radar Return
Number Observed:	☐ None ☑ 1 ☐ 2 ☐ 3 ☐ 4-5 ☐ 6-10 ☐ Over 10 ☐ Unknown
Date of Event:	September / 26 / 2013 ◉ Exact ○ Approximate Date
Time of Event (Local Time):	20 - 8 PM : 35 America/New_York (US Eastern Time) ◉ Exact ○ Approximate Time
Duration of Event:	0 HRS 0 MINS 15 SECS
Country:	UNITED STATES
State (USA):	Florida
County (USA):	Sarasota
City (Nearest):	Venice
Street Address:	[redacted]
Zip/Postal Code:	34293
Latitude/Longitude:	Approx: 27.0[redacted] / -82.3[redacted] Exact: 27.0[redacted] / -82.4[redacted]

Objects or Lights did the following:

☐ Changed Direction	☐ Hovered	☐ Affected Radio/TV	☐ Fluttered
☐ Turned Abruptly	☐ Descended	☐ Affect Electricity	☐ Spun
☐ Fell Like a Leaf	☐ Ascended	☐ Affected Magnetism	☐ Blinked
☐ Absorbed Object(s)	☐ Over Powerlines	☐ Affected Timepiece	☐ Pulsated
☐ Ejected Object(s)	☐ Over a Building	☐ Affected Engine	☐ Appeared Solid
☐ Changed Shape	☐ Landed on Ground	☐ Affected Vehicle	☑ Had Fuzzy Edges
☐ Cast Shadow	☐ Landed in Water	☐ Affected Animal	☑ Had Outline
☐ Cast Light	☐ Carried Occupants	☐ Affected Human	☐ Wobbled
☑ Reflected Light	☐ Communicated	☐ Affected Water	☐ Vibrated
☐ Left a Trail	☐ Gave off Heat	☐ Affected Ground	☑ Glowed
☐ Disintegrated	☐ Left Residue	☐ Affected Vegetation	☑ Appeared Transparent
☐ Projected a Beam	☐ Removed Anything	☐ Affected Cell Phone	☐ Transformed Reality
☐ Made a Noise	☐ Left Landing Traces	☐ Affected You Physically	☐ Affected You Psychologically
☐ Caused Injury/Death	☐ Unknown	☐ N/A	

Shape of Object(s):

○ Blimp	◉ Boomerang	○ Bullet/Missile	○ Cigar
○ Cone	○ Chevron	○ Circle	○ Cross
○ Cylinder	○ Diamond	○ Disc	○ Egg
○ Fireball	○ Flash	○ Oval	○ Saturn-like
○ Sphere	○ Square/Rectangular	○ Star-like	○ Teardrop
○ Triangle	○ Other	○ Unknown	○ N/A

Surface of Object(s):	☐ Dark ☐ Dull ☐ Reflective ☑ Glowing ☑ Mist/Shroud ☐ Varied ☐ Unknown
Structural Features of Object(s):	☐ None ☐ Dome ☐ Window(s) ☐ Patterned Surface ☐ Insignia ☐ Appendage(s) ☐ Louvres ☑ Wings ☐ Other ☐ Unknown
Apparent Size: [?]	☐ Starlike ☐ Aspirin ☐ Penny ☐ Golfball ☐ Basketball ☑ Larger ☐ Unknown
Actual Size:	☐ Under 1 ft ☐ 1-3 ft ☐ 4-10 ft ☐ 11-30 ft ☐ 31-100 ft ☐ 101-300 ft ☑ Over 300 ft ☐ Unknown
Prominent Colors:	White: Grey/Lead: Surface Black: Gold/Copper: Silver/Chrome: Pink/Rose: Red: Red-Orange: Yellow-Orange: Yellow: Green: Green-White: Blue-Green: Blue: Blue-White: Violet: Unknown:
Exterior Light Characteristics:	☐ None ☐ Unwavering ☐ Brightened ☐ Pulsated ☐ Flashed Sequentially ☐ Flashed Randomly ☑ Other ☐ Unknown
Emission:	☐ None ☐ Beam ☐ Flame ☑ Aura ☑ Cloud ☐ Trail ☐ Object ☐ Other ☐ Unknown
Sound:	☑ None ☐ Hum ☐ Buzz ☐ Jetlike ☐ Swish ☐ Whir ☐ Object ☐ Static ☐ Pulsating ☐ Beeping ☐ Rumble ☐ Roar ☐ Other ☐ Unknown
Also in Area:	☐ Airplane ☐ Helicopter ☐ Black Helicopter ☐ Balloon ☐ Searchlight ☐ Other ☐ Before Witness Sighted UFO ☐ During UFO Sighting ☐ After UFO Sighting
Elevation: (if multiple sources or factors, check all that apply)	Degrees above horizon when nearest to witness: 35 (0-90) ☐ Various ☐ Other ☐ Unknown
Lowest Altitude: (if multiple sources or factors, check all that apply)	☐ Landed ☐ Treetop ☐ 500 ft or less ☐ Over 500 ft (under cloudcover) ☑ Over 500 ft (no cloudcover) ☐ Unknown
Distance From Witness:	☐ 20 ft or less ☐ 21-100 ft ☐ 101-500 ft ☑ 501 ft - 1 Mile ☐ Over 1 Mile ☐ Unknown ☐ N/A
Flight Path:	☐ Stationary ☐ Hovering then path ☑ Straight-line path ☐ Path with directional change ☐ Path then hovering ☐ Other ☐ Unknown ☐ N/A
Direction First Observed:	☐ N ☑ NE ☐ E ☐ SE ☐ S ☐ SW ☐ W ☐ NW ☐ Unknown
Direction Last Observed:	☐ N ☐ NE ☐ E ☐ SE ☑ S ☐ SW ☐ W ☐ NW ☐ Unknown
Landing - Observation:	☑ No Landing Observed ☐ Aerial Path ☐ Hovering ☐ Descent ☐ Landing ☐ Take Off ☐ Ascent ☐ Unknown
Landing - Site / Material:	☑ None Found ☐ Unaffected ☐ Swirled ☐ Depressed ☐ Uprooted ☐ Discolored ☐ Baked ☐ Burned ☐ Scarred ☐ Broken ☐ Crushed ☐ Footprint(s) ☐ Imprint(s) ☐ Crater ☐ Radiation ☐ Artifact ☐ Other ☐ Unknown
Landing - Soil/Vegetation Samples:	☑ None Found ☐ Exist ☐ Obtained ☐ Tested ☐ Submitted ☐ Unknown
Area/Site:	Suburban
Area/Terrain:	Ocean
Area/Technical:	Airport
Sky:	Clear
Weather Factors (check all that apply):	☐ None ☐ Windy ☐ Lightning ☐ Fog ☐ Rain ☐ Hail ☐ Sleet ☐ Snow ☐ Heavy ☐ Medium ☐ Light ☐ Unknown ☐ Does Not Apply
Short Description of Event (max 25 words):	{rjl}Luminous transparent boomerang shaped UFO seen twice o

Detailed Description of Event: (cannot be edited)	We live in South Venice FL. On Thursday 26th September 2013 at 8.35pm and also on Friday 27th at 8.55pm we saw a strange craft flying in the night sky. On Thursday my wife and I were sitting out in the Lanai by the pool enjoying the lovely evening. The sky was clear with no clouds and no Moonlight, except for one or two small planes from time to time and the odd high flying jet you always see. I saw the craft first before my wife, but she saw it too on both nights. A subtle movement in the NE night sky caught my eye, at first I thought it was a flock of geese flying in a v formation. When I looked at it I could see It was a large transparent boomerang v-shaped wing flying high against the starfield, but you could only see the edge of the craft distorting the stars as it moved around. If youve seen the film Predator, the crafts structure appeared like it was cloaked just like that. It was huge, the size of my 2 crossed thumbs together held at arms length. On the 1st night the craft was flying level and steady to the south of us moving NE to S across the sky. It was about 1000 ft up or maybe more, so we could clearly see it from the side and underneath as it passed to the SW of us. The craft was silent, and it appeared to be shimmering like water, it seemed like it was surrounded by a luminous fluid or gas, it looked like a force field that was protecting (?) the craft from the air as it flew forwards, the gas flowed over and under the wing like water and it distorted the light of the stars behind it as it flew forwards. We saw it for about 10 seconds before it flew out of sight over the roof of our house. Incredibly on the next night we saw the same thing again. It was high up in the sky in the NE but this time it flew towards us at extreme speed (took about 5 secs to travel the distance to us) and then slowed and flew more slowly when directly overhead and then over the house towards the Gulf. It looked like the same craft returning as the previous night. As it flew over the lanai/house for about 4 secs it became visible (uncloaked?) and it banked over like a plane would do before it disappeared from view over the house roof. It looked like it was showing off doing an intentional fly-by ! It was huge and so breathtakingly awesome, an absolutely beautiful ship at least a football field or two wide. It was silent (my wife heard a crackling noise like a bug zapper as it passed over), it was shiny dark-gray colored and had a blue/white stripe of light from wingtip to wingtip shaped like a drawn longbow. The shape was like a boomerang with tapered rounded wings and when it became visible more like a Manta ray without a tail. The crafts surface was hard to see clearly but was not flat/smooth and it had ridges and convolutions on the wings and wing tip edges which were curved and curled up. It had 2 large circle/sphere shapes under each wing which could have been lights but they werent lit. I am reluctant to report this as people will think were crazy, but we arent. Im a perfectly sane ex-Psychiatric Nurse. The dog saw/felt it too and went ape running around the Lanai barking at it the 2nd time. I was a sceptic, now Im most definitely not ! Unfortunately we didn't have a camera with us the 2nd time as we thought this was a once in a lifetime thing. I was wrong. Ive never witnessed anything like this before and it was definitely not an airplane/lenticular clouds/birds etc !
Additional Evidence:	☐ Film Photo ☐ Digital Photo ☐ Analog Video ☐ Digital Video ☐ Audio Recording ☐ Sketch or Drawing ☐ Map ☐ Other

WITNESSES

Total Number of Witnesses:	2
Witness Release Agreement: (cannot be edited):	
Location:	Grouped
Agreement:	All Witnesses Agree
Witness A - Name:	chris (first name) [redacted] (last name) CLICK TO COPY SUBMITTER NAME AND COUNTRY
Witness A - Country:	UNITED STATES
Witness A - State (USA) or Province (Canada):	Florida
Witness A - County (USA):	Sarasota
Witness A - Street Address:	
Witness A - City:	venice
Witness A - Zip/Postal Code:	
Witness A - Phone - Home:	( ) - -
Witness A - Phone - Work:	( ) - -
Witness A - Cellphone:	( ) - -
Witness A - Email - Primary:	
Witness A - Email - Secondary:	
Witness A - Anonymous:	
Witness A - Birth Date:	/ /
Witness A - Gender:	
Witness A - Occupation:	
Witness A - Educational Level:	
Witness A - Educational Degree:	
Witness A - Vision:	
Witness A - Colorblind:	
Witness A - Eyeglasses/Contacts:	
Witness A - Hearing:	
Witness A - Uses Hearing Aid:	
Witness A - Health (During Sighting):	
Witness A - Health (After Sighting):	
Witness B - Name:	Page (first name) (last name)
Witness B - Country:	UNITED STATES
Witness B - State (USA) or Province (Canada):	Florida
Witness B - County (USA):	Sarasota
Witness B - Street Address:	
Witness B - City:	
Witness B - Zip/Postal Code:	
Witness B - Phone - Home:	( ) - -
Witness B - Phone - Work:	( ) - -
Witness B - Cellphone:	( ) - -
Witness B - Email - Primary:	
Witness B - Email - Secondary:	
Witness B - Anonymous:	
Witness B - Birth Date:	/ /
Witness B - Gender:	
Witness B - Occupation:	
Witness B - Educational Level:	
Witness B - Educational Degree:	

Form 1 ENTRY FORM | Form 3 ELECTRO-MAGNETIC | Form 4 ANIMAL | Form 5 PSYCHOLOGICAL/PHYSICAL | Form 6 LANDING TRACES | Form 7 ENTITY | BGE

SUBMIT CHANGES

CASE INFORMATION	
Source:	MUFON-CMS
Case Number:	51156
Log Number:	US-09282013-0023
VALLEE RATING AND CATEGORY	
Case Type (Vallee Classification): ?	AN1
Category Rating:	1 .
Category Change Notes:	.
STAR TEAM INFORMATION	
Star Team Case:	No
Star Team Manager Comments	Class V-AN-1-1, 09/28/13, 23:19 EDST, nd, [object]
CASE ASSIGNMENT	
Witness Caution:	No
Witness Caution Comments	
Report Assigned To (Primary Investigator):	State Director / Morgan A. Beall (FL)
Report Assigned To (Secondary Investigator):	------
State Director Comments: to the FI assigned	
CASE COMPLETION	
Investigation Status:	Completed
Report Completed By:	State Director / Morgan A. Beall (FL)
Case Disposition: ? ⇐ Click for a list of **Disposition Definitions**	Unknown - UAV ⇐ This menu will be activated when **Completed** is clicked in the **Investigation Status** menu.
Report Approved By:	State Director / Morgan A. Beall (FL)
PHOTO ANALYSIS OF REPORT	
Photo Disposition:	
Photo Analyst's Notes:	
FOR MUFON USE ONLY	
Temperature (Farenheit):	78 F
Wind Direction:	WNW
Wind Speed:	10 Mph Kph
Ceiling:	Clear
SUBMITTED BY	
Title:	Witness
First Name:	Nick
Last Name:	[redacted]
Country:	UNITED STATES
State (USA):	Florida
County (USA):	Sarasota
Street Address:	[redacted]
City:	Osprey
Zip/Postal Code:	34229
Phone - Home:	(941) [redacted]
Phone - Work:	( ) - -
Cellphone:	( ) - -
Email - Primary:	[redacted]
Email - Secondary:	
Anonymous:	No

EVENT

Observed the following:	☐ Light(s) ☑ Object(s) ☐ Orb(s) ☐ Entity ☐ Abduction ☐ Crop Circle ☐ Animal Mutilation ☐ Radar Return
Number Observed:	☐ None ☑ 1 ☐ 2 ☐ 3 ☐ 4-5 ☐ 6-10 ☐ Over 10 ☐ Unknown
Date of Event:	September / 28 / 2013 ◉ Exact ○ Approximate Date
Time of Event (Local Time):	22 - 10 PM : 25 America/New_York (US Eastern Time) ○ Exact ◉ Approximate Time
Duration of Event:	0 HRS 0 MINS 30 SECS
Country:	UNITED STATES
State (USA):	Florida
County (USA):	Sarasota
City (Nearest):	Osprey
Street Address:	[redacted]
Zip/Postal Code:	34229
Latitude/Longitude:	Approx: 27.1[redacted] / -82.4[redacted] Exact: 27[redacted] / -82.4[redacted]

Objects or Lights did the following:

☐ Changed Direction	☐ Hovered	☐ Affected Radio/TV	☐ Fluttered
☐ Turned Abruptly	☐ Descended	☐ Affect Electricity	☐ Spun
☐ Fell Like a Leaf	☐ Ascended	☐ Affected Magnetism	☐ Blinked
☐ Absorbed Object(s)	☐ Over Powerlines	☐ Affected Timepiece	☐ Pulsated
☐ Ejected Object(s)	☐ Over a Building	☐ Affected Engine	☐ Appeared Solid
☐ Changed Shape	☐ Landed on Ground	☐ Affected Vehicle	☐ Had Fuzzy Edges
☐ Cast Shadow	☐ Landed in Water	☐ Affected Animal	☐ Had Outline
☐ Cast Light	☐ Carried Occupants	☐ Affected Human	☐ Wobbled
☐ Reflected Light	☐ Communicated	☐ Affected Water	☐ Vibrated
☐ Left a Trail	☐ Gave off Heat	☐ Affected Ground	☐ Glowed
☐ Disintegrated	☐ Left Residue	☐ Affected Vegetation	☑ Appeared Transparent
☐ Projected a Beam	☐ Removed Anything	☐ Affected Cell Phone	☐ Transformed Reality
☐ Made a Noise	☐ Left Landing Traces	☐ Affected You Physically	☐ Affected You Psychologically
☐ Caused Injury/Death	☐ Unknown	☐ N/A	

Shape of Object(s):

○ Blimp	◉ Boomerang	○ Bullet/Missile	○ Cigar
○ Cone	○ Chevron	○ Circle	○ Cross
○ Cylinder	○ Diamond	○ Disc	○ Egg
○ Fireball	○ Flash	○ Oval	○ Saturn-like
○ Sphere	○ Square/Rectangular	○ Star-like	○ Teardrop
○ Triangle	○ Other	○ Unknown	○ N/A

Surface of Object(s):	☐ Dark ☐ Dull ☐ Reflective ☐ Glowing ☑ Mist/Shroud ☐ Varied ☐ Unknown
Structural Features of Object(s):	☑ None ☐ Dome ☐ Window(s) ☐ Patterned Surface ☐ Insignia ☐ Appendage(s) ☐ Louvres ☐ Wings ☐ Other ☐ Unknown
Apparent Size: ?	☐ Starlike ☐ Aspirin ☐ Penny ☐ Golfball ☐ Basketball ☑ Larger ☐ Unknown
Actual Size:	☐ Under 1 ft ☐ 1-3 ft ☐ 4-10 ft ☐ 11-30 ft ☐ 31-100 ft ☐ 101-300 ft ☐ Over 300 ft ☑ Unknown
Prominent Colors:	White: Grey/Lead: Surface Black: Gold/Copper: Silver/Chrome: Pink/Rose: Red: Red-Orange: Yellow-Orange: Yellow: Green: Green-White: Surface Blue-Green: Blue: Blue-White: Violet: Unknown: Surface
Exterior Light Characteristics:	☑ None ☐ Unwavering ☐ Brightened ☐ Pulsated ☐ Flashed Sequentially ☐ Flashed Randomly ☐ Other ☐ Unknown
Emission:	☑ None ☐ Beam ☐ Flame ☐ Aura ☐ Cloud ☐ Trail ☐ Object ☐ Other ☐ Unknown
Sound:	☑ None ☐ Hum ☐ Buzz ☐ Jetlike ☐ Swish ☐ Whir ☐ Object ☐ Static ☐ Pulsating ☐ Beeping ☐ Rumble ☐ Roar ☐ Other ☐ Unknown
Also in Area:	☑ Airplane ☐ Helicopter ☐ Black Helicopter ☐ Balloon ☐ Searchlight ☐ Other ☑ Before Witness Sighted UFO ☐ During UFO Sighting ☐ After UFO Sighting
Elevation: (if multiple sources or factors, check all that apply)	Degrees above horizon when nearest to witness: 30 (0-90) ☐ Various ☐ Other ☐ Unknown
Lowest Altitude: (if multiple sources or factors, check all that apply)	☐ Landed ☐ Treetop ☐ 500 ft or less ☐ Over 500 ft (under cloudcover) ☑ Over 500 ft (no cloudcover) ☐ Unknown
Distance From Witness:	☐ 20 ft or less ☐ 21-100 ft ☐ 101-500 ft ☐ 501 ft - 1 Mile ☐ Over 1 Mile ☑ Unknown ☐ N/A
Flight Path:	☐ Stationary ☐ Hovering then path ☑ Straight-line path ☐ Path with directional change ☐ Path then hovering ☐ Other ☐ Unknown ☐ N/A
Direction First Observed:	☐ N ☐ NE ☐ E ☐ SE ☑ S ☐ SW ☐ W ☐ NW ☐ Unknown
Direction Last Observed:	☐ N ☐ NE ☐ E ☑ SE ☐ S ☐ SW ☐ W ☐ NW ☐ Unknown
Landing - Observation:	☑ No Landing Observed ☐ Aerial Path ☐ Hovering ☐ Descent ☐ Landing ☐ Take Off ☐ Ascent ☐ Unknown
Landing - Site / Material:	☑ None Found ☐ Unaffected ☐ Swirled ☐ Depressed ☐ Uprooted ☐ Discolored ☐ Baked ☐ Burned ☐ Scarred ☐ Broken ☐ Crushed ☐ Footprint(s) ☐ Imprint(s) ☐ Crater ☐ Radiation ☐ Artifact ☐ Other ☐ Unknown
Landing - Soil/Vegetation Samples:	☑ None Found ☐ Exist ☐ Obtained ☐ Tested ☐ Submitted ☐ Unknown
Area/Site:	Suburban
Area/Terrain:	Woods
Area/Technical:	Powerlines
Sky:	Clear
Weather Factors (check all that apply):	☐ None ☐ Windy ☐ Lightning ☐ Fog ☐ Rain ☐ Hail ☐ Sleet ☐ Snow ☐ Heavy ☐ Medium ☐ Light ☐ Unknown ☐ Does Not Apply
Short Description of Event (max 25 words):	{nd} Transparent Vee shaped object

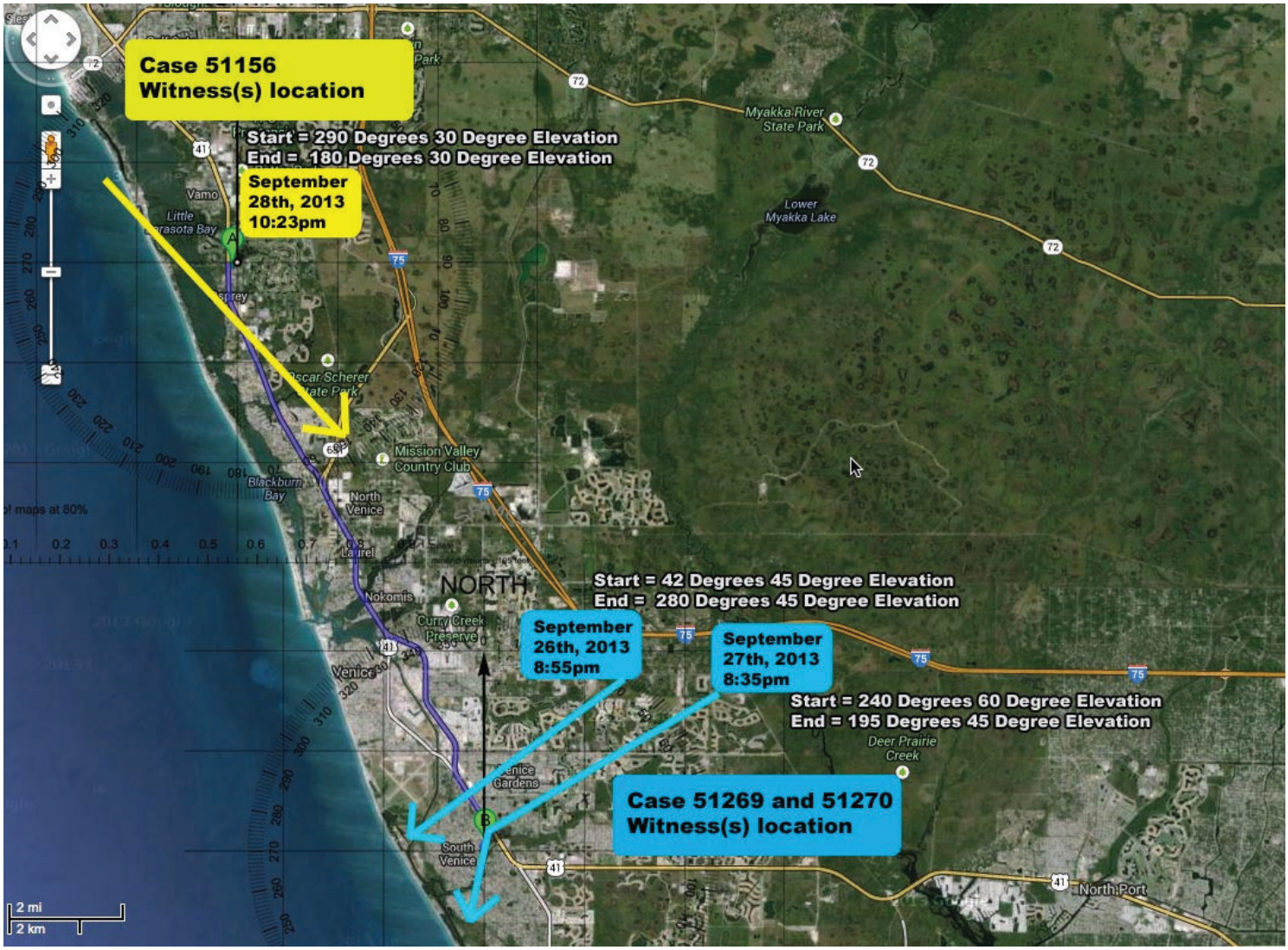
Detailed Description of Event: (cannot be edited)	9/28/13 - 10:23 pm - Osprey Florida. My wife and i were outside in our spa and we noticed a large cloud like semi transparent Vee shaped moving in a straight line at a low altitude. (5-10k Ft.)and moving in a steady fast speed.(faster than any aircraft) Observed looking south moving from NW to SW direction. Sky was mainly clear with some light clouds to our east. No moonlight. Very strange! Never seen anything like it. NO BULLSHIT! Would like to discuss this incident with anyone. We thought perhaps it may be a large bird or a spot light however the object did not move like a bird or a spotlight.
Additional Evidence:	☐ Film Photo ☐ Digital Photo ☐ Analog Video ☐ Digital Video ☐ Audio Recording ☐ Sketch or Drawing ☐ Map ☐ Other

WITNESSES

Total Number of Witnesses:	2
Witness Release Agreement: (cannot be edited):	
Location:	Grouped
Agreement:	All Witnesses Agree
Witness A - Name:	Nick (first name) [redacted] (last name) CLICK TO COPY SUBMITTER NAME AND COUNTRY
Witness A - Country:	UNITED STATES
Witness A - State (USA) or Province (Canada):	Florida
Witness A - County (USA):	Sarasota
Witness A - Street Address:	[redacted]
Witness A - City:	Osprey
Witness A - Zip/Postal Code:	34229
Witness A - Phone - Home:	(941) [redacted]
Witness A - Phone - Work:	( ) - -
Witness A - Cellphone:	( ) - -
Witness A - Email - Primary:	[redacted]
Witness A - Email - Secondary:	
Witness A - Anonymous:	
Witness A - Birth Date:	/ /
Witness A - Gender:	
Witness A - Occupation:	
Witness A - Educational Level:	
Witness A - Educational Degree:	
Witness A - Vision:	
Witness A - Colorblind:	
Witness A - Eyeglasses/Contacts:	
Witness A - Hearing:	
Witness A - Uses Hearing Aid:	
Witness A - Health (During Sighting):	
Witness A - Health (After Sighting):	
Witness B - Name:	(first name) (last name)
Witness B - Country:	------
Witness B - State (USA) or Province (Canada):	
Witness B - Street Address:	
Witness B - City:	
Witness B - Zip/Postal Code:	
Witness B - Phone - Home:	
Witness B - Phone - Work:	
Witness B - Cellphone:	
Witness B - Email - Primary:	
Witness B - Email - Secondary:	
Witness B - Anonymous:	
Witness B - Birth Date:	/ /
Witness B - Gender:	
Witness B - Occupation:	
Witness B - Educational Level:	
Witness B - Educational Degree:	
Witness B - Vision:	
Witness B - Colorblind:	
Witness B - Eyeglasses/Contacts:	
Witness B - Hearing:	
Witness B - Uses Hearing Aid:	
Witness B - Health (During Sighting):	
Witness B - Health (After Sighting):	
Witness(es): (Education, profession, experience summary)	

FIELD INVESTIGATOR REPORT

Please complete your


Case 51156
Witness(s) location
Start = 290 Degrees 30 Degree Elevation
End = 180 Degrees 30 Degree Elevation
September
28th, 2013
10:23pm
Start = 42 Degrees 45 Degree Elevation
End = 280 Degrees 45 Degree Elevation
September
26th, 2013
8:55pm
September
27th, 2013
8:35pm
Start = 240 Degrees 60 Degree Elevation
End = 195 Degrees 45 Degree Elevation
Case 51269 and 51270
Witness(s) location
Myakka River
State Park
Lower
Myakka Lake
Vamo
Little
Sarasota Bay
Oscar Scherer
State Park
Mission Valley
Country Club
Blackburn
Bay
North
Venice
Laurel
NORTH
Nokomis
Curry Creek
Preserve
Venice
Venice
Gardens
South
Venice
Deer Prairie
Creek
North Port
2 mi
2 km

Primary Investigator:
Name Kym O'Connell-Todd ID# 19525

Secondary Investigator:
Name Mark Todd ID# 19488

Date Assigned: 2013-10-07

Date Returned: 2012-11-08

Case Number: 51360

Log Number: US-10072013-0007

Report Submitted By:

Event Information:
Date / Time: 2013-10-06

Duration: c. 1 minute

Location:
Town Clark
County Routt
State Colorado 80428
Longitude / Latitude 106.38.997116 / 40.23.382261

Object Description
Two star-like objects at first, the smaller descending to below treeline in a leaf-like falling pattern, the larger a red glowing object when overhead revealing a thin rectangular box with sharp edges four to five times longer than wide when seen closer and directly overhead

Approx Distance:
When first seen? Less than a mile

When last seen? Less than 500 feet

Direction in sky:
When first seen? West

When last seen? Directly overhead

Estimated Elevation:
When first seen? 15 degrees of arc above horizon

When last seen? 90 degrees of arc

Estimated Altitude: less than 500 feet when directly overhead

Apparent size of object/light: from star-like to >10 degrees of arc when ovehead

Apparent distance of travel: approx. 1 mile

Flight movements or characteristics: The smaller object exhibiting leaf-like falling motion from 15 degrees above horizon to below treeline, the larger exhibiting straight trajectory then veering to pass overhead

Color of the object:
At first white from a distance, then red, and finally green (532nm) when observing bottom when it was directly overhead, with intense illumination that did not extend past the boundaries of the craft.

Sounds associated with the object: None

Synopsis:
On Sunday evening, Oct. 6 at 9:00pm, my daughter and I were traveling west on Highway 40 over Rabbit Ears Pass on my way home to Steamboat Springs area from Denver. I had just rounded a corner into a straight-away near Buffalo Park Trail Road (there is a small dirt parking lot there that was empty) when I noticed two white lights straight ahead in the distance that I initially thought were Venus and another dimmer star to the lower left. All of a sudden the lower white light began to descend and disappeared behind a stand of tall pine trees. It had an erratic path of descent and seemed to wave back and forth rather than just fall straight down. Just as the smaller white light disappeared, I saw the larger light that I thought was Venus begin to grow as it approached rather quickly. At this point I told my daughter to look up and she immediately saw the object as it sped towards us. The growing round white light developed a red border that transitioned in to a solid red red light. As the object approached, I noticed that there was also a blinking light behind it but am not sure if this blinking light was white or red. A very short bright green line had also appeared just below and to the immediate left of the solid red light. The object then slowed and swerved to the right (north) towards our truck. When the object was positioned just to the left in front of us, it dropped in elevation and began to slowly pass overhead. As the object slowly moved above us, we could see that the short green line was actually a long flat bright rectangular strip. From the new overhead perspective, this strip extended just a bit in front of the solid red light and stretched quite a bit behind it. My daughter and I both remarked about how crisp and clear the green box angles were and how there was no glow given how bright the green light was. I have previously worked with low powered lasers (<100mW), and would say the green color was exactly at 532nm. There seemed to be some glow from the red light and flashing light in the rear, but we were unable to see any reflections on a craft body or wing/propeller parts--all we could see were the lights. Not sure if there was a sound. Initially I was unsure of the objects size. As the object was flying towards us, I thought it might be something small like a drone or RC airplane/helicopter because it arrived so fast and its flight path had such quick but smooth directional changes. However, once it was above us, the object slowed considerably--almost to a hover, and we were able to see it clearly before passing underneath. I was traveling between 70-65 mph, so anything small should have zipped right over us. Once the object passed out of view above our windshield, we were unable to see it again out the back window or

rearview mirrors. My daughter did not want to stop and get a better look. I would love to know what your group might think this was, because I have never seen a solid object emit such a bright green light.

Evaluation:
This sighting is anomalous and without rationale alternative explanation. Particularly striking is the unusual and non-aerodynamic rectangular shape as well as the intense green illumination on the bottom of the reported craft.

Checked MUFON CMS for correlating cases:
No other correlations in the database for a similar encounter other than an earlier sighting we investigated, Case 43412 for a sighting on 2012-10-15 over Grand Mesa, Colo., that also described a rectangular structure that appeared to approach witnesses, but the earlier sighting was during daytime and with no reported glowing.

Weather report for time and date of sighting: 28 degree, estimated mild wind from SW

Checked Internet for possible ISS, satellite or known astronomical connection:
Checked log online for Cloundbait.com, a meteorological observatory for Central Colorado. No correlations for date and time.

Other -
EVIDENCE: None, but witness submitted artwork describing sighting.

Witness Interview & Statements:
A 45-minute telephone interview and e-mail follow-up.

Witness Credibility:
Witness was well educated, articulate, and appeared very credible

Natural Phenomenon or Man Made:
Man Made

Investigation Log:
- Checked weather conditions @ http://www.almanac.com/weather/Clark/Colorado/2013-10-06
- Checked terrain at GoogleMaps: Mountainous, with flat areas and forested patches
- Checked Spokeo.com to confirm the home phone number at the address given.
- Checked Skyviewcafe.com for reported times sightings for possible misidentified astronomical phenomena: No correlations
- Checked SkyVector.com for aeronautical charts and restricted military airspace in reported sighting area: No correlations
- Checked FAA advisories and pilot NOTAMs at http://www.faa.gov/pilots/flt_plan/notams/ for sighting region and sighting date:

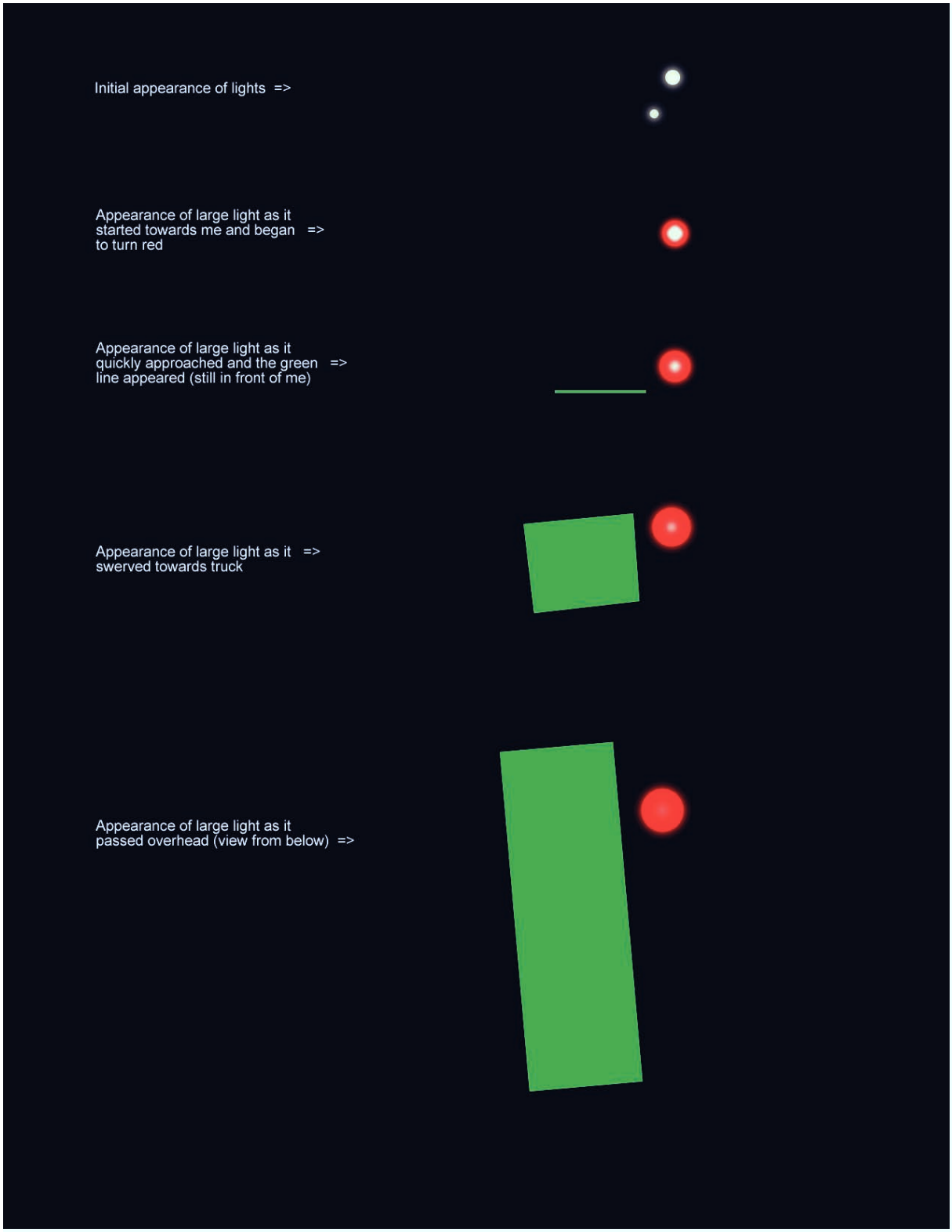
No correlations.

Contact Log:
See separately attached Activity Log

Final Conclusion:
This anomalous sighting does not correlate to shape or flight characteristics of any known civil or military aircraft. Of particular interest are the pairing of two distinct crafts as well as the unusual shape of the larger of the two and its unusual illumination. We recommend a disposition category of **Unknown – UAV**.

Field Investigators
Kym O'Connell-Todd
Mark Todd
Colorado MUFON

BALLISTER-GUASP RESULTS : 9.43 percent / 0.0943 value


Initial appearance of lights =>
Appearance of large light as it started towards me and began to turn red =>
Appearance of large light as it quickly approached and the green line appeared (still in front of me) =>
Appearance of large light as it swerved towards truck =>
Appearance of large light as it passed overhead (view from below) =>


Western direction of travel:
Watched large light object approach this entire distance
Colo. Department of Transportation
Small dropping light
disappeared from line of
sight behind this treeline
Large light object flew overhead here
Path of large light object: Traveled west to east & swerved towards my truck
First spotted lights
above western horizon here
Map
Traffic
Buffalo Park Trail
Walton Creek
500 ft
200 m

INVESTIGATION LOG:
11/19/2013 - Sighting occurs at 1820 US EST.
11/20/2013 - Sighting reported to MUFON via CMS.
11/23/2013 - Witness 1 sends email to Georgia SD R. Howard.
11/24/2013 - SD Howard assigns case to FI Trainor and FIT Haslam.
11/25/2013 - FI Trainor contacts Witness1 via telephone.
12/01/2013 - FI Trainor contacts Witness 1 and arranges for onsite interview.
12//03/2013 - Onsite interviews conducted by FI Trainor and FIT Haslam.
12/17/2013 - Check with Moody Air Force Base.
01/22/2014 - Report created/case closed.

FINAL REPORT DATE: 01/22/2014
FI ID# 7585 (Trainor), 19149 (Haslam)
CASE # 52339
BGE RESULTS: Total Certainty Index is 33%.
LONGITUDE/LATITUDE (N 31.13691, W -83.42336), approximate vicinity (witness confidentiality)

SYNOPSIS: The witnesses (hereinafter Witness #1, who reported to MUFON, and Witness #2) state that on November 19th 2013 at 1820 they both observed a huge triangular flying object that flew about 500 ft above them moving roughly from North to South. They both said that the object had a wing span larger than a C-5A cargo plane. The object flew slowly at 10 – 15 knots (12-17 mph) allowing Witness #1 to examine the underside of the object. The object flew silently with absolutely no noise. As it was slowly passing by, the rear of the object displayed a row of white pulsing lights. As it got further out a very small drone like object was noticed flying alongside on the left. When the object got further out it banked to the southeast allowing them to see clearly the triangular shape of the object.

OBJECT DESCRIPTION: An important fact that is quite evident from the start is that both witnesses were extremely well qualified to be observing what they observed as their background will attest. We have a flying object with a huge wingspan. Measurements taken on site verify that the span of the object was in excess of 350 ft. and flying 500ft. above them, roughly from North to South. (Reference photos attached to the case.) The surface of the object was dull like carbon fiber. It made absolutely no sound as it passed slowly overhead at 10-15 knots (12-17 mph). As it was slowly passing by, the rear of the object displayed a row of white pulsing lights. As it got further out a very small drone like object was noticed flying alongside on the left. When the object got further out it banked to the southeast toward Moody Air Force Base, allowing them to see clearly the triangular shape of the object. They estimate it was in sight for about 7 minutes in all. Witness #1 has included two sketches of the object and a photo that he identifies as resembling what the object looked like, particularly the front of it. (Reference sketches & photo attached to the case.)

INTERVIEW/STATEMENTS: To begin this investigation I will review/post the CMS report submitted by Witness #1, the reporting witness, and follow that with the email that Witness #1 sent to Georgia SD R. Howard that reveals many more added details of the sighting and the background information of the witnesses. The CMS post has been edited for grammar, to improve readability, and also with certain details (indicated as [__] or [. . .]) withheld or altered, to protect the witnesses' privacy. Both witnesses indicated no interest in publicity, and MUFON policy is to strictly protect all UFO witnesses' confidentiality, if that is their wish, as it is here.

From CMS: *"Arrived exactly at my home at 1820 with a friend (NOTE this is Witness #2)(carpool), retired [military] and [military] aviation personnel, both with 30+ years' experience in aircraft. Live in the country. Friend said, [Friend], what is that? and pointed up. Clear night, no noise at all, no chickens, dogs, or anything. Looked up and saw this big triangle shape moving slowly over my yard, me, and my house. I have a big yard and it covered the whole thing; 2 acres. No sounds. I could make out the outline as sort of a triangle with maybe a rounded front, what I would call a big wing. One small solid reddish light on the front. Used the oak trees as a gauge for size and for distance. It was below clouds but maybe 250 feet above trees. We watched it come over my house and as it reach the road it banked to the southeast. As it moved off what appeared to be a small chase plane appeared to*

the left side about 100 feet off its side. At this point the back of the object had a row of white lights that sort of pulsed but in a left to right and not in a pattern. This means no tail fin as normal aircraft have. It went about 8 to 10 miles and turned south. We both are unaware of any aircraft in our or other countries to match what we saw."

On 11/23/2013 3:31 PM, Witness 1 wrote to SD R. Howard via email. Again, minor edits for grammar, only:

"Good day, Sorry about the short report. Was at work and trying to get it sent in a very short window. History, I'm a [. . .] Vet with over 35 years' experience on military aircraft. I have worked everything from old Huey's to T38C Apache Long Bows and Black Hawks. I work flight controls and avionics to include electrical systems. My friend [Witness #2] has a few more years' experience but much the same back ground. He was [military branch] I was [mil branch] with some time in Military Intel. Anyway we both have clearances. I know aircraft when I see them, been in enough in night under NVG's and combat. However I have no Idea what this was. I have very good eyesight at distance it's just up close and circuit-board work that I need glasses. That being said.

*It was 6:20 pm we had arrived back at my home in the country where [Witness #2's] van was parked. It was past dusk and a fairly clear night. Normally when the lights from the car hit the chicken coop the chicken are out wanting to get fed, along with the cats and dogs. The 1st thing I notice the only ones out where a couple cats. [Witness #2] got out and said what the F**K is that, [(name)]?, and pointed up. I look up and above the trees (a good estimate 250 to 500 feet off the top of the oaks) was a huge triangle-shaped object. Really it was big, the tip of, say, the forward edge of the left side was by the pool, and the leading edge of the right was over the trees in to the back yard. I could almost make out what appeared to be seams in the material, but it was not shiny, but was dull, and like carbon fiber. The leading edge was rounded and there was no tail to see. (In today's aircraft everything has a vertical stabilizer with a stabilizer or ailerons. Sort of like a big "T" or a "t." You know what I mean and the anti-collision lights go on top bottom and left and right.) The object appeared to be a very big triangle with no sound whatsoever. Moving at 60* (this was a typo he means 6) *knots or less. I think me and [Witness #2] differ on this as he said it took a few minutes to get over the house, I think more like 5, before it was out over the field.*

I walked under it trying to make out markings, but it was just blending in with the sky so good the only way to tell the outline was that it was blocking out the stars and what few clouds where there. The ends had a reddish/pink glow but not strobes or rotating beacons. I could not make out a cockpit. It turned to the southeast towards Moody Air Force Base, as if it was in a pattern, but way too low. As it did this I could see the back of it. This is why I say it look like the big wing. The lights on the back were from left to right, and white, not strobes, but pulsing. [Witness #2] said "that's a tight formation;" then as it banked he said "[(name)] that's 1 single object!" I said "yeah I know, but damned if I know what."

As it leveled out it appeared that a small object (this could have been a chase plane) just appeared off to the left and it had the standard red and white strobes (T) shape, but next to this object it look like a fly, smaller than a T38 or A10, but still no noise at all. It appeared to go about 6 to 8 miles and turn right and keep going. [Witness #2] followed it in his van for a while but lost it. Funny thing, the next day [Witness #2] has a C Crain Radio that he records Coast to Coast and news on, well he turned it on at work and all his files were erased. Not just a few but all. And at lunch he went to update it and all the file just came back. It has a flash drive/thumb drive for memory. It was as if the thing got locked up by something. Like an EMP or EMI. I know a lot about this, and either one would have destroyed the device so I'm not sure what happened. Anyway I would be willing to talk to you about this. I served from [year] till [year] and then (private defense contractor) until 2007 and now [military branch]. Like I said lots of electronic experience. [__Name___], [phone number]."

On 11/25/13 I called and spoke with Witness #1 and discussed the case in detail. This was our first of several telephone conversations that will be reviewed, with further details, in the EVIDENCE/INVESTIGATION section.

The initial witness interview and contact was made by telephone on 11/25/2013. Witness #1 was very open and we discussed the sighting, incorporating his CMS report and some of the content of his email to SD Howard. Because of the upcoming Thanksgiving Holiday we decided to talk again on 12/01/2013. We closed this telephone interview with the agreement of an on-site meeting and investigation. In our telephone conversation on

12/01/2014 it was decided to do an on-site visit on 12/03/2014. In addition Witness #2 advised he would be able to stop by at his (Witness #1's) home after his scheduled work day. This slight difference in time availability allowed us to interview both witnesses separately.

In addition to these above contacts and statements with the witnesses, we contacted Moody Air Force Base by telephone to ask for comment and concerning experimental or "V-wing" aircraft. Their response in summary was "we do not have that, or any information regarding your inquiry."

NATURAL/MANMADE PHENOMENON: Natural phenomena seem unlikely to have been a factor in this sighting. The waning gibbous moon at 96% illuminated had already set at 5:32pm EST. Calsky (online astronomy website) has no unusual or natural phenomenon occurring in this area at this time. Man-made objects however can be considered further.

WEATHER INFORMATION: The weather METAR from wunderground.com gives the following information for the approximate time of this sighting from KVAD (Moody Air Force Base). This is the closest weather station that includes full METAR information and is located about [15-20] miles SE of Adel GA. (The exact sighting location has Adel as the nearest town.)

At 5:58 PM: Temp 58.5 °F, Dew Pt 45.9 °F, Humidity 63%, Pressure 30.04 in, Visibility 10 mi, Winds NE at 3.5 mph, clear skies.

METAR KVAD 192258Z AUTO 04003KT 10SM CLR 15/08 A3003 RMK AO2 SLP171 T01470077 $

LOCATION: Adel, Georgia is located about 23 miles NNW of Valdosta GA along Interstate Highway 75. (As indicated in CMS, Adel is the nearest town.) Adel is located at Latitude N +31.12394 and Longitude W -83.35752. It is about 23 miles North of Valdosta and 4 miles east of Interstate 75. Witness #1's property, the sighting location, is [15-20] miles North West of Moody Air Force Base.

EVIDENCE/INVESTIGATION: On 12/03/2014 at 1500 EST (3:00pm) both myself & FI J. Haslam arrived on-site and started our investigation. Witness #1 was interviewed extensively over a three-hour period. At approx. 1800 Witness #2 arrived and was interviewed for over an hour.

During the interviews it came out that a report of this sighting was also given to Coast to Coast Radio. This became a negative issue as to how it was disseminated by Coast to Coast during our interviews. Witness #2 was critical of the broadcast inferring that the witnesses were "frightened" by their sighting.

The on-site investigation began with a review and examination of the information supplied to MUFON CMS and the contents of the email sent to SD Ralph Howard. This discussion led to a few interesting details that will be amplified in the Conclusions section. An important factor that was quite evident from the start was that both witnesses were extremely well qualified to be observing what they observed. In this sighting I would consider them both to be "expert" witnesses.

After this review, we decided to take the investigation outside to the source of the sighting which began in Witness #1's back yard. Measurements were taken from the exact location of the witnesses at location #1. Initial sighting was located at exactly Latitude N 31.[___] and Longitude W -83.[____]. For clarification purposes; when Witness #1 first saw the object it was headed straight toward and over, his head. The object was travelling roughly from North to South. As such his first impression was that the edge of the object lined up with a group of trees toward the right side of his property. This in fact was the left side of the object. This is pertinent to later observations. At the same moment he recalled that the object's right side lined up roughly with his chicken coop. This allowed several measurements to be taken.

Starting from Location #1 where Witness #1 first sighted the object; the distance from there (Witness #1) at Location #1 to the base of the trees on the right was measured at 159 feet at an elevation angle of 30º to the top of the trees. This results in a tree height of 92 feet. The distance from Location#1 to the chicken coop was

measured at 475 feet. The distance from the chicken coop back to the trees on the right measured approx.. (~) ~370 feet. This gives us a basis to estimate the approximate wingspan of the object as more than 350 feet. For comparison, the wing span of the C-5 cargo airplane is 222.8 feet. Witness #1's assessment of the object's span being more than a C-5 was "spot-on." The distance to the oak trees, which were pretty close to the center of the initial sighting, was ~437 feet, and the altitude above the oaks where the witness places the center of the object when first sighted gave us an altitude angle of 48º. This results in a height of roughly 485 feet above ground.

**These estimates support that, at the start of this sighting, we have an object that appears to be about 500 feet above the witnesses with a wing span in excess of 350ft flying slowly toward them with absolutely NO sound.

For the next part of the investigation I asked Witness #1 to reenact the sighting from start to finish, just as it happened, in real time. With the witnesses permission this was audio recorded and is in the possession of FI Trainor (see Note at Attachment #7). The audio provides a rich detailed recording of the account from start to finish. This audio account and the extended email account provided to SD Ralph Howard by Witness #1 are very similar in detail, with the following exceptions and additions.

--- The speed of the object in the email as 60 knots or less is a typo and should read 6 knots (7 mph) or less. The speed estimate in the audio is stated as 5-10 knots and this seems to roughly correspond with the time line of the observation.
--- Witness #1 was trying to observe details of the surface as the object was directly above him. He notes that the surface is not clear, and has a rippling effect like "a heat mirage down the road on a hot summer's day." He was trying to discern seams on a surface that was rippling. This is what he tries to detail in his sketch (Ref. Attachment #4) and note the "L" marking on the right underside.
--- Further, as the object passed overhead and the rear of the object came into view, a row of glowing lights was observed that seemed to be pulsing from left to right. (Ref. Attachment #5). It should be noted that these lights did not light up the exterior of the object. They were set back or surrounded by a shroud. It was surmised that this might have been a view of the propulsion system.
--- As the object continued to fly away from them, witness #2 noticed that there was another much smaller object flying separately alongside on the left. This did have conventional aircraft lighting of red and white strobes, but was tiny in comparison. The witnesses compared the size to something smaller than a T-38, which has a wingspan of just under 25ft.
--- As the object leveled out and was near a ridge line, the object banked to the left. This turn to the southeast was toward the direction of Moody Air Force Base. This allowed the witnesses to see the triangular profile quite clearly. At this point Witness #2 left in his vehicle and tried to follow the object without success.

After this re-enactment, the four of us, witnesses #1 and #2, FIT Jeremy Haslam & FI Brion Trainor, sat down to discuss this event in its entirety. This was really a review to see if anything was missed or if there was any additional information to be included. After that, the discussion led to somewhat of a team collection of ideas and to some speculation.

From our discussion there is some additional information worth noting:

--- It should be pointed out that the ridge line is approximately 2 miles away. The entire event took place in about 7 minutes, or 420 seconds, and movement was steady throughout. The witnesses agree that the object was moving at 5 to 10 knots. 10 knots works out to 16.88ft/second, so multiplying by the duration of 420 seconds (16.88 x 420), gives us ~7,090 feet, or 1.34 miles. This is somewhat close to the 2-mile distance, but also does suggest the object was travelling slightly faster. Given the distance the object covered, a good estimate would be 10 to 15 knots. This is still a very slow-flying object, given the enormous reported size.
--- Witnesses agreed that the word "drone" was more descriptive of the much smaller object. As such; was the "drone" being controlled by the large object, or was the "drone" controlling the large object, or was each object independently controlled?
--- The witnesses were shown various pictures representing triangular flying objects by FIT Jeremy Haslam. One picture "clicked" with Witness #1 and will be included with his comment as Attachment #6.

WITNESS CREDIBILITY: Witness #1 is a [__]-year old disabled Army veteran with over 38 years of experience working on military aircraft. He has worked on just about everything that flies. His expertise is on flight controls and avionics including electrical systems. He is currently working for the military at [. . . . .] in [. . . .] Georgia. He has had some college experience. The second witness (Witness #2) has a few more years of similar experience than Witness #1, but in [military branch]. He works at [. . . .] in [. . . .] Georgia. Both witnesses were extremely courteous, credible, and honest. They could be characterized as expert witnesses when it comes to the content of this sighting.

CORRELATING CASES:

__Report Date	Description
7/23/2013	Triangle Craft Hovered Slowly south Toward Military Base (City/County Not provided, GA, US)
12/21/2012	I was traveling in a south eastern direction, had stopped to turn right, when I saw a triangular object in the sky in front of me. it was shimmering, or pulsating, silvery white, had sharp edges and no sounds were heard. (Geneva, GA, US)
11/5/2013	Saw a triangle object-revolve as it was moving. white, green around it, with white, green, and red lights under it. (Tucker, GA, US)
12/14/2012	Large slow moving triangle with five white lights. Moving approximately 20 mph and all lights flickered one time. (Harlem, GA, US)
1/13/2014	Two triangular ufos silently floated past not 110 ft above my family and I, closely followed by a bright orange glowing disc and then two fighter jets. (Rome, GA, US)
2/6/2014	Saw low-flying, triangular aircraft which, upon closer distance, was hovering above the highway. (Norcross/Lilburn, GA, US) ** (NOTE: this case (53948) was investigated and determined Unknown-UAV. It has striking similarities to this case.)
12/5/2012	Huge object made a triangle shape with its lights. (Danville, GA, US)

CONCLUSIONS: Unknown – UAV.

When all the factors and information are added up, the sighting remains unexplained. Both witnesses apparently saw a truly unidentified aerial object or machine of some unknown kind. (Unknown-UAV). Having said that however, I believe that these two expert witnesses may have seen an advanced aircraft that was created in the USA.

This conclusion was based on the following facts:

1) An important factor that was quite evident from the start was that both witnesses were extremely well qualified to be observing what they observed. In this sighting I would consider both to be “expert” witnesses.

2) Both witnesses were clear in their assessment that what they both observed was very much not a typical or ordinary aircraft. At the start of this sighting we have an object that appears to be about 500ft above the witnesses with a wing span in excess of 350ft flying slowly toward them with absolutely NO sound.

3) Is there any known aircraft that can fly silently at 10-15 knots that is this size and make NO noise? So slowly that the witness can examine the underside for seams and panels.

4) As the object leveled out with its companion “drone” and was near a ridge line, the object banked to the left. This allowed the witnesses to see the triangular profile quite clearly. This turn to the southeast was toward the direction of Moody Air Force Base that is located [15-20] miles from the witnesses’ home.

5) The final question that was asked of the two witnesses was: Do you think that what you saw was “one of ours” or “something else”? Both witnesses responded: “We both believe that what we observed was an experimental, probably secret, advanced aircraft, and one of ours.”

See SD’s Note below Attachments List.

Case-specific Attachments

The following info sources and/or materials were created or gathered for investigating this case. They will be posted in CMS.

Attachment 1. The CMS report Case 52339. (Removed due to amount of personal information.)
Attachment 2. The weather information for 11/19/2013..
Attachment 3. Graphic image of sighting location. (Removed due to location o witness's home is revealed.)
Attachment 4. Sketch #1 of the object by Witness #1.
Attachment 5. Sketch #2 of the object by Witness #1.
Attachment 6. Picture of triangle with comment picked by Witness #1.
Attachment 7. Note concerning Audio recording of sighting by Witness #1.

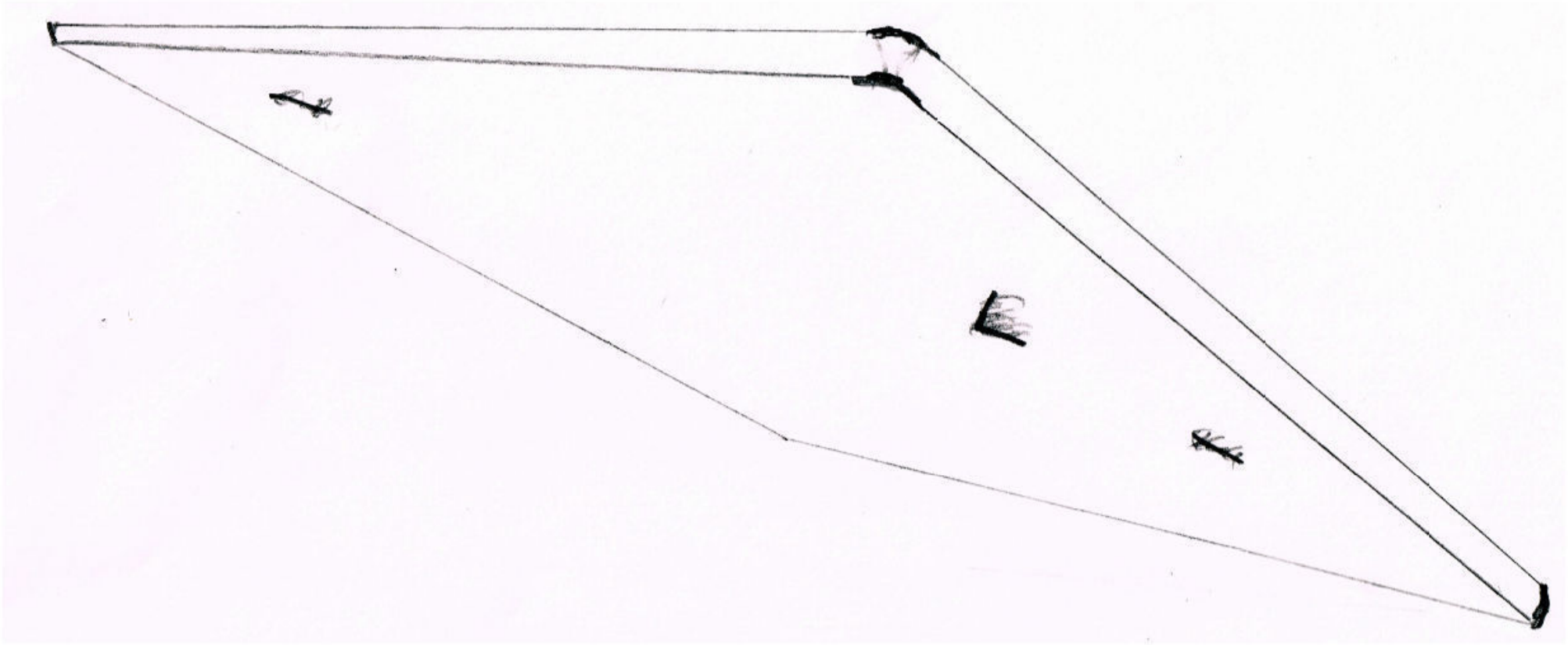
[SD's Note- I support the FIs' conclusion here. This case points up the difficulty in making a defensible choice between Man-Made, which here means a top-secret presumably military advanced experimental aircraft, and Unknown Aerial Vehicle (UAV). The witness' opinions are almost certainly as highly informed as it is possible to find. They say "one of ours." And yet, the answer to FI Trainor's question #3 at present is, "No one." No known individual, group, or country, including the United States, is testing anything close to being capable of doing what is reported here. If this is "one of ours," then it represents nothing less than an astonishing advance of scientific and aeronautical knowledge. -ROH-Jr., 17 FEB 2014.]

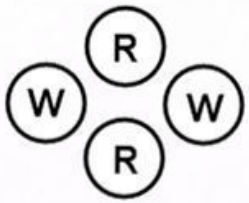
ATTACHMENT 2

Weather Conditions for November 19, 2013
From KVAD Moody Air Force Base

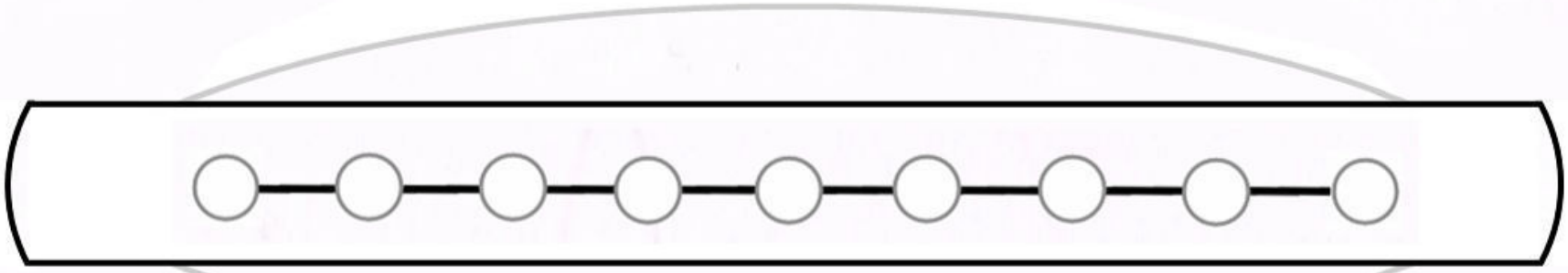
5:58 PM 58.5 °F 45.9 °F 63% **30.04** in 10.0 mi NE 3.5 mph - N/A Clear
METAR KVAD 192258Z AUTO 04003KT 10SM CLR 15/08 A3003 RMK AO2 SLP171 T01470077 $

ATTACHMENT 4

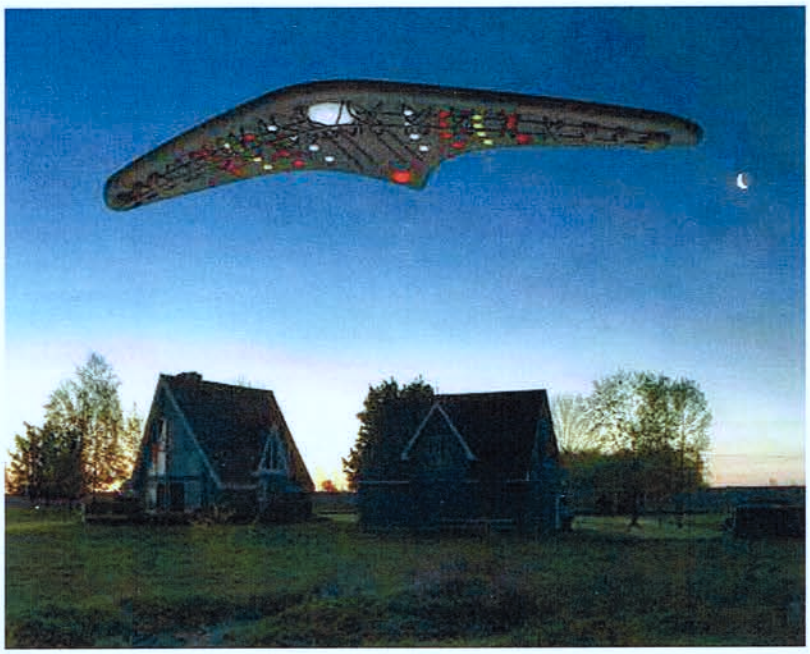




ATTACHMENT 5



Looks like this with the rounded front →



A triangle -shaped craft reportedly crash landed on a mountainsi
500 x 400 26.5KB www.openminds.tv

Enlarge View all ima

ATTACHMENT 7

Note in place of FIs Att7-Audiofile

As discussed with the FI, reference canm be made to witness statements without attaching the audio record of the interview. SD has removed this file from CMS, the audio will remain with the FI.
-ROH-Jr., 17 FEB 2014

MUFON CMS 53948 REPORT

INVESTIGATION LOG:
2/12/2014 Some preliminary work before contacting witnesses and email to Brenda.
Emails to arrange meeting and interview location for 6 people: 2/17, 2/18, 2/20, 2/24, 3/5, 3/11/2014.
3/15/2014: Interview at Collins Hill Library, about 1 hour followed by a "re-enactment drive" up I-85N with photos. Follow up emails getting additional information: 3/15, 3/24, 4/2, 4/8, 4/9/2014.

FINAL REPORT DATE: 5/3/2014
Field Investigator ID#: 12682
CASE#: 53948
BGE Results: Total Certainty Index is 16%
LONGITUDE/LATITUDE: Lat 33.927698 N, Long -84.1804620000 W, Exact

SYNOPSIS:
The witnesses, Witness_1 and Witness_2, observed a large black triangular object and actually drove beneath it as it hovered mostly over the southbound lane of I-85. Traveling from work at about 2:45 am on I-85 North, the object was first seen just North of the Jimmy Carter Blvd overpass and initially appeared to be a low flying aircraft with landing lights. As they approached they saw a rectangular array of lights making it obvious that the object was not an ordinary aircraft. Witness_1 and Witness_2 drove under the object which was approximately 400 to 600 feet above. Witness_1 looked up through the closed window and could not see the entire object. Witness_2 could not see the underside at all from his passenger side position. Beneath the object, Witness_1 observed several white recessed lights along the edges of the triangle and one recessed red light at the “rear” of the object. The object, estimated to be 280 to 300 feet along one edge and some 30 to 35 feet high, did not move or rotate during the entire sighting. After passing under the object, they tried to keep it in sight; Witness_1 looking in the rear view mirrors and Witness_2 looking out the back window. Somewhere before reaching Beaver Ruin Rd they lost sight of the object after going far enough for the lights of the object to become confused with the background city and tower lights. They did a u-turn (indicated in Figure 1) at Beaver Ruin Rd but failed to see the object again. The whole sighting lasted an estimated 5 minutes and there was no sound that could be associated with the object. They were no apparent effects on the witnesses, other than dismay, resulting from the sighting although Witness_2 complained of a headache afterward but could not readily attribute this to the sighting.

OBJECT DESCRIPTION: Object was a black (estimated equilateral) triangle with white lights along the vertical sides, recessed white lights equally spaced underneath with 1 red recessed light at the “rear” (Figure 2 graphic done by Witness_1). The estimated length along one side is 280 to 300 feet and height was estimated to be about 30 to 35 feet. When first seen, the object appeared as landing lights on a plane (Figure 4 illustrates the object as it appeared from about 1/3 mile, Witness_1 superimposed the object on the photo).

Last seen was while still driving and watching through the rear view mirrors and rear window but, at some point, described as “too far away” (at most 1 mile), its lights became confused with other city and tower lights.

The object remained still and never moved or rotated.

WITNESS INTERVIEWS/STATEMENTS:
A 1 hour interview was conducted in person with both witnesses. There was plenty of follow up emails specifically to pin down some details of the sighting that were not possible during the 1 hour interview.

It was interesting that the duration of the event was reported to be about 10 minutes but calculations for the distance traveled from Jimmy Carter to Beaver Ruin Rd, 3.24 miles with an estimated speed of 45 to 55 mph, would have taken at most 5 minutes. It has been experimentally demonstrated that subjective time slows down for people under duress.

Among some of the graphics passed back forth between Witness_1 and myself, I had marked the size and location of the object on a Google Earth satellite view as well an estimated location of his car when he looked up at the object (Figure 3; estimated size of object and location of automobile). He wrote back that the size of the object looked good but that the car was 10 to 15 yards further North than where I had marked (Figure 3 has his corrected position with a green X). When asked how he knew the car was at that particular location he replied he saw the microwave tower (marked with a yellow tack at the top of Figure 3) when he looked up at the object and also found he could not exit off to Indian Trail Lilburn Rd to get a closer look so knew where he was in relation to the exit. In his initial CMS narrative weeks earlier, Witness_1 had already specifically mentioned that he wanted to pull off I-85 at Indian Trail Lilburn Rd exit but there was no opportunity. This later forced the u-turn at Beaver Ruin to return for another possible look at the object. (U-turn location noted in Figure 1).

As an aside … when passing beneath the object, Witness_1 recalled that he did not roll his window down and, while I did not ask him why he did not, we should note the outside air temperature was 28 degrees. The wind chill at 45 to 55 mph would have been significant.

Witness_1 noted that they were not in the HOV lane but one lane to the right while heading North on I-85. Witness_1 superimposed a graphic (see Figure 4) of the object as seen (approximately) from the location in the photo which was about 1/3 of a mile from the object. I used this graphic and witness narrative to calculate the size, altitude and location of the object (Calculations are described in detail at the end of the document after the Figures). It should be noted that these are estimates, not even near precise measures. They are precise enough, however, to get some notion of the size of the craft and altitude.

Although the object's description and motions preclude ordinary aircraft, I did discuss the possibility with the Gwinnett County Police Aviation Division, Corporal Conolly, 3/12/2014 12:28PM, and asked if he could check the flight logs for Feb 6. He said he would have his supervisor check about pulling those records. They were already put away for that month. I asked the lowest altitude for air traffic over such an (sighting) area and he said no lower than 1000ft. I left my number for the supervisor to call me back. 3/12/2014 1:41PM Greg called back and said that the I-85 is used as a corridor for Medevac, Ga State Patrol, DeKalb Police. Gwinnett had no traffic at that time.

NATURAL PHENOMENON OR MAN MADE:
No natural phenomenon or known manmade objects match the description or behavior of this object.

WEATHER INFORMATION:
1:58 am Temp: 28F, Humidity: 72%, Barometric: 30.26 in, Visibility: 10mi, Winds: NW at 11.5 mph
Scattered Clouds
METAR KPDK 060653Z AUTO 32010G20KT 10SM SCT020 M02/M07 A3021 RMK AO2 SLP245 T10221067

LOCATION:
Highway; traveling North on I-85N very near the Indian Trail exit. This is just outside Atlanta's beltline (circular) highway I-285, and is a heavily-populated area.

EVIDENCE/INVESTIGATION
There is no evidence beyond what is included in this report.

WITNESS CREDIBILITY:
Witness_1's estimates of various aspects of this sighting were very accurate as nearly as I could measure. Witness_1 has had some college, and is a very observant witness. On various occasions, before, during and after the interview, Witness_1 demonstrated an excellent memory. Witness_2 appeared truthful and his descriptions correlated very well to the overall event. During the two interviews, I saw no indication at all of any "rehearsal" or collusion in their reported facts.

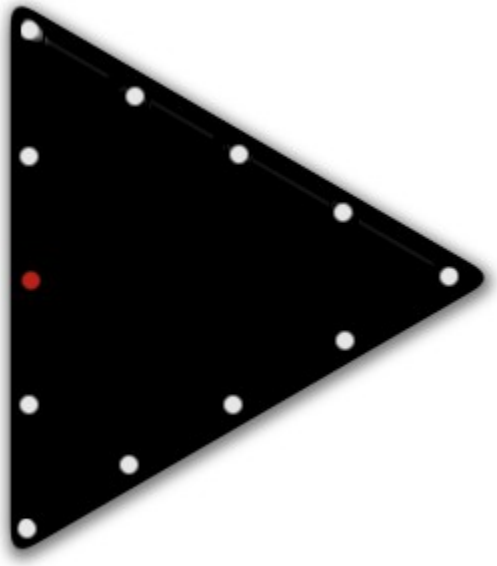
CORRELATING CASES:

Nothing in NUFORC or MUFON records for 2/6/2014 for the area.

CONCLUSIONS:
Unknown-UAV. This conclusion is based on the veracity of the two witnesses and their given description.

FIGURES

Figure 1



Underside light pattern of craft

Figure 2

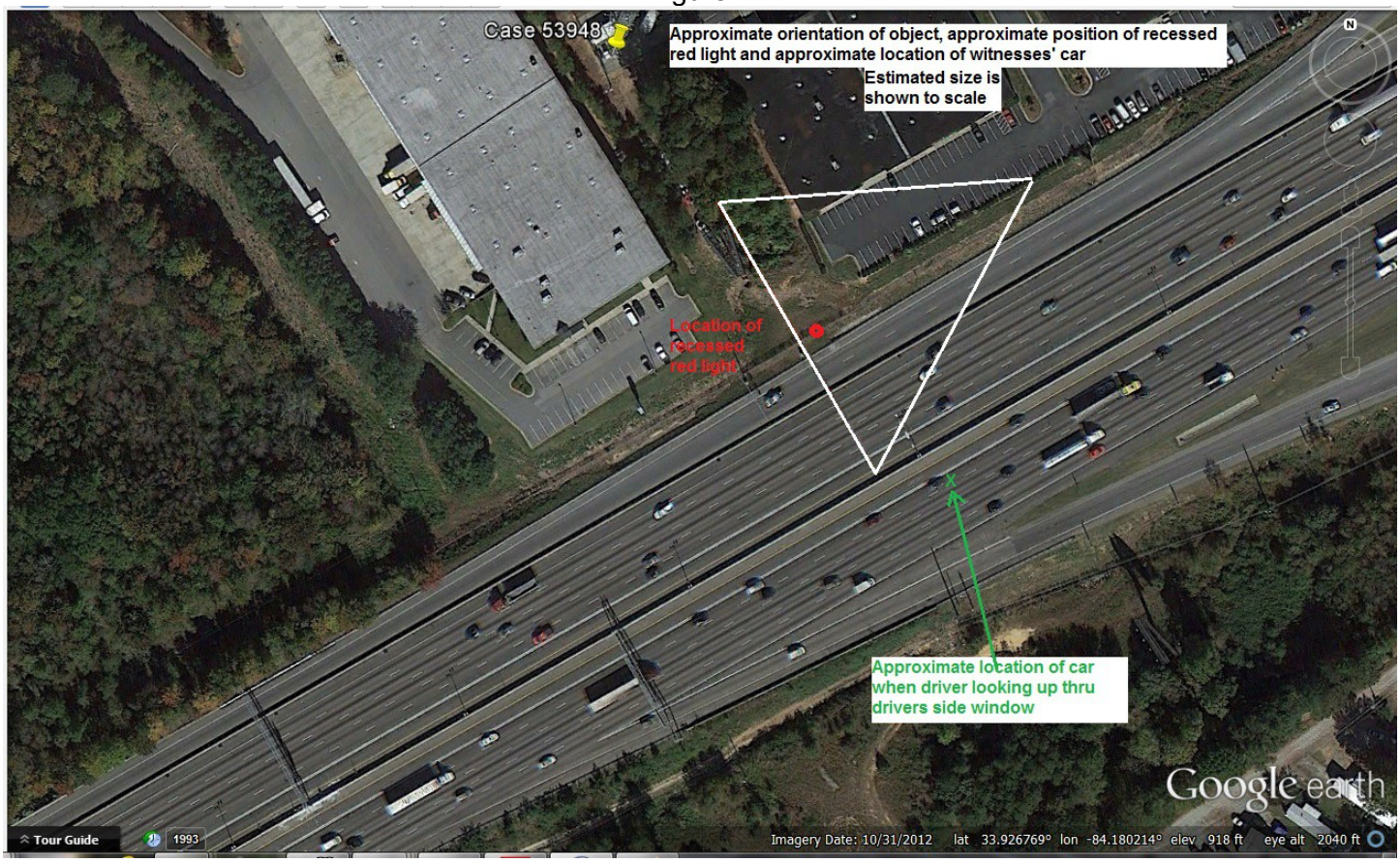


Figure 3

Figure 4

CALCULATIONS

Degrees per pixel derivation:
Field of View (FOV) of the camera is used to determine the angular size in degrees per pixel:
FOV: 62.6 degrees
Degrees per pixel: 3072 horizontal pixels; 62.6/3072 = 0.02038 deg per pixel

Angular size of object estimate:
Using the degrees per pixel derived above, the angular size of the object is derived.
Figure 4 graphic of object by Witness_1 has an object size of 476 pixels.
Angular size of object is 476 * 0.02038 = 9.7 degrees

Horizontal size (of 1 edge) of triangular object estimate:
The distance from the location on I-85 seen in the Figure 4 photo to the estimated location of the object edge center is 1670 feet. Side adjacent to the 9.7 degrees is the 1670 feet. Because it is the object center we have Object Size = 2*Tan(9.7/2)*1670 = 283 feet. For slop factor I estimate 280 to 300 feet.

Vertical size of object estimate:
There are 52 vertical pixels in the object depicted Figure 4. The pixels ratio of height to width is 52/476 = 0.10924; the height is only about 11% of the width. So
280 * 0.10924 = 30.5 feet
300 * 0.10924 = 32.8 feet
So the estimate of object height is 30 to 35 feet.

Object altitude estimate:
Witnesses were only approximate in the relation of object altitude to the microwave tower. Calculation of the tower height based on the shadow cast is about 195 feet. The shadow of some trucks, estimated to be 15 to 18 feet high, gave the tangent angle of the sun to be about 1 (between 0.92194 and 1.10633) making the length of any shadow cast to be very close to the actual height of the object. In slop terms, the altitude of the object was 2 to 3 times the height of the microwave tower or 2 * 195 to 3 * 195; 390 to 585 feet. I rounded this to an estimate 400 to 600 feet.

FINAL REPORT DATE: November 30, 2014

FI ID# 5465

CASE#: 59652

BGE Results: Total Certainty Index is 38.28 %

LATITUDE / LONGITUDE: (45.638728 / -122.661486) Note: I have used the general coordinates for Vancouver in order not to divulge the location where the witness was conducting surveillance at the time of the sighting.

SYNOPSIS: RP reported that while on duty in Vancouver, WA on 07/02/2014 at about 1300 hours, he observed below-described UFO move from right to left while elevating. As the unknown object moved to the left and upwards, the front of the object began to shimmer and disappear and in about 2-3 seconds the craft was completely invisible.

OBJECT DESCRIPTION: Circular metallic object that flew silently across the sky and was observed to disappear or become invisible while it was under observation. The leading edge of the object was seen to shimmer and disappear as the object passed an invisible vertical line in the sky followed by the rest of the object until it was completely invisible. Described as moving across the sky faster than a conventional aircraft.

INTERVIEW/STATEMENTS: Multiple interviews by phone and by e-mail. Communication is ongoing.

NATURAL/MANMADE PHENOMENON: There is no known natural phenomena that would account for the object described. Very advanced military technology is a conceivable explanation, but this raises the question of why such technology would be exhibited in plain view of a very large civilian population.

WEATHER INFORMATION: 72 degrees, 5.8 mph wind SSW, Clear

LOCATION: Vancouver, WA – City of Vancouver is in Washington State on the Columbia River across from Portland, OR. The population of Vancouver is about 167,000. The Portland-Vancouver Metro area is the 24th largest in the USA with a total population estimated at 2,314,000. Portland International Airport is a major facility and is home to the Oregon Air National Guard; it is the most likely origin of the F-15 fighter that is part of this incident.

INVESTIGATION REPORT:

On Sunday, 07/13/2014 the witness called the phone number listed for Washington State MUFON; this is my cell phone. He was hesitant at first. He said he needed to talk to someone about an experience he had. The witness stated he found my information on the Internet and he decided to call me because I have a background in UFOs and law enforcement. (I am a retired police sergeant with 20 years of service and at the time of this call I was coming to the end of 10 years of service as a fraud investigator for Washington State.) When he called I was away from home so we arranged a time later the same day for an interview.

I called him back and I told him about MUFON and about the investigative process. He started off hesitant, because of his position as a law enforcement officer he was concerned that he might place his job in jeopardy if he was identified. But he added what he saw was so startling it had changed his view of reality. He added that his vision is 20/15, he is in excellent health and he considers himself to be a careful observer. This is why he can't deny the reality of what he observed.

The sighting occurred while he was on duty in Vancouver, WA on 07/02/2014 at about 1300 hours. After the witness explained the nature of his job, we agreed that I would not reveal his name or employer. This is why when I filed the report with MUFON to obtain a CMS Case Number I did not identify the witness.

The witness was very candid about his qualifications and background. It is entirely in keeping with his position and I believe he is probably risking a lot by reporting his sighting, but I also concur that it is important that he made this report.

He was in the passenger seat of a vehicle with a partner. The other officer was not looking in the same direction as he was. He stated he did not tell him what he had seen either because he was worried about the consequences of saying he had seen a UFO.

When he described the circular metallic object that he observed crossing a clear sky at one in the afternoon, he made the comment, "While I was watching it, I really hoped I would see something normal, propellers, jet engines, wings, anything like a conventional aircraft. It had no components of ordinary airframes."

Given the qualifications of the witness, I am including his statement in its entirety as follows:

WITNESS STATEMENT:

On July 2, 2014, at approximately 1300 hours, I was on-duty and near the intersection of (Location Deleted by JC), Vancouver, Washington. The weather was warm, with excellent visibility, and a partly cloudy sky. I was in my vehicle, facing east, toward (Deleted). My window was rolled down, providing me with an unobstructed view of the southern and eastern sky.

I noticed movement in the sky, approximately forty-five degrees above the horizon, to the southeast. I observed a metallic disc, silver-in-color and circular in shape, moving rapidly across the sky from the south to the northeast. This movement was from my right to my left.

The object was shiny and glinted in the sun as it moved. It appeared to be several thousand feet in elevation, and from my perspective, appeared to be the size of a dime held at arms-length. I heard no sound at all from the object, and there was no contrail. Further, it looked uniformly metallic and circular, with no visible wings, tail, windows, lights, landing gear, or other components of conventional airframes, both rotor and fixed-wing. It also did not look similar to any Unmanned Aerial Vehicles I have observed.

I observed the object travel up and to my left, which was north/northeast. I saw it increase in elevation rapidly in a straight line, and it appeared to be travelling faster than any conventional aircraft. After approximately five seconds, I observed the leading edge of the object shimmer and disappear. I observed this continue, as an image of the surrounding blue sky enveloped the object, moving in a vertical line across the surface to the rear edge, until the object blended in with the sky behind it.

As this change occurred, I observed a slight blurriness in the changed areas, inconsistent with the sky behind it. This distortion was similar to looking at an object immersed in water. However, once the entire object had changed, this effect stopped and I immediately lost sight of the object. The time from complete visibility to disappearance was approximately two to three seconds.

At the time of disappearance, the surrounding sky was blue and cloudless. I continued looking but was unable to find the object. Approximately thirty seconds later, I observed a jet fighter aircraft flying rapidly along the same course the disc had taken. I recognized this aircraft, based on prior experience, to be an F-15. I was only able to observe the bottom of the aircraft, and no insignia were visible, but it looked identical to the F-15 fighters based at the Portland Air National Guard base.

I observed the F-15 follow the same flight path, moving from my right to upper left. It continued, flying beyond where I had last seen the object, but in the same direction and elevation. From my perspective, the F-15 was the approximate size of a quarter held at arms-length. Additionally, the F-15 was extremely loud while passing over, whereas the disc was silent. I observed the F-15 continue to the northeast, out of my line of sight.

Based on my training and experience, this was no known military or civilian aircraft, Unmanned Aerial Vehicle, astronomical phenomenon, balloon, atmospheric effect, or misidentification of a known object. This object was a real, physical, tangible craft, and it exhibited flight characteristics at least comparable to a military fighter aircraft. Further, the object's ability to adopt complete camouflage, which was capable of effectively mirroring the surrounding environment, is a capability which to my knowledge has not been successfully developed or implemented. Nothing further.

We discussed the weather conditions at the time of the sighting. It was warm with excellent visibility and a partly cloudy sky. In Vancouver. The witness was in the passenger of a vehicle on a surveillance mission. He was facing east with the window rolled down. There was an unobstructed view of south and east sky. He was first attracted by a movement in the sky 45 degrees above the horizon.

He observed the object a uniformly metallic and circular disc moving 120 degrees to NE to about 90 degrees. It moved from Right to left and upwards in his field of view. It was shiny and glinted in the Sun. He believes it was possibly a few thousand feet in the sky. It appeared the same size as a dime at arm's length. There was no sound at all.

The F-15 fighter arrived shortly after the object disappeared. It was very loud. By comparison the F-15 appeared to be the size of a quarter held at arm's length. The witness is very familiar with F-15 fighters because of prior work experience, but I am not revealing further details about his background.

Shortly after I completed the initial investigation, I contacted William Puckett, founder of UFOSNW (www.ufosnw.com), retired from a career with NOAA and highly experienced in meteorology and radar. I asked him if it would be possible to obtain radar data related to this report.

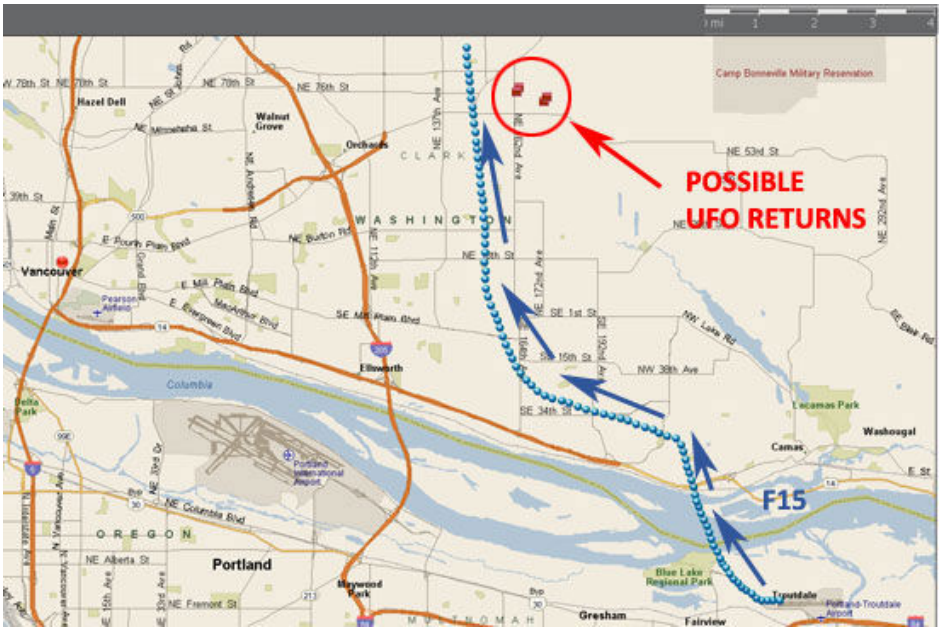
On September 1, 2014 he sent the report that follows in response to my request. I also asked about whether or not the altitude of the objects could be determined. He replied that, "*The approach radars (ASR-9 and ASR-11's) don't have height finding. Only the modernistic long range radars (ARSR-4's) have*

this capability. These radars are characteristically on borders and the coasts. However, the FAA doesn't provide the 3D data (height). The Air Force did, but now they are not responding to requests."

RADAR REPORT RECIEVED ON 09/01/2014 – Report from William Puckett

Interpretation of Radar Report:
Radar data was requested from the FAA (Federal Aviation Administration) for Portland International Airport for July 2, 2014 from 12:45 PM to 1:15 PM PDT. Analysis revealed that an aircraft (possible F15 as described by witness) departed Portland-Troutdale Airport at around 1:08 PM PDT. The aircraft proceeded to the NW and then turned to a near N heading. The craft rose to about 10,000 feet and a speed of 350 MPH by 1:15 PM. Two groups of "uncorrelated primary" returns were found to the NE of the witness position at around 1:12 and 1:13 PM respectively. This was a few minutes before the probable F15 aircraft arrived. This is consistent with what the witness saw. The F15 was likely from the Oregon Air National Guard which is stationed at Portland International Airport. It is not known why the aircraft took off from Portland-Troutdale Airport. A search has revealed that the runway at Portland-Troutdale Airport is a little over 1 mile long. This is sufficient length for a F15 to land and take off. The F15 aircraft needs a runway with a minimum of 3,000 feet length. (Source Wikipedia.) A search (Wikipedia) also revealed that military aircraft do use the Portland-Troutdale Airport. It is not known for sure if the primary returns belong to the UFO. The witness stated that the UFO was only visible for about 5 seconds. This is slightly longer than one rotation of the radar antenna (4.8 seconds) so it would be expected that the UFO would probably only show up for one rotation of the radar. The radar returns could be due to other effects such as "radar angels," but they also could belong to the UFO.

The map showing radar returns can be viewed below:



Again I can't say for certain if the primary returns are the UFO, but they could be. The flight characteristics of the aircraft are consistent with a F15 as described by the witness. I have updated my

webpage with the report. I did not reveal any personal witness information. Let me know if you have any questions.

William Puckett
P.O. Box 4926
Helena, MT 59604-4926

WITNESS CREDIBILITY: Very high credibility based upon training, experience and the level of risk involved in making this report.

CORRELATING CASES: CMS 58006 from July 5 involved a disc-shaped UFO in the Vancouver area.

CONCLUSION: Based on the witness statement, additional interviews, evaluation of radar data, I believe this is a high credibility Unknown Aerial Vehicle sighting with radar confirmation.

Mufon Case # 59680

Field Investigator: Tom Lyford **Today's Date:** 11/18/2014 **Case Type:** CE1 **Case Category:** 2

Date Submitted: 9/9/2014 **Submitter:** Husband and Wife **County:** Somerset

Date/Time of Event: Sunday 09/07/2014, 8:00 pm local / Monday 09/08/2014, 12:00 am UTC/GMT

Event Location: I-95 between Exits 109 and 112 **City & State:** Augusta, ME

County: Kennebec **Latitude:** 44.325911 **Longitude:** -69.815453

Duration: 20-25minutes **Case Disposition:** Unknown UAV

Weather Conditions (from wunderground.com/history):

Temp 63.0 Dewpoint: 48.9 Humidity 60 F Pressure: 30.14 in Visibility: 10.0 Wind Dir: NW Wind: 5.8 mph Precip: NA Conditions: Clear

amsmeteors.org/observations: There are no reports of fireballs or any other similar observations on this date on this website.

Considerations from seeandavoid.com:

The Augusta Airport is situated approximately one mile to the east of I-95's Exit 109.

The Maine Army National Guard training base (once known as Camp Keyes), headquarters to the Adjutant General, is situated adjacent to, just east of, the Augusta Airport.

AUGUSTA Heliport, Latitude: 44.2675688888889, Longitude: -69.7817111111111

LAKESIDE MARINA Heliport, Latitude: 44.3209019444445, Longitude: -69.8894930555556

There is a single, straight-line Low Level Training Route (LLTR) that crosses WNW to ESE, right over Hallowell, about 8 miles south of Augusta.

Short and Long Descriptions from MUFON's CMS Case # 59860:

Short Description: "Hovering triangular UFO"

Long Description: "We had just gotten on I-95 north in Augusta, Maine, at exit 109. The sky was clear. It was dusk. The sky was still bluish pink from the sun setting. We all noticed something hovering in the sky on the opposite side of the highway in front of us. It was triangular. It was not moving. At each vertex of the triangle there was a white light. The three lights appeared equidistant from each other. We could see a flat bottom and the light allowed us to see a 90 degree angle where the bottom met the edges that then moved up to give the object height. Most of us couldn't stop looking at the edges because they were not anything like any aircraft that we are familiar with. We could see that the object was a flat metal color. It had no shine to it. Where the light hit the object, it looked like a tin color. There were no color lights at all. My wife was driving, but she could see it out her window, but not for as long as I could see it from the passenger seat. My three children were in the backseat. All three children saw the object.

I saw it out the front window first, then through the back window, and then I took off my seatbelt and stuck my head out the roof through the sunroof. When I stuck my head out the roof, I could not hear anything more than the wind caused by driving. No airplane sound at all, at anytime. The object never moved, it just hovered. My wife was afraid to pull over, so we lost sight of it as we drove away. We do not look for UFO's. This object was so out of place that it was difficult for us not to notice it. All of us noticed it at the same time, and we were all in shock as we stared at it for as long as we could. My daughter even became frightened; it was that real to her. I did not try to take a photo because there was not enough time, and I would have lost a lot of the time I had to observe it. All we had was our cell phones, and we didn't think a cell phone picture would have shown anything more than the lights, so we just watched the object as we drove away from it."

Interview (9/27/2014):

The witnesses' interview was conducted around the family dining room table, and lasted one hour and twenty minutes. Four of the five of them were present, as follows: the father, age 44; the mother, age 49; one son, age 14; and one daughter, age 9. The eldest son, age 16, could not be present. I asked for, and received, permission to record the session on a digital recording device.

The father, a mathematics educator who holds a Ph D., did the near majority of the reporting, but the mother (a postal clerk) and two children liberally expressed their memories and impressions, throughout, of what they had seen and experienced on that Sunday night at 8:00 pm. It was very much a family affair.

The incident began after shopping at or around Augusta's Target store. The mother was driving, the husband had the front passenger seat, and the three kids were in the rear seat. They had just swung onto I-95 North at Exit 109 and were merging into traffic. Somebody asked what time it was because they were concerned about arriving home by a certain time. The entire family remembers someone checking and saying it was 8:01. It was turning dusk, but the sky overhead was still blue, and clear, except down low at the horizon where some "blue-gray clouds" were gathered over the tree line. Immediately facing them up ahead was the Western Avenue overpass. And immediately beyond and above that barrier, some bright white lights caught their attention on the other side of the overpass.

Excerpts transcribed from the digital recording:

Husband: (This is) "when we noticed these white lights. Not too high up in the sky but they were, you know, high enough where we could *see* them… and I think all of us noticed them at once. I remember saying, "Why are there just *white* lights in the sky? What has just *white lights?*"

Wife: "Yeah, and it was kind of like, *'What is that thing* flying over there?' "

Husband: "Well it was just *stationary*… It almost looked like it *belonged.* But it completely *didn't*."

They all agreed the object, because it was gray-ish, blended right into the sky which was also graying at sunset, makingg the object challenging to spot (except for the lights).

Son: "The lights looked so close, to perspective."

Husband: "They were. They were close to *us*."

Son: "They didn't seem like stars."

Husband: "No, no, they were way, *way too low*. This is like a hundred and fifty feet over the sky, I mean over the trees. And they were a very constant bright."

Wife: "Those headlights that you see, that are so white…?"

Husband: "Like the halogens."

Wife: …that you're like, 'Why are they so white?"

Husband: Yeah. Not flickering. Nothing. They were just stationary."

Then they drove under the overpass and got a better look at what was there on the other side. It was off to their left.

Husband: "Right away we could see it was a triangle. And it had three lights. It had a light at every vertex. And… the light seemed to *be* the vertex itself. It wasn't like there was a triangle with little lights on the ends; it seemed to be *so* bright on the vertex part, that you really couldn't see how the edge was defined… Then we started to notice that it had height to it. You could see the height. …It had like (and it's funny because when we were talking about it later, we both used the exact same word to define what it looked like, do you remember [to the wife]what it was…? The color? *Tin*. It looked like *tin*) … The height part, the part of the ship that was height. What I could notice was there were kind of like two seams, that it seemed like it was triangular-shaped, but were two seams that maybe changed the angle slightly. (I can draw it. It would make more sense.)… [see drawings accompanying this report] And the height of it… I mean, it was so solid looking, it was… it just… it looked like we were looking at a solid object, and it was just stationary, not moving, there was nothing underneath it, nothing attached, nothing above it, and it just, it was so solid, you could be convinced something was holding it there, because it just wasn't moving with any air. She slowed down…"

Wife: "He wanted me to pull over but…"

Husband: "She did *not* want to pull over. The kids were getting… [the daughter's name] was getting nervous…"

Wife: "I don't like to do that…"

Husband: "Well not on the highway…"

As they drove past it, the husband released his seatbelt and pushed his head out through the sun roof, or sky-light, and looked at it as it dropped away in their wake behind them. He re-confirmed that it had three lights and was a tin color, but his wife had noticed one other characteristic that he had not.

Wife: "I saw in the *middle*, underneath, that it… either… I think it came out, like, bubbled out a little bit, like right in the very center…" She was unable, she said, to distinguish whether the "bubble" went up or down, i.e., whether it was convex or concave. "But I could see something circular in the middle of it… It kind of looked like, like he said, *tin*. It kind of looked like, you would think it was maybe like *thin kind of metal* because it… you could see the angles of where it was poking out a little bit, like if it was galvanized steel kind of, you know what I mean?"

Then they were past it, and the husband began to say, "Let's turn around." Which they did when they got to Exit 112, three miles north of where they had entered onto I-95. They hit red stop lights, but eventually got back on the highway heading south. Now it was getting dark, not pitch black, but much darker. They drove past where the object had been and could no longer see it there, but there *was* an "object" in the sky now, far away, that was just a white light. And it was stationary. They wondered, even suspected, that it might be the same object they had seen before, but considered perhaps they were now viewing a common plane. But there seemed to be a rotation of white lights going on underneath it.

They could no longer make out the shape of this "object" however. And then suddenly, according to the husband, "…it just took off! Straight across the sky." And when that happened, a big, red light appeared on the bottom of it. And the red light was "bigger. Much bigger than the white lights." The red light was located right where the wife had claimed to see the convex, or concave, bulge.

Husband: "And that's what made me think… at first I'm thinking *Oh, this is a plane landing at the airport now*. But then…"

Wife: "It went faster than…"

Husband: "It did, it went really fast straight across…"

The family then drove up onto the hill at Target's parking lot to watch the thing. It headed south until they lost it going over the horizon, not that it was going down or landing, just continuing on. At one point they thought maybe it was going to land at the airport, but then they realized that the airport was actually behind them now as it was dwindling off into the south.

The husband was apologetic that he hadn't taken a picture. All they had were their cell phones, he explained, but he knew the quality of a cell phone camera, shot from a moving vehicle, would not do the object justice; they would just get a dot of light, and it would probably be blurred.

Husband: "I wasn't about to be wasting my time doing this, because I want to get as much detail as I can see because, otherwise, we're never going to see this again. And it was not just like seeing lights. It was an object, a clear object."

I reminded him that in his initial CMS report, he had estimated the relative size of the object when seen at first, by Exit 109, as being about the size of a golf ball ("actually a little bigger,' he told me), held out at arm's length. So I asked him to estimate the relative size of the object when seen coming back down I-95 in the southbound lane. "About a penny," he said. However, when seen at first, up close, he estimated that the real, actual height of the thing was two stories high, as in a two-story building. The son estimated it at least one-and-a-half stories high, and the mother chimed in that for sure, this wasn't some object about the size of a car or anything. They all agreed it was at least "as big as our house."

When they'd gotten home, the son began recording one of the UFO shows on the TV, just to see if he might find an image that looked just like what they had seen, and overall the family retrieved a number of triangular UFO photos off the internet that matched their experience. The biggest differences between the internet photos and what they had actually seen were that (a) those of the internet were pretty much all highly aloft, overhead, while the one they had seen at Exit 109 was a lot closer down to eye-level, so that they were witnessing it more from the side than from underneath, and (b) they appeared more black in the internet photos, whereas what they had witnessed was gray.

When I asked about the nine-year-old daughter having been frightened (mentioned in the CMS report), she immediately tried to pooh-pooh that away until her dad reminded her that she'd had a little trouble getting her to sleep that night, and they'd had to reassure her that the aliens didn't know who their family is, didn't know their address, and didn't even know if their family had seen them or not.

The wife tried calling the airport a number of times that night, but could only get a recording of their hours. She tried again the next day, off and on, but the phone just kept ringing. Nobody picked up. She tried several times to call over the next week, but finally just gave up.

During the closest part of their encounter at Exit 109, the husband reported that they could hear no sound whatsoever, but reminded me that they were not in a sound-free environment either. With his head stuck out the sun roof, he could hear the wind around his ears, but he believed that he could have heard the noise of a helicopter, if that had been what this thing was. Their radio was not turned on at the time. They experienced no loss of power in the vehicle, not even a flickering of the lights, nor did

they feel any unusual sensations as they might in a magnetic, or static electricity, field. There was no unusual smell. Everything had remained totally normal for them inside the car.

Thoughts on the Case Disposition ("Unknown – UAV"):

There were five witnesses in total. That adds credibility to the sighting, as does the fact that the husband is a mathematics educator who has a Ph D, and the mother is gainfully employed as a postal clerk.

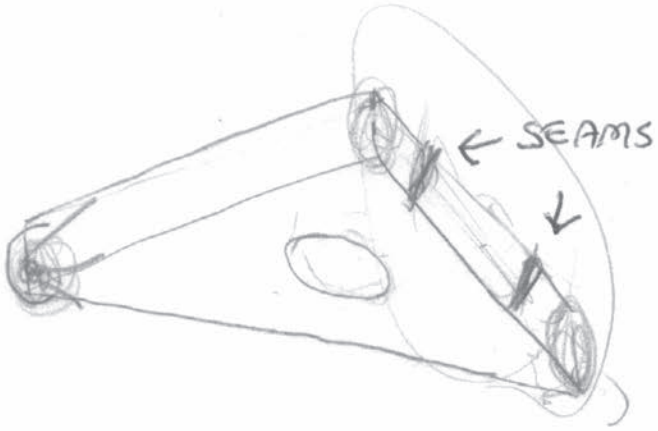
All five witnesses observed this 'object' fairly close up, allegedly 100-150 feet above the trees and the shopping center light poles. They were close enough to judge its relative size as "slightly larger than a golf ball," and close enough to discern two markings that appeared as vertical "seams" on one of the "heights," or sides (see witness drawing, included), close enough to see that it appeared metallic (a tin-gray, or galvanized steel color). They all agreed that it appeared to be a solid object hovering in the air, and not just a solid object but a *huge* one between one-and-a-half and two stories high in depth, as large as their house if not larger. They all agreed that it had three white lights at the three vertexes, lights so bright they actually could not make out the points of the triangles tri-corners. Only the mother, however, noted a convex or concave bulge in the bottom-center of the thing.

The sheer size of the thing alone, along with the fact that it moved as if under intelligent control, is a strong argument for a craft or a vehicle. First it was hovering motionlessly to the left of I-95 as the family drove north from Exit 109. By the time they'd returned to the same area, having travelled the six-mile round trip to Exit 112 and back, it was no longer in that spot. Instead, they subsequently witnessed an "object" far away in the sky, yet still with a relative visual size of a "penny."A penny is obviously greatly larger than a pin-point of light, or a star-like object. Although it was never confirmed that this object was the same triangle seen minutes earlier, the rotating white lights beneath it would correspond directly to the position of the triangle's bright white lights, and the big red light centered below the object and among the rotating white lights also corresponds with the position of the bulbous protrusion or hollow that the wife had reported seeing earlier. I say "moved as if under intelligent control" because it didn't slam down into the earth as a meteorite would have, due to gravity. It wasn't bumping into houses and mountainsides. No, both the triangle and the penny-sized brightly lit object were seen "hovering," and then the latter object was seen streaking off across the night sky, as a craft or vehicle would do.

This family has a nice home and a very good relationship, judging from the sharing, the good humor, and the sense of caring for one another that I was witnessing going on around the table as I sat with them during the hour and twenty minutes. They struck me as sincere, honest , and credible in what they shared with me. The sighting had obviously made a huge impression on all of them, and they related it to me with a sense of excitement and wonder. The fact that they want to remain anonymous tells me they aren't seeking attention, prestige, or financial rewards of any kind due to their making this report. At one point, I listened to the father gently remind the daughter that she really shouldn't be sharing this incident with her friends at school. These struck me as people who would have much more to lose through disclosure than to gain.


TRIANGLE
Exit 109
Augusta, ME, USA
© 2014 Google
Google earth
1991
44°18'50.39" N 69°48'13.04" W elev 325 ft eye alt 10915 ft

DRAWINGS BY THE ADULT MALE WITNESS:



TOO BRIGHT AT THE CORNERS TO TELL IF THE TRIANGLE HAD POINTED ENDS OR ROUNDED...

SUBMIT CHANGES

CASE INFORMATION

Source:	MUFON-CMS
Case Number:	69105
Log Number:	US-08082015-0027

VALLEE RATING AND CATEGORY

Case Type (Vallee Classification): ?	CE1
Category Rating:	1 .
Category Change Notes:	changed Case FB1 to CE1 ... < 100 ft ... triangle ... Belated .

STAR TEAM INFORMATION

Star Team Case:	No
Star Team Manager Comments	Class V-CE-1-1, 08/08/15, 23:53 EDST, nd, [< 100 ft], [triangle], [Belated Case]

CASE ASSIGNMENT

Witness Caution:	No
Witness Caution Comments	
Report Assigned To (Primary Investigator):	Field Investigator — Kreiter, David (UNITED STATES)
Report Assigned To (Secondary Investigator):	Assistant State Director — Trout, Beverly J. (UNITED STATES)
State Director Comments: to the FI assigned	[redacted] ASSIGNED TO DAVE KREITER ON 8-8-15. Assigned TO BEV TROUT AS SECONDARY..... since if

CASE COMPLETION

Investigation Status:	Completed
Report Completed By:	Field Investigator — Kreiter, David (UNITED STATES)
Case Disposition: ? ⇐ Click for a list of **Disposition Definitions**	Unknown - UAV ⇐ This menu will be activated when **Completed** is clicked in the **Investigation Status** menu.
Report Approved By:	Assistant State Director — Trout, Beverly J. (UNITED STATES)

PHOTO ANALYSIS OF REPORT

Photo Disposition:	
Photo Analyst's Notes:	

FOR MUFON USE ONLY

Temperature (Farenheit):	73 F
Wind Direction:	SSE
Wind Speed:	4 Mph Kph
Ceiling:	clear

SUBMITTED BY

Title:	Witness
First Name:	[redacted]
Last Name:	[redacted]
Country:	UNITED STATES
State (USA):	Iowa
County (USA):	Iowa
Street Address:	[redacted]
City:	Marengo
Zip/Postal Code:	[redacted]
Phone - Home:	[redacted]
Phone - Work:	[redacted]
Cellphone:	[redacted]
Email - Primary:	[redacted]
Email - Secondary:	[redacted]
Anonymous:	[redacted]

EVENT

Observed the following:	☑ Light(s) ☑ Object(s) ☐ Orb(s) ☐ Entity ☐ Abduction ☐ Crop Circle ☐ Animal Mutilation ☐ Radar Return
Number Observed:	☐ None ☑ 1 ☐ 2 ☐ 3 ☐ 4-5 ☐ 6-10 ☐ Over 10 ☐ Unknown
Date of Event:	

	June / 4 / 2015 ○ Exact ◉ Approximate Date
Time of Event (Local Time):	22 - 10 PM : 20 America/Chicago (US Central Time) ◉ Exact ○ Approximate Time
Duration of Event:	0 HRS 10 MINS 0 SECS
Country:	UNITED STATES
State (USA):	Iowa
County (USA):	Iowa
City (Nearest):	Marengo
Street Address:	US Hwy 6
Zip/Postal Code:	52301
Latitude/Longitude:	Approx: 41.8001040000 / -92.0693820000 Exact: -1.0000000000 / -1.0000000000

Objects or Lights did the following:

☑ Changed Direction	☑ Hovered	☐ Affected Radio/TV	☐ Fluttered
☐ Turned Abruptly	☐ Descended	☐ Affect Electricity	☐ Spun
☐ Fell Like a Leaf	☐ Ascended	☐ Affected Magnetism	☐ Blinked
☐ Absorbed Object(s)	☑ Over Powerlines	☐ Affected Timepiece	☐ Pulsated
☐ Ejected Object(s)	☐ Over a Building	☐ Affected Engine	☑ Appeared Solid
☐ Changed Shape	☐ Landed on Ground	☐ Affected Vehicle	☐ Had Fuzzy Edges
☐ Cast Shadow	☐ Landed in Water	☐ Affected Animal	☑ Had Outline
☑ Cast Light	☐ Carried Occupants	☐ Affected Human	☐ Wobbled
☐ Reflected Light	☐ Communicated	☐ Affected Water	☐ Vibrated
☐ Left a Trail	☐ Gave off Heat	☐ Affected Ground	☑ Glowed
☐ Disintegrated	☐ Left Residue	☐ Affected Vegetation	☐ Appeared Transparent
☐ Projected a Beam	☐ Removed Anything	☐ Affected Cell Phone	☐ Transformed Reality
☐ Made a Noise	☐ Left Landing Traces	☐ Affected You Physically	☑ Affected You Psychologically
☐ Caused Injury/Death	☐ Unknown	☑ N/A	

Shape of Object(s):

○ Blimp	○ Boomerang	○ Bullet/Missile	○ Cigar
○ Cone	○ Chevron	○ Circle	○ Cross
○ Cylinder	○ Diamond	○ Disc	○ Egg
○ Fireball	○ Flash	○ Oval	○ Saturn-like
○ Sphere	○ Square/Rectangular	○ Star-like	○ Teardrop
◉ Triangle	○ Other	○ Unknown	○ N/A

Surface of Object(s): ☑ Dark ☑ Dull ☐ Reflective ☑ Glowing ☐ Mist/Shroud ☐ Varied ☐ Unknown

Structural Features of Object(s): ☑ None ☐ Dome ☐ Window(s) ☐ Patterned Surface ☐ Insignia ☐ Appendage(s) ☐ Louvres ☐ Wings ☐ Other ☐ Unknown

Apparent Size: ? ☐ Starlike ☐ Aspirin ☐ Penny ☑ Golfball ☐ Basketball ☑ Larger ☐ Unknown

Actual Size: ☐ Under 1 ft ☐ 1-3 ft ☐ 4-10 ft ☑ 11-30 ft ☐ 31-100 ft ☐ 101-300 ft ☐ Over 300 ft ☐ Unknown

Prominent Colors:

White:	Grey/Lead:	Black: Surface	Gold/Copper:	Silver/Chrome:	
Pink/Rose:	Red:	Red-Orange:	Yellow-Orange:	Yellow:	
Green:	Green-White:	Blue-Green:	Blue:	Blue-White: Exterior Lights	
Violet:	Unknown:				

Exterior Light Characteristics: ☐ None ☑ Unwavering ☐ Brightened ☐ Pulsated ☐ Flashed Sequentially ☐ Flashed Randomly ☐ Other ☐ Unknown

Emission: ☑ None ☐ Beam ☐ Flame ☐ Aura ☐ Cloud ☐ Trail ☐ Object ☐ Other ☐ Unknown

Sound: ☑ None ☐ Hum ☐ Buzz ☐ Jetlike ☐ Swish ☐ Whir ☐ Object ☐ Static ☐ Pulsating ☐ Beeping ☐ Rumble ☐ Roar ☐ Other ☐ Unknown

Also in Area: ☑ Airplane ☐ Helicopter ☐ Black Helicopter ☐ Balloon ☐ Searchlight ☐ Other
☑ Before Witness Sighted UFO ☑ During UFO Sighting ☐ After UFO Sighting

Elevation: (if multiple sources or factors, check all that apply) Degrees above horizon when nearest to witness: 15 (0-90)
☐ Various ☐ Other ☐ Unknown

Lowest Altitude: (if multiple sources or factors, check all that apply) ☐ Landed ☐ Treetop ☑ 500 ft or less ☐ Over 500 ft (under cloudcover) ☐ Over 500 ft (no cloudcover) ☐ Unknown

Distance From Witness: ☐ 20 ft or less ☐ 21-100 ft ☑ 101-500 ft ☐ 501 ft - 1 Mile ☑ Over 1 Mile ☐ Unknown ☐ N/A

Flight Path: ☐ Stationary ☑ Hovering then path ☑ Straight-line path ☐ Path with directional change ☐ Path then hovering ☐ Other ☐ Unknown ☐ N/A

Direction First Observed: ☐ N ☐ NE ☐ E ☐ SE ☐ S ☐ SW ☑ W ☐ NW ☐ Unknown

Direction Last Observed: ☐ N ☐ NE ☑ E ☐ SE ☐ S ☐ SW ☐ W ☐ NW ☐ Unknown

Landing - Observation: ☑ No Landing Observed ☐ Aerial Path ☐ Hovering ☐ Descent ☐ Landing ☐ Take Off ☐ Ascent ☐ Unknown

Landing - Site / Material: ☐ None Found ☐ Unaffected ☐ Swirled ☐ Depressed ☐ Uprooted ☐ Discolored ☐ Baked ☐ Burned ☐ Scarred ☐ Broken ☐ Crushed
☐ Footprint(s) ☐ Imprint(s) ☐ Crater ☐ Radiation ☐ Artifact ☐ Other ☑ Unknown

Landing - Soil/Vegetation Samples: ☐ None Found ☐ Exist ☐ Obtained ☐ Tested ☐ Submitted ☑ Unknown

Area/Site:	Farmland
Area/Terrain:	Fields
Area/Technical:	Powerlines
Sky:	Clear

Weather Factors (check all that apply): ☑ None ☐ Windy ☐ Lightning ☐ Fog ☐ Rain ☐ Hail ☐ Sleet ☐ Snow
☐ Heavy ☐ Medium ☐ Light ☐ Unknown ☐ Does Not Apply

Short Description of Event (max 25 words): {nd} 2 witnesses to a 75 ft. Triangular shaped hovering, silent craft, bright lights, for 10 mi

Detailed Description of Event:
(cannot be edited)

I was at a friend's home approx 15 miles away from my home town, Marengo. He was bringing me back to Marengo after watching a movie that evening. (We were 100% sober). We had almost reached Hwy 6, we were traveling north. I noticed an extremely bright, glowing stationary light (blue-ish white) in the western sky. I said, "Is that that bright planet? It seems lower and brighter." He replied that the planet Venus, was further to the right of the bright light, or north, and I saw the planet then. He said, "Well, it has to be a plane then, or a new tower light or something." I knew there were no towers in that area, and we had seen a few planes earlier, since we are near the Cedar Rapids airport. We reached US Hwy 6, stopped at stop sign, and turned left (west) onto Hwy 6 towards Marengo, & towards the object. It's 4 miles to Marengo and our turn into town, going north, at the Ampride Gas Station. As we drove, we rolled down our windows, drove slowly, about 45mph, and never took our eyes off the hovering light. As we neared the object, it stayed stationary, approx 25 ft off the hwy from us, hovering over a cornfield(which had not been planted yet) about 75 feet in the air. The object was triangular in shape, a solid black color, with criss crossing, almost fluorescent looking bar shaped lights all across the bottom of the entire craft, mainly white and bright blue. We were in absolute shock. We had to turn right, off the hwy, to head into town. We instead turned around in the Ampride drive to keep observing it. Just as we did that and were going to go back the way we came to keep watching it, it suddenly started moving slowly east, but steadily. It looked huge, and it was just gone. We started driving into Marengo and I turned to the right, looking east, to see if I could spot it. it was hovering 4 miles away near the highway intersection, exactly where we had turned west onto Hwy 6. It went 4 miles in approximately 2 seconds! We just stated at each other, basically in shock. I have always been a believer, and have had a few incidents in my 50 years of life. But my friend, who is a sports editor, photographer for the [ga], and has been for over 30 years, had never really truly believed in UFOS, aliens, etc.... And he takes his camera with him everywhere, but for some reason, forgot it. He called the [ga] station, they didn't see it but thought it was very cool. We bring it up in conversation frequently, if not daily. We were almost directly under it. I've never seen anything like it in my life...there was no noise, and the speed of it was nothing of this earth. It went

from hovering near the highway with bright lights, noiseless, to hovering again directly east, 4 miles away, in under 2 seconds. We will never forget it. Def a UFO.

Additional Evidence:	☐ Film Photo	☐ Digital Photo	☐ Analog Video	☐ Digital Video	☐ Audio Recording
	☐ Sketch or Drawing	☐ Map	☐ Other		

WITNESSES

Total Number of Witnesses:	2
Witness Release Agreement: (cannot be edited):	
Location:	Grouped
Agreement:	All Witnesses Agree

Witness A - Name:	[redacted] (first name) [redacted] (last name) CLICK TO COPY SUBMITTER NAME AND COUNTRY
Witness A - Country:	UNITED STATES
Witness A - State (USA) or Province (Canada):	Iowa
Witness A - County (USA):	Iowa
Witness A - Street Address:	[redacted]
Witness A - City:	Marengo
Witness A - Zip/Postal Code:	[redacted]
Witness A - Phone - Home:	[redacted]
Witness A - Phone - Work:	[redacted]
Witness A - Cellphone:	[redacted]
Witness A - Email - Primary:	[redacted]
Witness A - Email - Secondary:	[redacted]
Witness A - Anonymous:	[redacted]
Witness A - Birth Date:	[redacted] / [redacted] / 1963
Witness A - Gender:	Female
Witness A - Occupation:	Licensed Professional
Witness A - Educational Level:	College - AA
Witness A - Educational Degree:	Fine Arts
Witness A - Vision:	Good
Witness A - Colorblind:	No
Witness A - Eyeglasses/Contacts:	No
Witness A - Hearing:	Excellent
Witness A - Uses Hearing Aid:	No
Witness A - Health (During Sighting):	Good
Witness A - Health (After Sighting):	Good

Witness B - Name:	[redacted] (first name) [redacted] (last name)
Witness B - Country:	UNITED STATES
Witness B - State (USA) or Province (Canada):	Iowa
Witness B - County (USA):	Iowa
Witness B - Street Address:	[redacted]
Witness B - City:	Williamsburg
Witness B - Zip/Postal Code:	[redacted]
Witness B - Phone - Home:	[redacted]
Witness B - Phone - Work:	[redacted]
Witness B - Cellphone:	[redacted]
Witness B - Email - Primary:	[redacted]
Witness B - Email - Secondary:	[redacted]
Witness B - Anonymous:	[redacted]
Witness B - Birth Date:	[redacted] / [redacted] / 1956
Witness B - Gender:	Male
Witness B - Occupation:	Other
Witness B - Educational Level:	College - BA
Witness B - Educational Degree:	Political Science
Witness B - Vision:	Excellent
Witness B - Colorblind:	No
Witness B - Eyeglasses/Contacts:	No
Witness B - Hearing:	Excellent
Witness B - Uses Hearing Aid:	No
Witness B - Health (During Sighting):	Good
Witness B - Health (After Sighting):	Good

Witness(es): (Education, profession, experience summary)	

FIELD INVESTIGATOR REPORT

Please complete your investigation report here.

You may use the text box to the right or attach an Investigation report in MS Word format below. Please be sure to include all video, photo, audio, sketches or other data gathered from your investigation.

INVESTIGATION LOG: An initial email was sent to both witnesses on 08/09/2015. No reply was received. Because of the importance of the case Chief Investigator Bev Trout called the witness on 8/11/2015, requesting an interview with both witnesses. Investigators Trout and I (Kreiter) met with both witnesses on 08/19/2015 and measurements were taken at the site. Subsequently, a second trip to the site occurred on 08/25/2015 to confirm measurements.

FINAL REPORT DATE: 08/28/2015
FI ID # 16964
CASE # 69105
BGE RESULTS: Total Certainty Index is: 22.18%
LATITUDE/LONGITUDE: (+41.800104, -092.069382)

Mufon Case # 69105

The reporting witness (A) was watching a movie with her friend witness (B) at his home in Williamsburg, Iowa on Thursday June 4th 2015. At around 10:00 p.m., they decided to leave the premises so that he could drive her to her home in Marengo, Iowa just 15 miles away. As they left Williamsburg and proceeded north on county rd. V 77, they were enjoying the view of the starry night sky. Just seven miles ahead County rd. V 77 intersects old highway 6 between Marengo to the west and the Amana colonies to the east. This stretch of highway with rolling hills and numerous farm ponds has been designated a "scenic bypass." This idyllic Iowa country side is sparsely populated lending itself to little light pollution and very dark night-time skies.

About a mile before they reached old highway 6, she noticed an extremely bright bluish-white light in the western sky. She said to her friend, "Is that that bright planet? It seems lower and brighter." Her friend told her that he didn't think so because Venus was further to the right, or north of the light. She then looked and saw what they believed to be the planet Venus to the north. He said, "Well, it has to be a plane then, or a new tower light or something." The Eastern Iowa Airport is located about 20 miles ENE of Marengo, but the object they were looking at was completely stationary and could not have been a plane, and she knew that there were no towers in the area.

They reached highway 6 and turned west toward Marengo which is just 3 to 4 miles in distance. They rolled down their windows and drove slowly never taking their eyes off of the stationary object. As they approached their destination and got closer to the light, they could now see that the source of the light was a very large black triangular object with a crisscross pattern of bluish-white lights. It was so close that witness A instinctively grabbed the door handle because she felt that the object was going to descend right on top of them. Instead of turning off the highway in route to her home, they turned into the Ampride gas station located just north of the highway at the outskirts of Marengo. The object remained stationary over the unplanted corn field just a short distance south of their position. They believed it to be only 25 feet off the highway and about 75 feet in altitude. She described the object as a solid black triangular shaped object with fluorescent looking bar shaped lights in a crisscross pattern. She said, "We were in absolute shock."

As they were watching the object from their car it began to move slowly to the east and then it went four miles east in about two seconds according to the witness. She stated:

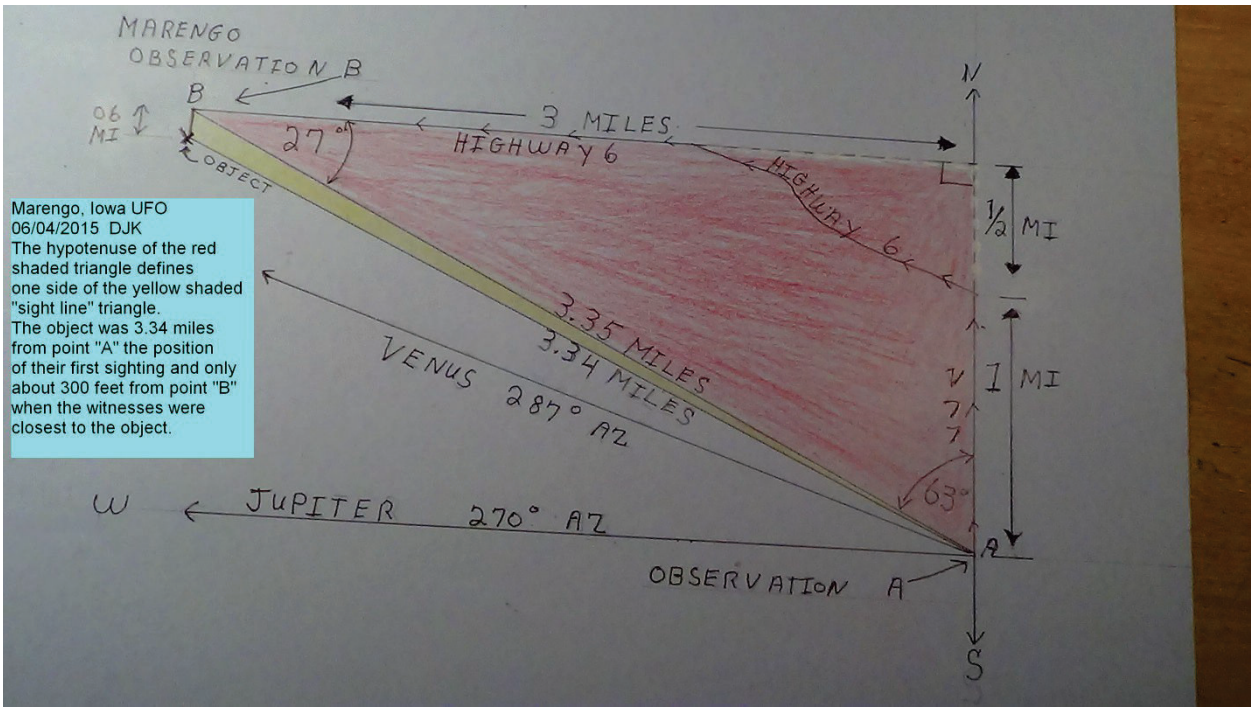
> *It looked huge, and it was just gone. We were almost directly under it. I've never seen anything like it in my life...there was no noise, and the speed of it was nothing of this earth. It went from hovering near the highway with bright lights, noiseless, to hovering again directly east, 4 miles away, in under 2 seconds."*

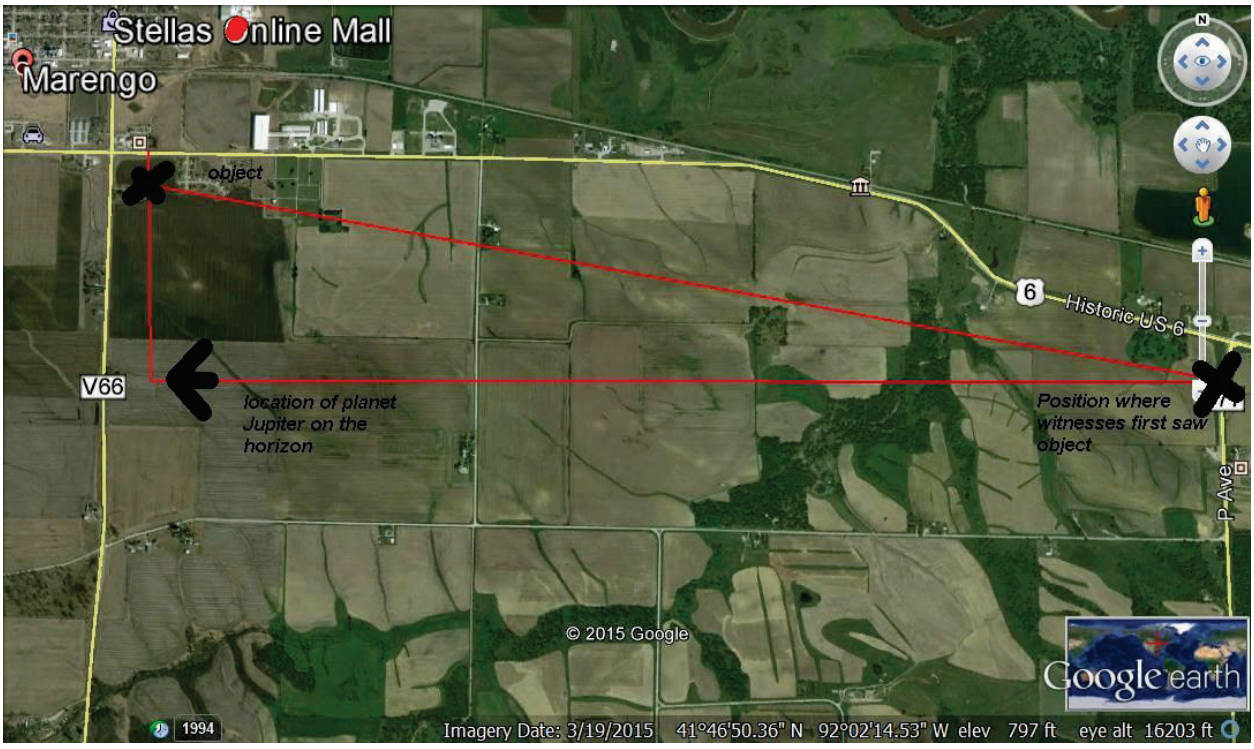
As they drove into Marengo she looked east to see it she could still see it. She wrote , “It was still hovering 4 miles away near the highway intersection exactly where we had turned west onto highway 6.” Shortly after if just disappeared from view.

After witness B returned to his home in Williamsburg, he called the Ampride gas station to find out if anyone at the station had seen the object. The recipient of the call said that as far as he knew no one there saw an object in the sky. The witnesses said that they often talk about the experience and will never forget it.

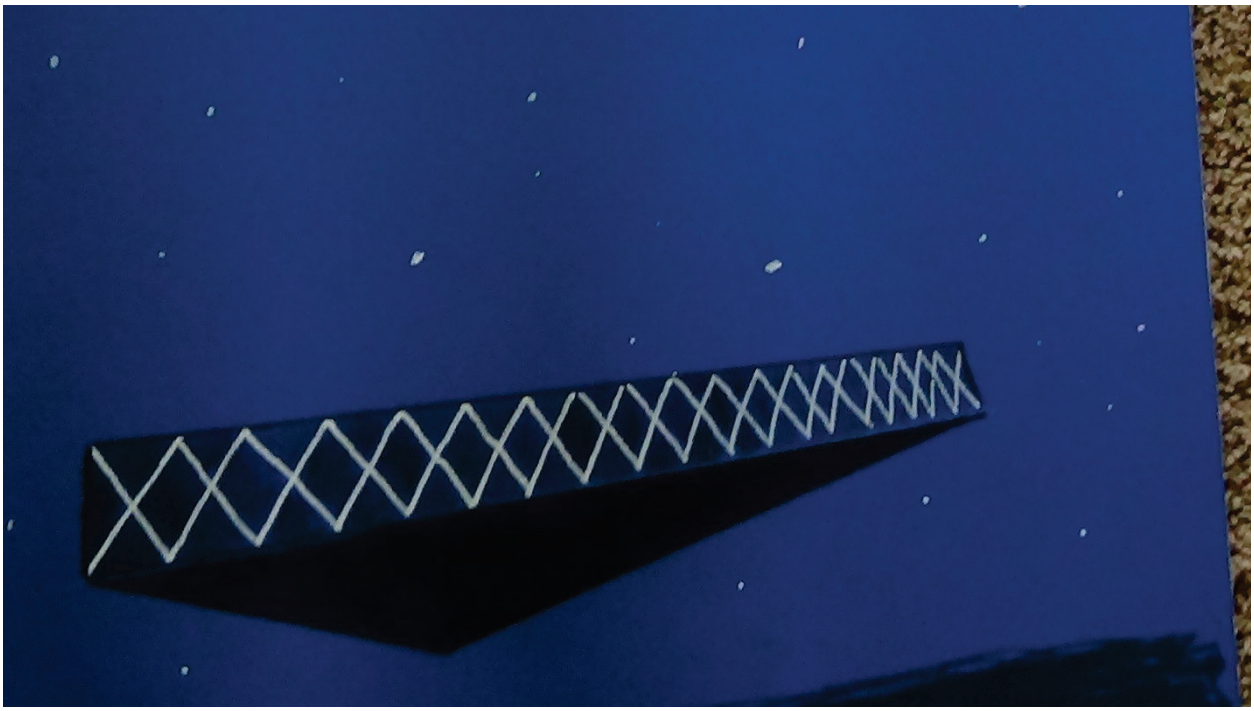
INTERVIEW AND INVESTIGATION:

The interview took place at the Ampride gas station in Marengo, Iowa where the two witnesses parked to watch the object at its closest point. Google maps of the area were presented to the two witnesses during the interview. They were asked to: 1) Mark their location on county rd. V77 where they first saw the unidentified light. 2) Mark the location of the unidentified light in the sky. And 3) Mark the place where they had “passed” the location of the object from an imaginary north/south line. Their location marks showed that when they first saw the light on county rd. V77, the light was just over 3 miles in distance at a heading of 297 degrees azimuth. After turning onto highway 6 and heading west toward the object, they turned into the Ampride gas station at the outskirts of Marengo. Now they were nearly directly north of the object. [See investigator’s drawing]





Witness B described the pattern on the edge of the triangle, which he said was about 10 feet in width, and I asked him to draw a sketch. He then attempted a sketch. Simultaneously I began to draw a sketch from his description and when he looked at my sketch he said, "Yes, that's it exactly." A refined drawing of this object depicts an X configuration of fluorescent-like bluish-white lights that traversed the entire length of the triangle's side. [See investigator's drawing below]



Both witnesses agreed with this configuration of lights. Witness B estimated the size of the triangle to be between 20 and 30 yards on each side, making it about ¼ the size of a football field. Witness B said that the object might have been a bit further from the highway than his initial estimate of 25 feet, but he still believed that the object was only about 75 feet in altitude.

The witnesses were asked to walk to the place near the Ampride gas station where they were closest to the huge triangular object. When asked how high above the horizon the object appeared he stated that it was the height of the power lines that ran along the north side of the highway. Measurements were taken by this investigator with an accurate clinometer showing 15 degrees above the horizon. To satisfy doubts about the accuracy of the measurement a second trip was made to the site by this investigator and a friend on 08/25/2015 to retake the measurements. The measurements were confirmed using two different methods—15 degrees above the horizon!

Of all the estimates provided by the witnesses, the altitude in degrees above the horizon, in my opinion, is the most reliable. Normally, estimates of degrees above the horizon are unintentionally inflated because of the lack of reference points. This certainly was true in this case as both witnesses believed that the object was about 45 to 50 degrees above the horizon. Fortunately, a reference point was available. The witness stated that the object appeared to be at the height of a nearby power line. That was our reference point. Measurements, (degrees above the horizon) of the power line conclusively showed the power line to be at 15 degrees above the horizon from the position of the observing witness. If the witnesses' estimate of the height of the triangular object is accurate, (75 feet) then the land distance would have been 278 feet, and the air distance 288 feet [see investigator's sketch below].

The reporting witnesses were contacted again on 01/11/2016, and 01/27/2016 by Chief Investigator Beverly Trout to clear up some lingering questions we investigators have had concerning the apparent size of the object and the identity of the celestial object the witnesses saw north of the bright light they observed when they were on county road V77. Witness B believed it was Venus, but this would seem impossible because Venus's azimuth was 287 degrees at the time and date of the sighting and Jupiter was even further south with an azimuth of 270 Degrees. The bright object they saw was at azimuth 297 degrees well north of both planets. The search was on to find the mystery planet or star north of the bright unidentified light. A check conducted of the web application Stellarium showed that the star Capella in the constellation Auriga had an azimuth of 329 degrees, a magnitude of .05, and it was low on the horizon. This, we believe was the star they saw north of the unidentified light when viewed from county road V 77.

One piece of data we were lacking from our initial investigation was the apparent size of the object when the witnesses were closest to the object at the Ampride gas station in Marengo. In the most recent contact with witness B on 01/27/2016, he was asked by Chief Investigator Trout to hold up various objects at arm's length to determine the apparent size of the object at its nearest point. He performed this experiment and found that a small dinner plate was the closest approximation. The plate was 6 inches in diameter or 15 centimeters. Using 15 degrees as the arc angle and 288 feet as the air distance I used the *law of sines* to calculate the actual size of the object. Investigator Trout confirmed the results of the calculations. The results were extremely close to the witness' original estimation of size—76 feet!

CONCLUSION: The conclusion reached by chief investigator Trout and I [Investigator Kreiter] is that the witnesses saw a very large, black, triangular object with a bluish-white crisscross pattern on at least one

edge at very close range. We believe, as the witnesses stated, that the object was about 76 feet on each side and about 10 feet thick. We also believe that the witnesses' estimation of the distance and size of the object from their vantage point at the Ampride gas station in Marengo was reasonable according to our distance and angular measurements at two key locations. After creating a scale drawing of the location and a second and third interview with the witnesses, we now believe that the witnesses saw the star Capella north of the bright light (the unidentified light) as viewed from a distance of about 3 miles on county rd. V77. We both feel that the witnesses were very credible and honest about their assessment of what they saw the night of June 4th 2015. The witnesses, who are in their 50s, each have high profile careers in their respective communities and have asked that their identity be protected. We felt that this only added to their credibility as they were taking somewhat of a risk by reporting their sighting. Taking all of the evidence into account we investigators believe that the witnesses saw a very large black triangular object at close range on June 4th 2015.

FORM 30-MUFON FIELD INVESTIGATOR'S REPORT

7-16-2015…Version3-Hoffman/Turner **ANONYMOUS: yes [ ] no [X]**

1) **Synopsis:** [On June 14, 2014, at 12:50 p.m., a man observed and photographed an unknown object during daylight. He then called his roommates to come outdoors and see the object before it flew away to the northeast.]
2) **Background:** [First reported to NUFORC; report read by James Clarkson, Washington SD, who notified Tom Bowden.]
3) **Location:** [The location is a rural area north of the small town of North Plains, OR.]
4) **Describe the object when first seen, at its closest approach, and when last seen. Discuss size and distance if known, direction, elevation, and angular size in each of those instances.** [Object appeared to be disk seen from the side. First seen in the NW, and in the NNW at closest approach, then last seen in the NE. 40 degrees elevation; angular size was about the size of a thumbnail at arm's length.]
5) **Evidence-physical:** [Digital photo attached to the submitted report.]
6) **Evidence-evaluation:** [Photo is authentic; EXIF intact; no sign of manipulation. Witnesses were cooperative and sincere.]
7) **Evidence-disposition:** [ ]
8) **Weather Information:** [(Hillsboro, OR, airport) Temperature: 77 degrees F Wind: variable direction, 5.8 MPH Clear skies, visibility 10 miles.]
9) **Local airport, military base, space launch, MOA:** [Hillsboro, OR, airport]
10) **Trace evidence including Radiation EM Field:** [N/A]
11) **Evaluation of photographs or video evidence:** [Digital photo attached to the submitted report. EXIF intact; no sign of manipulation.]
12) **Related cases (MUFON, API, NUFORC):** [None]
13) **Researched Web Sites [by name and findings]** [ ]
14) **Witness background:** [ ]
15) **Witness interview:** [Two hour interview on July 10, 2015. All witnesses agree on the details and confirm that the object in the photo is what they observed.]
16) **Witness original CMS statement:** [My roommate screamed for me to come out and look, I came of the house first and observed a symmetrical disc or maybe birthday cake shaped object. This object was gleaming metallic and was moving steadily.. I observed for 10~ seconds or so before I determined it was unusual and ran back in the house to call for my other roommates to take a look.. It traveled in a North Eastern direction and I lost it behind some tree's. Before I lost visual I watched it wobble a bit then bank at about a 35 degree angle towards the earth where it dropped altitude slightly and I lost it behind some nearby tree's.

My feeling was it was some kind of drone or unusual aircraft, but it made no noise.. The camera did not pick it up that well but I could see it pretty good and it did not look like anything I had ever seen before.]
17) **Expert statement [if applicable]:** [N/A]
18) **Investigator's summary and conclusion:** Due to lack of sound reported by witnesses, a conventional aircraft, helicopter or blimp may be ruled out. A remote control unmanned aerial vehicle is remotely possible, however there is no known unmanned aerial vehicle that can fly silently and without wings, rotors or other lifting surfaces.

The digital photo that was submitted contains intact EXIF data for the original image, including the following information: Samsung model SCH-I545 (cellular phone camera); Software version I545VRUFNCS; image - 4128 x 2322 pixels (about 9 megapixels); original date 6/14/2015 1:39:30 PM (PDT); modified date 6/24/2015 (reflects the date the file was copied to my computer from MUFON CMS); shutter speed 1/1540; aperture f.2.2; focal length 4.20 mm; flash off (did not fire). The completeness of this information indicates that the photo was not altered prior to submission to MUFON CMS.

Examination of the image leads me to conclude that the object appears to be solid and has a curvature consistent with a disk-shaped object rather than an elongated blimp-shaped object. By maninulating the exposure using computer software, I was able to enhance the detail enough to discern that the dark stripe accross the middle of the object appears to be a row of dark panels, perhaps windows.

Conclusion is that the witnesses observed an unknown structured craft.

SUBMIT CHANGES

CASE INFORMATION

Source:	MUFON-CMS
Case Number:	77860
Log Number:	GB-07232016-0003

VALLEE RATING AND CATEGORY

Case Type (Vallee Classification): ?	CE1 Original Vallee Rating: CE1
Category Rating:	2 . Original Category: 2
Category Change Notes:	.

STAR TEAM INFORMATION

Star Team Case:	No
Star Team Manager Comments	

CASE ASSIGNMENT

Witness Caution:	No
Witness Caution Comments	
Report Assigned To (Primary Investigator):	National Director / Turnbull, Jack (UNITED KINGDOM) zz] = Inactive
Report Assigned To (Secondary Investigator):	------ zz] = Inactive
State Director Comments: to the FI assigned	

CASE COMPLETION

Investigation Status:	Completed
Report Completed By:	National Director / Turnbull, Jack (UNITED KINGDOM) zz] = Inactive
Case Disposition: ? ⇐ Click for a list of **Disposition Definitions**	Unknown - UAV ⇐ This menu will be activated when **Completed** is clicked in the **Investigation Status** menu.
Report Approved By:	------ zz] = Inactive

PHOTO ANALYSIS OF REPORT

Photo Disposition:	
Photo Analyst's Notes:	

FOR MUFON USE ONLY

Temperature:	° F ≈ ° C
Wind Direction:	
Wind Speed:	Rate = Mph<->Kph
Ceiling:	**Fog, Low, Medium, High, or Clear** Ceiling notes:

SUBMITTED BY

Title:	Witness zz] = Inactive
First Name:	Peter
Last Name:	[redacted]
Submitter 18 or older?:	Yes
Parent or Guardian (if under 18 years old):	First Name / Last Name
Country:	UNITED KINGDOM
Street Address:	[redacted]
City:	Milton Keynes
Zip/Postal Code:	[redacted]
Phone - Home:	[redacted]
Phone - Work:	
Cellphone:	
Email - Primary:	[redacted]
Email - Secondary:	
Anonymous:	Yes

EVENT

Observed the following:	☐ Light(s) ☑ Object(s) ☐ Orb(s) ☐ Entity ☐ Abduction ☐ Crop Circle ☐ Animal Mutilation ☐ Radar Return

Number Observed:	None ☑ 1 ☐ 2 ☐ 3 ☐ 4-5 ☐ 6-10 ☐ Over 10 ☐ Unknown
Date of Event:	July / 20 / 2016 ◉ Exact ○ Approximate Date
Time of Event (Local Time):	15 - 3 PM : 20 Europe/London ○ Exact ◉ Approximate Time
Duration of Event:	HOUR HRS MIN MINS SEC SECS Reset Duration
Country:	UNITED KINGDOM
City (Nearest):	Flitwick
Street Address:	M1 Motorway
Zip/Postal Code:	0
Latitude/Longitude:	Approx: -1.0000000000 / -1.0000000000 Exact: -1.0000000000 / -1.0000000000

Objects or Lights did the following:

☑ Changed Direction	☐ Hovered	☐ Affected Radio/TV	☐ Fluttered
☑ Turned Abruptly	☑ Descended	☐ Affect Electricity	☐ Spun
☐ Fell Like a Leaf	☐ Ascended	☐ Affected Magnetism	☐ Blinked
☐ Absorbed Object(s)	☑ Over Powerlines	☐ Affected Timepiece	☐ Pulsated
☐ Ejected Object(s)	☐ Over a Building	☐ Affected Engine	☐ Appeared Solid
☐ Changed Shape	☐ Landed on Ground	☐ Affected Vehicle	☐ Had Fuzzy Edges
☐ Cast Shadow	☐ Landed in Water	☐ Affected Animal	☑ Had Outline
☐ Cast Light	☐ Carried Occupants	☐ Affected Human	☐ Wobbled
☐ Reflected Light	☐ Communicated	☐ Affected Water	☐ Vibrated
☐ Left a Trail	☐ Gave off Heat	☐ Affected Ground	☐ Glowed
☐ Disintegrated	☐ Left Residue	☐ Affected Vegetation	☐ Appeared Transparent
☐ Projected a Beam	☐ Removed Anything	☐ Affected Cell Phone	☐ Transformed Reality
☐ Made a Noise	☐ Left Landing Traces	☐ Affected You Physically	☐ Affected You Psychologically
☐ Caused Injury/Death	☐ Unknown	☐ N/A	

Shape of Object(s):

○ Blimp	○ Boomerang	○ Bullet/Missile	○ Cigar
○ Cone	○ Chevron	○ Circle	○ Cross
○ Cylinder	○ Diamond	○ Disc	○ Dumbbell
○ Egg	○ Fireball	○ Flash	○ Oval
○ Saturn-like	◉ Sphere	○ Square/Rectangular	○ Star-like
○ Teardrop	○ Triangle	○ Other	○ Unknown
○ N/A			

Surface of Object(s):	☐ Dark ☐ Dull ☑ Reflective ☐ Glowing ☐ Mist/Shroud ☐ Varied ☐ Unknown
Structural Features of Object(s):	☐ None ☐ Dome ☐ Window(s) ☐ Patterned Surface ☐ Insignia ☐ Appendage(s) ☐ Louvres ☐ Wings ☐ Other ☑ Unknown
Apparent Size: ?	☐ Starlike ☐ Aspirin ☐ Penny ☐ Golfball ☐ Basketball ☑ Larger ☐ Unknown
Actual Size:	☐ Under 1 ft ☐ 1-3 ft ☑ 4-10 ft ☐ 11-30 ft ☐ 31-100 ft ☐ 101-300 ft ☐ Over 300 ft ☐ Unknown
Prominent Colors:	White: Surface Grey/Lead: Black: Gold/Copper: Silver/Chrome: Pink/Rose: Red: Red-Orange: Yellow-Orange: Yellow: Exterior Lights Green: Green-White: Blue-Green: Blue: Blue-White: Violet: Unknown:
Exterior Light Characteristics:	☐ None ☑ Unwavering ☐ Brightened ☐ Pulsated ☐ Flashed Sequentially ☐ Flashed Randomly ☐ Other ☐ Unknown
Emission:	☑ None ☐ Beam ☐ Flame ☐ Aura ☐ Cloud ☐ Trail ☐ Object ☐ Other ☐ Unknown
Sound:	☑ None ☐ Hum ☐ Buzz ☐ Jetlike ☐ Swish ☐ Whir ☐ Object ☐ Static ☐ Pulsating ☐ Beeping ☐ Rumble ☐ Roar ☐ Other ☐ Unknown
Also in Area:	☐ Airplane ☐ Helicopter ☐ Black Helicopter ☐ Balloon ☐ Searchlight ☐ Other ☐ Before Witness Sighted UFO ☐ During UFO Sighting ☐ After UFO Sighting
Elevation: (if multiple sources or factors, check all that apply)	Degrees above horizon when nearest to witness: (0-90) ☑ Various ☐ Other ☐ Unknown
Lowest Altitude: (if multiple sources or factors, check all that apply)	☐ Landed ☑ Treetop ☐ 500 ft or less ☐ Over 500 ft (under cloudcover) ☐ Over 500 ft (no cloudcover) ☐ Unknown
Distance From Witness:	☐ 20 ft or less ☐ 21-100 ft ☑ 101-500 ft ☐ 501 ft - 1 Mile ☐ Over 1 Mile ☐ Unknown ☐ N/A
Flight Path:	☐ Stationary ☐ Hovering then path ☐ Straight-line path ☑ Path with directional change ☐ Path then hovering ☐ Other ☐ Unknown ☐ N/A
Direction First Observed:	☐ N ☐ NE ☐ E ☐ SE ☐ S ☐ SW ☐ W ☑ NW ☐ Unknown
Direction Last Observed:	☐ N ☑ NE ☐ E ☐ SE ☐ S ☐ SW ☐ W ☐ NW ☐ Unknown
Landing - Observation:	☑ No Landing Observed ☐ Aerial Path ☐ Hovering ☐ Descent ☐ Landing ☐ Take Off ☐ Ascent ☐ Unknown
Landing - Site / Material:	☐ None Found ☐ Unaffected ☐ Swirled ☐ Depressed ☐ Uprooted ☐ Discolored ☐ Baked ☐ Burned ☐ Scarred ☐ Broken ☐ Crushed ☐ Footprint(s) ☐ Imprint(s) ☐ Crater ☐ Radiation ☐ Artifact ☐ Other ☑ Unknown
Landing - Soil/Vegetation Samples:	☐ None Found ☐ Exist ☐ Obtained ☐ Tested ☐ Submitted ☑ Unknown
Area/Site:	
Area/Terrain:	
Area/Technical:	
Sky:	
Weather Factors (check all that apply):	☐ None ☐ Windy ☐ Lightning ☐ Fog ☐ Rain ☐ Hail ☐ Sleet ☐ Snow ☐ Heavy ☐ Medium ☐ Light ☐ Unknown ☐ Does Not Apply
Short Description of Event (max 25 words):	Daylight object in sky travelling west then dived, it then came towards me and I could see a

Detailed Description of Event:
(cannot be edited)

The sighting took place on Wednesday 20th July 2016 above the M1 motorway North of London UK, on a straight section of road (From 510 58' 54.27'' North to 510 59' 26.97'' West) at 15:20 BST (14:20 GMT) approximately. Weather conditions were bright sunshine with a few scattered cumulus clouds. I was returning home after a days work travelling North as I do every weekday. After passing through junction 12 on the M1 I continued on in light traffic. When the road curved around to the section I mention above I noticed what I thought was a light aircraft, although I could not make out any details it just seemed to be a white dot against the blue sky to left of the motorway high above and to the north of the trees. I was struck by the speed of the object that made me think it must be a high performance aircraft, which further tweaked my interest as I am a pilot and professional engineer in the aerospace industry. I was startled when it pitched down into a dive at 45 degrees. My first reaction was that it was going to do some aerobatic manoeuvres and felt I wanted to see this and find out what type of aircraft it was. As I watched it descend I was looking for wings and a tail but could see none. It descended to just above the motorway and then appeared to be flying just above the motorway traffic approaching in my direction. As it approached I realised it was circular and thought it must be a helicopter but could not see any rotors or other structures. When it passed the electricity pylon nearest to me on the right hand side of the road I could see it was a shiny silvery white sphere about 2 metres or 7 feet in diameter. It also had a yellow circular light at its centre. It then seemed to veer off towards the right hand side of the road descending and the last time I saw it it went behind the trees about 150 to 200 metres ahead on the right. I attach some slides I have made using images from Google Earth and Street View to show the location, path lengths and my position on the motorway. The last slide I constructed to show what the object looked like. The duration of the sighting was about fifteen seconds. The wind direction was from the south west, in other words at right angles to the motorway and the path the object followed. I said to myself afterwards What was that? I was shocked.

Additional Evidence:	☐ Film Photo	☐ Digital Photo	☐ Analog Video	☐ Digital Video	☐ Audio Recording
	☐ Sketch or Drawing	☐ Map	☑ Other	Power Point slides of map	

WITNESSES

Total Number of Witnesses:	1
Witness Release Agreement: (cannot be edited):	
Location:	
Agreement:	
Witness A - Name:	Peter (first name) [redacted] (last name) CLICK TO COPY SUBMITTER NAME AND COUNTRY
Witness A - Country:	UNITED KINGDOM
Witness A - State (USA) or Province (Canada):	
Witness A - Street Address:	[redacted]
Witness A - City:	Milton Keynes
Witness A - Zip/Postal Code:	[redacted]
Witness A - Phone - Home:	[redacted]
Witness A - Phone - Work:	
Witness A - Cellphone:	
Witness A - Email - Primary:	[redacted]
Witness A - Email - Secondary:	
Witness A - Anonymous:	
Witness A - Birth Date:	[redacted] / [redacted] / 1953
Witness A - Gender:	Male
Witness A - Occupation:	Engineer
Witness A - Educational Level:	College - BS
Witness A - Educational Degree:	Physics
Witness A - Vision:	Good
Witness A - Colorblind:	No
Witness A - Eyeglasses/Contacts:	Yes
Witness A - Hearing:	Excellent
Witness A - Uses Hearing Aid:	No
Witness A - Health (During Sighting):	Excellent
Witness A - Health (After Sighting):	Excellent
Witness(es): (Education, profession, experience summary)	Degree in Physics 1974 Leeds University, Research assistant Cosmic Ray Physics 1974 to 1976. Aerospace and Defence industry since, Fellow of the Institution of Engineering and Technology U.K., Private Pilot. I have worked on both side of the Atlantic for major defence contractos and government agencies.

FIELD INVESTIGATOR REPORT

Please complete your investigation report here.
You may use the text box to the right or attach an Investigation report in MS Word format below. Please be sure to include all video, photo, audio, sketches or other data gathered from your investigation.

this is an email sent to MUFON headquarters, please update the report as requested. Thank you. Linda Flechtner 18809

Dear Ms. Klimova,

I recently filed a sighting report (77860) relating to the 20th July 2016 near Flitwick in the UK. I have discovered two minor errors I made in the filing and would appreciate it if MUFON could correct them to improve the quality of my report if permitted please, these are;

1. The co-ordinates I gave for the section of the M1 motorway seem to have been corrupted in transferring from the word document I wrote them in to the filed report. They should have read (From 510 58' 54.27'' North, 000 31' 39.06'' West to 510 59' 26.97'' North, 000 32' 04.89'' West). Also the latitude and longitude are given in degrees, arc minutes and arc seconds the latter two of which are replaced on your online presentation as ??????, could

MULTIMEDIA ATTACHMENTS BY SUBMITTER

Submitter Media Release Agreement:	Agrees
File 1:	Object.pptx

FILE ATTACHMENTS TO INVESTIGATION REPORT

File 1: Word Doc Report, Digital photos of site, etc.	Choose File No file chosen
File 2: Word Doc Report, Digital photos of site, etc.	Choose File No file chosen
File 3: Word Doc Report, Digital photos of site, etc.	Choose File No file chosen
File 4: Word Doc Report, Digital photos of site, etc.	Choose File No file chosen
File 5: Word Doc Report, Digital photos of site, etc.	Choose File No file chosen

[ADD MORE ATTACHMENTS]

SUBMIT CHANGES

ORIGINAL REPORT FROM WITNESS

Degree in Physics 1974 Leeds University, Research assistant Cosmic Ray Physics 1974 to 1976. Aerospace and Defence industry since, Fellow of the Institution of Engineering and Technology U.K., Private Pilot. I have worked on both side of the Atlantic for major defence contractors and government agencies.

The sighting took place on Wednesday 20th July 2016 above the M1 motorway North of London UK, on a straight section of road (From 510 58' 54.27'' North to 510 59' 26.97'' West) at 15:20 BST (14:20 GMT) approximately. Weather conditions were bright sunshine with a few scattered cumulus clouds. I was returning home after a days work travelling North as I do every weekday. After passing through junction 12 on the M1 I continued on in light traffic. When the road curved around to the section I mention above I noticed what I thought was a light aircraft, although I could not make out any details it just seemed to be a white dot against the blue sky to left of the motorway high above and to the north of the trees. I was struck by the speed of the object that made me think it must be a high performance aircraft, which further tweaked my interest as I am a pilot and professional engineer in the aerospace industry. I was startled when it pitched down into a dive at 45 degrees. My first reaction was that it was going to do some aerobatic manoeuvres and felt I wanted to see this and find out what type of aircraft it was. As I watched it descend I was looking for wings and a tail but could see none. It descended to just above the motorway and then appeared to be flying just above the motorway traffic approaching in my direction. As it approached I realised it was circular and thought it must be a helicopter but could not see any rotors or other structures. When it passed the electricity pylon nearest to me on the right hand side of the road I could see it was a shiny silvery white sphere about 2 metres or 7 feet in diameter. It also had a yellow circular light at its centre. It then seemed to veer off towards the right hand side of the road descending and the last time I saw it it went behind the trees about 150 to 200 metres ahead on the right. I attach some slides I have made using images from Google Earth and Street View to show the location, path lengths and my position on the motorway. The last slide I constructed to show what the object looked like. The duration of the sighting was about fifteen seconds. The wind direction was from the south west, in other words at right angles to the motorway and the path the object followed. I said to myself afterwards What was that? I was shocked.

CORRECTIONS SUBMITTED BY WITNESS TO HIS ORIGINAL REPORT

I recently filed a sighting report (77860) relating to the 20th July 2016 near Flitwick in the UK. I have discovered two minor errors I made in the filing and would appreciate it if MUFON could correct them to improve the quality of my report if permitted please, these are;

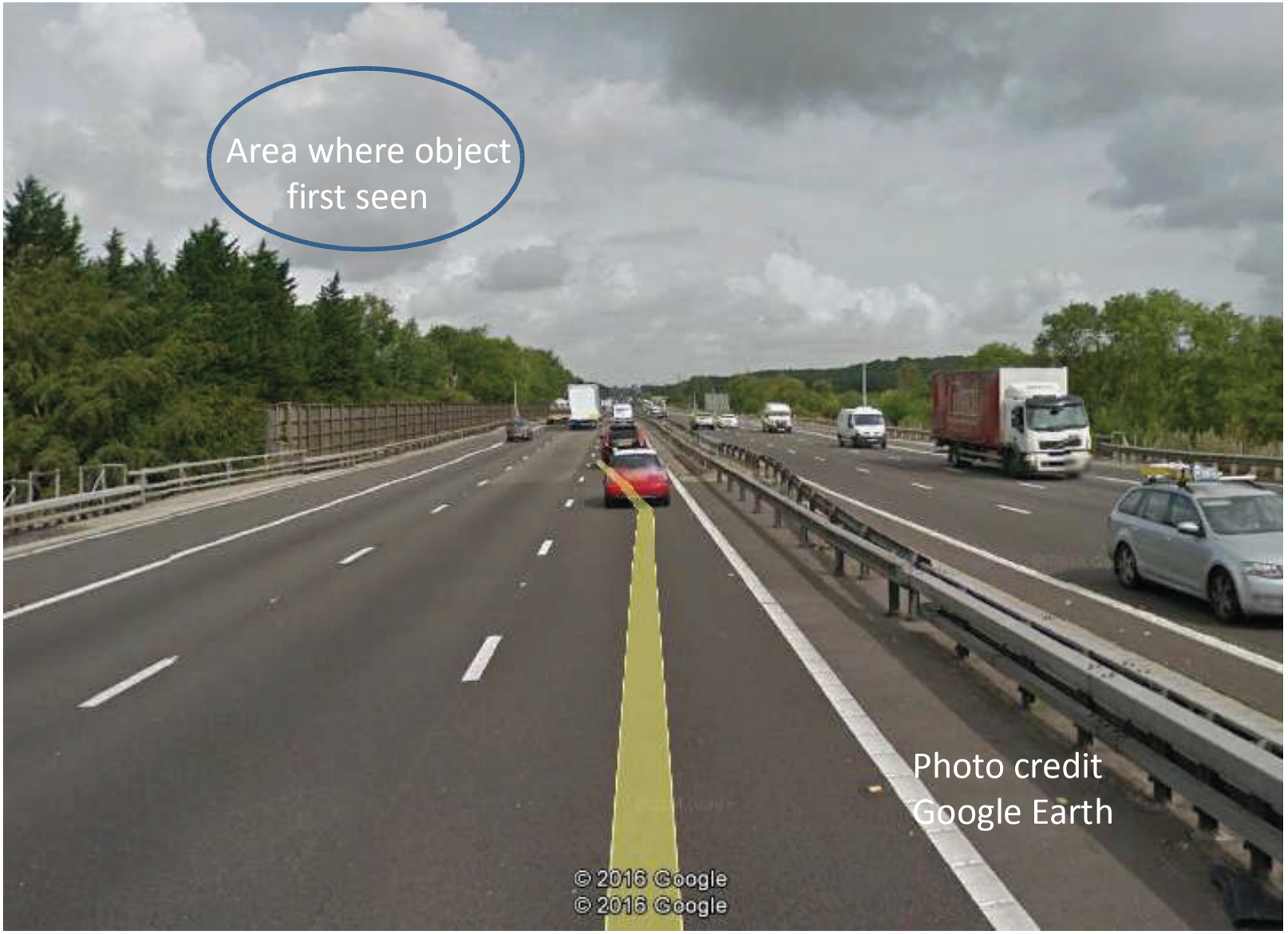
1. The co-ordinates I gave for the section of the M1 motorway seem to have been corrupted in transferring from the word document I wrote them in to the filed report. They should have read (From 510 58' 54.27'' North, 000 31' 39.06'' West to 510 59' 26.97'' North, 000 32' 04.89'' West). Also the latitude and longitude are given in degrees, arc minutes and arc seconds the latter two of which are replaced on your online presentation as ??????, could these ? please be removed and replaced by my original numbers as above as they are technically correct.
2. I made a mistake in the short title that is required, I said in that the object was moving to the West when I first saw it. It was in fact moving to the East as shown in slide one of my Power Point slides I attached to the sighting report.

Kindest regards

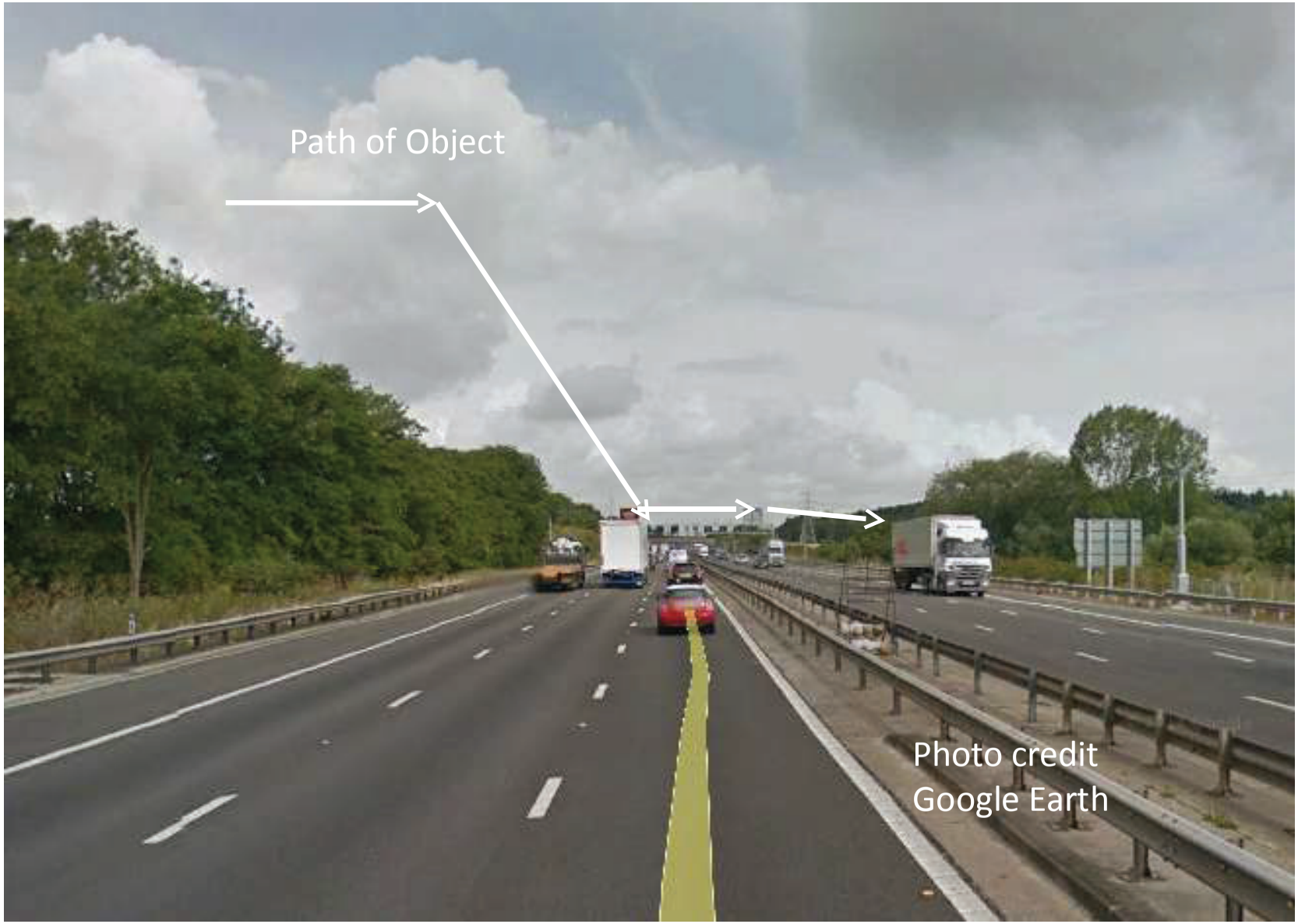
Peter [redacted]

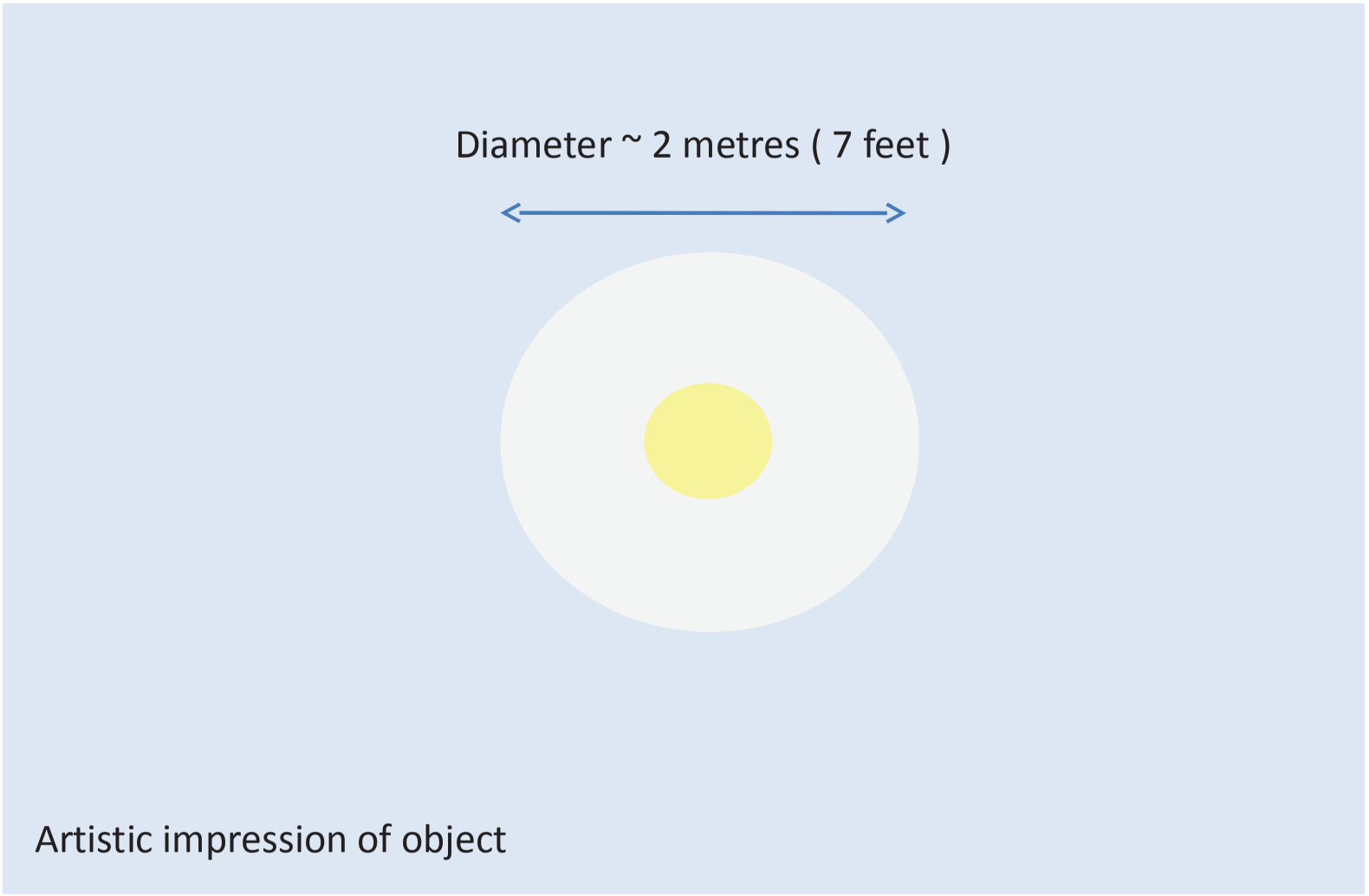
B.Sc. C.Eng. F.I.E.T.


Path of object
Wind Direction
Path of my car
Photo credit
Google Earth
Steppingley
Eversholt Rd
Steppingley Rd
Flitwick
Dunstable Rd
Eversholt
A5120
M1
Tingrith
Park Rd


Area where object first seen
Photo credit Google Earth
© 2016 Google
© 2016 Google


Area where object last seen
Photo credit Google Earth


Path of Object
Photo credit
Google Earth



Artistic impression of object

Category 1-Investigation Report Form 30 Short

FINAL REPORT DATE:
01/13/2017

FIELD INVESTIGATOR:
W. Wayne Walker

CASE #:
79471

LONGITUDE/LATITUDE:
Latitude: 46.282842°
Longitude: -119.198721°
Altitude: 1259.84 Feet (501.97 meters) msl
Datum = WGS84

INVESTIGATION LOG:

Date	Time	Method of Contact	Activity
10/17/2016	12:32	e-Mail	Received MUFON Sighting Report FI Assignment (79471) Accepted Case and began investigation.
10/17/2016	16:48	e-Mail	Received Reporting Party (RP) interview results, witness drawings, photos, and FI notes from James Clarkson.
10/17/2016	17:52	N/A	Created Google Earth Sighting Location Maps
10/17/2016	17:52	N/A	Created VFR Aviation Charts (Seattle Sectional) Sighting Location Maps with key locations annotated.
10/17/2016	17:52	N/A	Created IFR Aviation Charts (IFR Enroute Low) Sighting Location Maps with key locations annotated.
10/20/2016	15:04	e-Mail	Sent e-Mail to reporting Party requesting an additional interview.
10/20/2016	18:25	Phone	Conducted a phone interview with RP. Length of interview was 00:59:28.
10/21/2016	09:00	N/A	Transcribed recording of interview with RP (Witness #1).
10/21/2016	17:03	N/A	Created estimated flightpath(s) maps in ExpertGPS Pro Case based on interview with RP.
10/21/2016	11:29	N/A	Created an enhanced composite (panoramic) image of witness view of object based on RP interview.
10/22/2016	09:00	N/A	Gathered information about the Pasco (Tri-Cities) airport (KPSC). The sighting location is within the Class D Airspace around the airport. In one case, the object could have been within a few hundred yards of the departure end of Runway 30.
10/23/2016	11:00	N/A	Gathered weather, Sun Angle, and Moon Angle data at time of sighting.
10/24/2016	15:19	N/A	Created an enhanced composite (panoramic) image of witness view, annotated with a composite image of object based on 4 witness drawings.
10/24/2016	17:30	N/A	Calculated bearings, altitude and distance of object from witness description and landmarks in composite photo for Bearings of 68.27° True (Azimuth = 6.4°) and 0.9°True (Azimuth = 5.05°)
10/26/2016	10:51	N/A	Determined distance between object when last seen and the departure end of Runway 30 at KPSC.
10/26/2016	12:25	N/A	Searched for similar cases. Found 4 to scrutinize.
10/27/2016	09:00	N/A	Continued the “Ruling Out” process, for Weather, Natural Events, etc.

10/28/2016	09:00	e-Mail	Sent request for an interview with 2nd witness and requested review of enhanced and annotated composite (panoramic) image by RP.
10/28/2016	09:00	N/A	Gathered additional aeronautical information.
10/28/2016	12:45	Phone	Talked with RP. He reviewed and commented on annotated composite image. He is leaving on vacation in a few hours and will contact me to arrange a site-visit and interview with Witness #2.
11/26/2016	12:42	e-Mail	RP has returned from vacation and wants to set up an interview with Witness #2.
11/28/2016	09:20	e-Mail	Set up interview with Witness #2 for 11/30/2016 @ 11:00 PST at their home (the sighting location).
11/30/2016	11:00	Face to Face	Interviewed Witnesses #2, #3, & #4. Inspected the sighting location. Total duration of visit = 4.5 hours.
12/04/2016	09:00	N/A	Transcribed recording of interview with Witness #2.
12/05/2016	11:00	N/A	Transcribed recording of interview with Witnesses #3 & #4.
12/15/2016	9:04 PM	e-mail	Received Preliminary Analysis - Pasco Radar - Sep 27, 2016 from William Puckett/James Clarkson
01/13/2017	13:30	N/A	Completed evaluation(s) and report.
02/02/2017	11:40	N/A	Corrected error in Longitude/Latitude Coordinates

SYNOPSIS:

On 09/27/2016 at exactly 20:05 PDT, four people witnessed (from their patio) a large single craft moving silently, at a very low altitude from North to East (left to right) of their location. It then began to move away to the Northeast of their location. An attempt was made to follow the object in their car, but they could not locate it after they left their driveway.

OBJECT DESCRIPTION:

The object presented an oval profile with three evenly spaced circular red lights that went on and off sequentially from left to right. The object was a dark color against a dark sky and was barely visible except for the red lights.

WITNESS INTERVIEWS/STATEMENTS:

Witness #1 (the RP) was interviewed by telephone on 10/20/2016 beginning at 18:25 PDT. The duration of the interview was 00:59:30. He estimated the object to be about 1-mile away, 1300-feet long, the altitude to be approximately 300 feet AGL and the speed to be 1 to 2 mph. In order to access his ability to estimate speed distance and altitude, I asked him; “How high are the planes you frequently see landing at the Pasco Airport?” His response was about 1000 feet (AGL). {FI NOTE: Traffic Pattern Altitude for KPSC is 1,000 ft. AGL for propeller driven aircraft and 1,500 ft. AGL for turbine driven aircraft (Jets and turbo-props).} He described an oval object with three red lights that did not project a beam. In a protracted discussion about the concept of “UFOs” he related that he had experienced sightings previously (none reported to MUFON). The three sightings were: In 1979 in Montana, in 2012 in Bagdad, Iraq and in 2015 at his home in Pasco. None of these previous sightings were similar to the sighting being investigated. He feels that he has a sort of sixth sense that allows him to have UFO experiences. He supplied the FI with a sketch of what he saw. See the file *Witness #1 Sketch #1.jpg*.

Witness #2 (the wife of the RP) was interviewed face-to-face on 11/30/2016 beginning at 11:25 PST. The duration of the interview was 01:06:46. The physical descriptions of the craft were pretty much identical to her husband's narrative, but she related a lot more information about the emotional aspects of the sighting. The singular difference (between her and the other witnesses) as far as a physical description of the craft was that she felt that there was a dome shape on the top of the oval. See the file *Witness #2 Sketch #2.jpg*. Most of her testimony was about how the experience affected her, in regard to believing in UFOs as being extraterrestrial. The experience took her from being a non-believer to a believer. She felt like the craft was only about 400-feet long, but she estimated it to be much closer than witness #1's estimate. She estimated it to be about 500-feet away. She felt that it was moving about 5 mph. She related that Witness #1 frequently "sky watches" after dark and has frequently called her (and others) to come and look at an anomaly that no one else observes. When she and the other two witnesses were called out to the patio this time, she was shocked to see this huge craft hovering above them. She insists that the size and behavior of this craft indicated that it wasn't of this earth, a position that she has never taken before.

Witness #3 and Witness #4 (the Granddaughter and Boyfriend respectively) were interviewed face-to-face on 11/30/2016 beginning at 13:33 PST. They were interviewed together. The duration of the interview was 00:48:21. Their narrative was essentially the same as the previous two witnesses. See the files *Witness #3 Sketch #3.jpg* and *Witness #4 Sketch #4.jpg*. They estimated the altitude as 120-feet and the speed as about 25 mph. They estimated the distance to be about 500-feet. They also expressed that Witness #1 was would frequently call them out to see something he had spotted in the sky, that they could not see (or verify). This practice had made them feel that he wasn't actually seeing anything and wondered why he spent the time "sky watching". They now have a completely different attitude about Witness #1's activities and intend to join him in the future in hopes of a repeat sighting.

NATURAL PHENOMENON OR MAN MADE:

The Following items were RULED OUT:

Natural Celestial Events - (Stars, Planets, Comets, etc.) [Ruled Out] – The Sun and Moon were ruled out because they were both below the horizon at the time of the sighting. Even though the Double Star Capella should have been visible, it in no way correlates with the movements and behaviors in the witness accounts. From witness interview and analysis of the data from Heavens Above, Stellarium, Moon+ and Star Walk 2.

Any Satellite - [Ruled Out] - There were several satellites in view during the sighting period, and in the direction of the sighting. None of these satellites correlate with the movements and behaviors in the witness accounts.

Rocket Launch and Re-entry - [Ruled Out] Nature of object did not lend itself to a rocket launch. Plus, there were no acknowledged rocket launches at the time of the sighting. Although the COSMOS 2196 Satellite was due to reenter the Earth's atmosphere on 09/27/2016, it was predicted to be between 18:30Z or (± 2 hrs.) That would be between 10:30 AM PDT and 12:30 PM PDT. Data from: Aerospace.org, NASA and SpaceflightNow.com

Birds - [Ruled Out] – There is a well documented history of flocks of migratory birds being misidentified as a solid object such as this photo taken in Ireland:

While no bird flyway information was readily available for the sighting area, it is (ecologically) similar to the Pasco Tri-Cities Airport (KPSC) which is only 4.5 miles away. Information found in Pasco Tri-Cities Airport Master Plan Update May 2012: by Mead & Hunt, Inc. 201 NE Park Plaza Drive, Suite 167 Vancouver, WA 98684 (360) 883-0047 www.meadhunt.com Chapter 6. Environmental Review – "The [study area] can be characterized as developed and disturbed, and poses very little to no viable ecological habitat. The Airport is not considered a migratory bird flyway, and does not provide migratory bird habitat." Therefore: It is not likely that the sighting was a flock of migratory birds misidentified as a solid object. Additionally, even if it were a flock of birds appearing to be a solid object, that does not account for the 3 bright red lights seen by all three witnesses.

Iridium Flare - [Ruled Out]. There were no Iridium flares visible during the sighting period. Data from: Heavens Above, Stellarium, and Star Walk 2.

Private release of Chinese (Sky) Lanterns - [Ruled Out] The witness testimony eliminates the possibility of a Chinese (Sky) Lantern.

Weather Balloons - [Ruled Out]. Prevalent wind speed and direction at the time of the sighting was; "winds out of the NW at 3.5 mph". This would fit with the initial sighting if it was some type of lighter-than-air object (weather balloon, hobby balloon etc.), but is ruled out by the two direction changes that the witnesses observed. Winds aloft have not been determined.

Thermal Inversions - [Ruled Out] Temperature at 17:00Z 10:00 AM PDT was 20°C (68°F). The temperature at the time of the sighting was 17°C (62.6°F), this does not yield conditions that would contribute to inversion related optical effects at ground level. (See weather report and METAR.) The dry adiabatic lapse rate: the rate of temperature decrease is 9.8 °C/km (5.38 °F per 1,000 ft), (3.0 °C/1,000 ft). If the object was at the highest calculated minimum altitude of 1,795 ft. AGL , the temperature at altitude would be 11.615°C (52.9°F) yielding only a 10 °F

difference between ground level and altitude. (See “Analysis of Photo Geometry” below), From: Weather Underground and FAA.

Meteor Shower(s) - [Ruled Out] Although there were three meteor showers in view during the sighting period, and in the direction of the sighting they were at the end of their active period, plus they in no way correlate with the movements and behaviors in the witness accounts. From: Heavens Above, Stellarium and Star Walk 2

RC Toy Airplane with LED's - [See Drone]

Ball Lightning - [Ruled Out] Not typical behavior and conditions. See weather report and METAR (Weather Underground and FAA)

Conventional Aircraft - [Ruled Out] Note: There was no ATC in the KPSC airport tower during the sighting. The properties and behavior of the object as described by all four witnesses was not that of any conventional aircraft. (i.e. Huge size, altitude lower than allowed by FAA, low altitude, walking speed, non-conventional navigation lights and absolutely no engine or other propulsion noise. Radar data was obtained through a Freedom of Information Act (FOIA) request. The "uncorrelated primary returns” (aircraft not transmitting transponder data) did not compare with the witness accounts in any way (speed, time, or location) such that any of them would indicate that what the witnesses saw had corresponding evidence from radar.

Unconventional Aircraft - [Ruled Out] There are no Military Training Routes (MTRs) or Special Military Activity Routes (SMARs). Data Source: FAA Sectional and Enroute (Low Altitude) charts.

Drone - [Ruled Out] Internet research determined: Hobby and commercial drones are very popular in the Pasco area. There are many sites in the general area of the sighting that would seem to be ideal for hobbyist to launce drones. However, if one assumes the drone would be operated within the FAA regulations (The Small UAS Rule) that went into effect on August 29, 2016, it is unlikely to be an area where drones would be operated. Due to the proximity to the airport the drones would have to weigh less than 250-grams (0.55 lbs.) total and remain in sight of the pilot controlling it. Larger commercial drones (weighing up to 55 lbs.) would have to have a NOTAM issued through the FAA. Therefore: Even though a drone cannot positively be ruled out, it is so unlikely that a drone meeting the sighting profile for the object, the probability is so low it is considered “Ruled Out”. From: FAA B4UFLY & UAV Zones (iPhone Apps), FAA Seattle Sectional chart, SkyVector.com, Google Earth, and ExpertGPS Pro.

WEATHER INFORMATION:

Temperature: 62.6°F (17°C)
Heat Index: 62°F
Dew Point: 56.6°F (12°C)
Humidity: Relative Humidity was 72%
Pressure: Barometric Pressure was 29.96 in Hg
Visibility: 10.0 mi
Wind Direction: Out of NW
Wind Speed: 3.5 mph

Gust Speed: N/A
Precipitation: None
Weather Events: None
Weather Conditions: Clear Skies

LOCATION:

Inside the city limits of Pasco, WA. Pasco is a city in and the county seat of Franklin County, Washington, United States. Pasco is one of three cities that make up the Tri-Cities region of the state of Washington. The Tri-Cities is a mid-sized metropolitan area of approximately 279,116 (a 2015 estimate). Pasco's population is 70,560 as of the April 1, 2016 Washington State Population estimate.

EVIDENCE/INVESTIGATION:

There was no physical evidence discovered in this investigation.

WITNESS CREDIBILITY:

All four of the witnesses interviewed were highly credible. Witness #1 (the Reporting Party(RP)) was especially credible due to his professional history: 30-yrs as a Law Enforcement Officer, he was Former Police Chief of [redacted] WA, worked as a WA State Fraud Investigator and also worked In Iraq for the U.S. State Department. He was very articulate and open about discussing the event. There were 4 witnesses total: the RP, his wife, grand daughter and her boyfriend. The RP's wife works as a Customer Service Representative for a medical facility and was very open to the questions and discussion. The Granddaughter and her boyfriend (interviewed together) are both students and part-time workers.
Ballester-Guasp Report Evaluation Result: Information Quality 100%; Reliability 66.5%; Strangeness 28.57%; Certainty 19%.

CORRELATING CASES:

Case Number 76687 (Kennewick, WA)
Date of the Sighting 2016-05-29 22:35
Short Description: Oval like ship, flying from N to W, spinning while heading down slowly.

Case Number 73724 (Clarkson, WA)
Date of the Sighting 2016-01-02 15:50
Short Description: Cigar shaped reflective, no wings,no tail, approx.1,000 feet above the terrain. NO contrails .Temp approx 30 Disappears suddenly

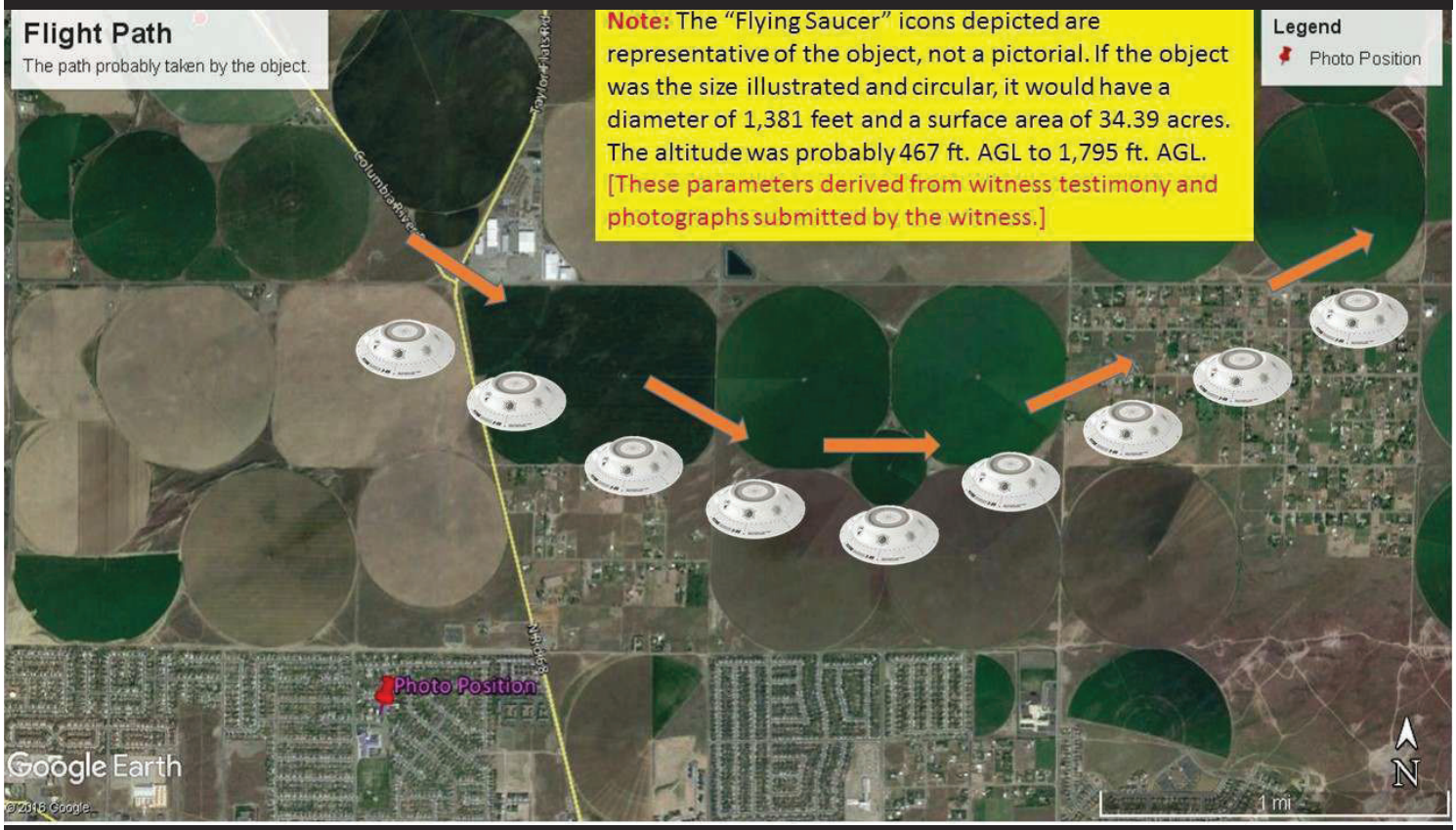
Case Number 58219 (Pasco, WA)
Date of the Sighting 2014-02-02 08:00
Short Description: 3 orange glowing circles evenly spaced apart then fade out.

From: CMS, NUFORC, Latest UFO sightings, UFOs Northwest, and UFO Stalker.

CONCLUSIONS:

While this case has some very interesting elements, and the witnesses are of a very high quality, each with a narrative that supports the others, there is no physical evidence that supports an identification of what they saw. All four witnesses were of the belief that what they saw was some sort of vehicle or craft. With all of the natural and man-made objects ruled out, this case has to be closed as an "Unknown UAV".


Case #79471 Sighting Location
Google Earth
1996
Imagery Date: 4/18/2015 lat 46.. lon -119..
elev 507 ft eye alt 27954 ft


Flight Path
The path probably taken by the object.
Note: The "Flying Saucer" icons depicted are representative of the object, not a pictorial. If the object was the size illustrated and circular, it would have a diameter of 1,381 feet and a surface area of 34.39 acres. The altitude was probably 467 ft. AGL to 1,795 ft. AGL. [These parameters derived from witness testimony and photographs submitted by the witness.]
Legend
Photo Position
Photo Position
Google Earth
© 2016 Google
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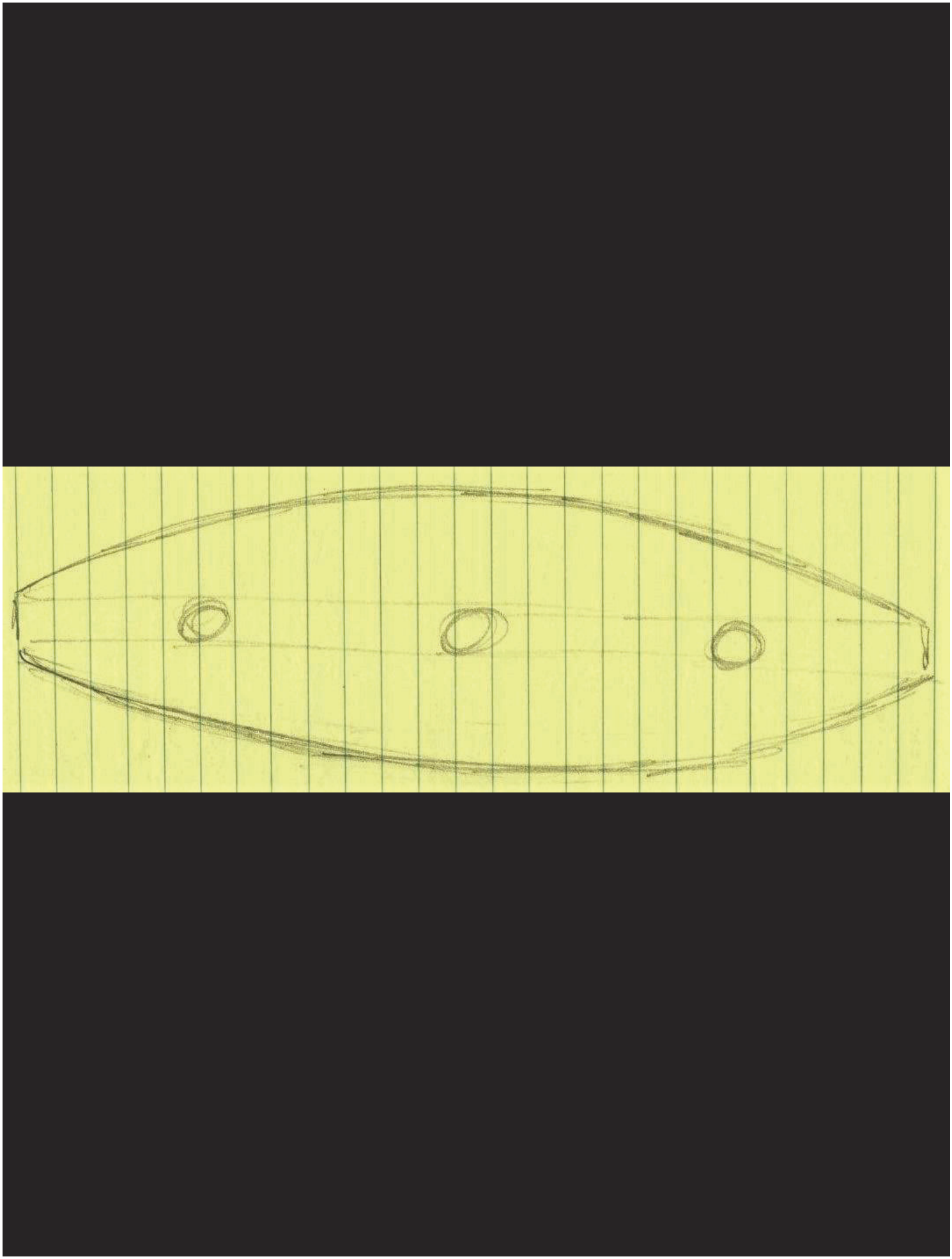
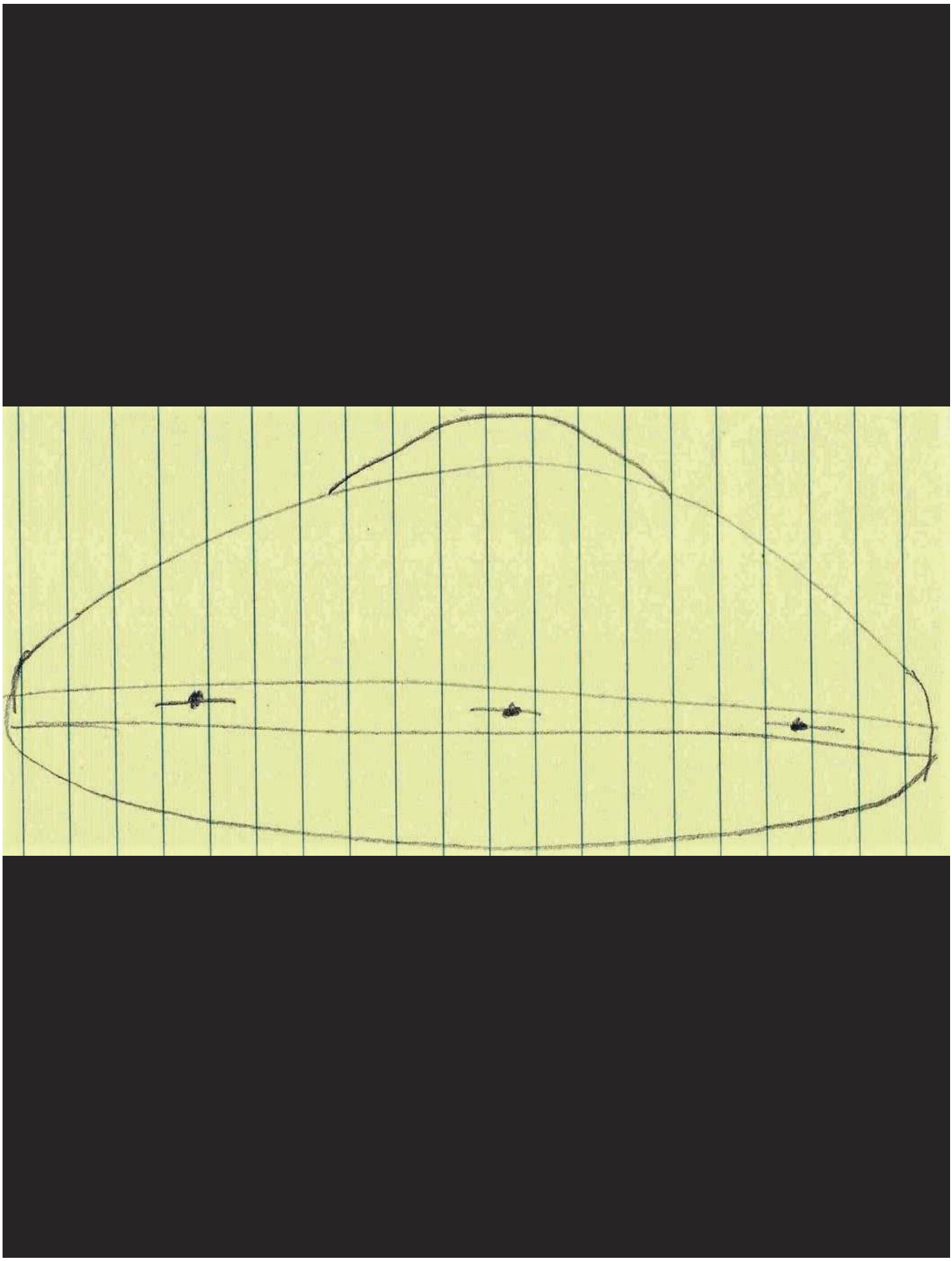
[redacted]

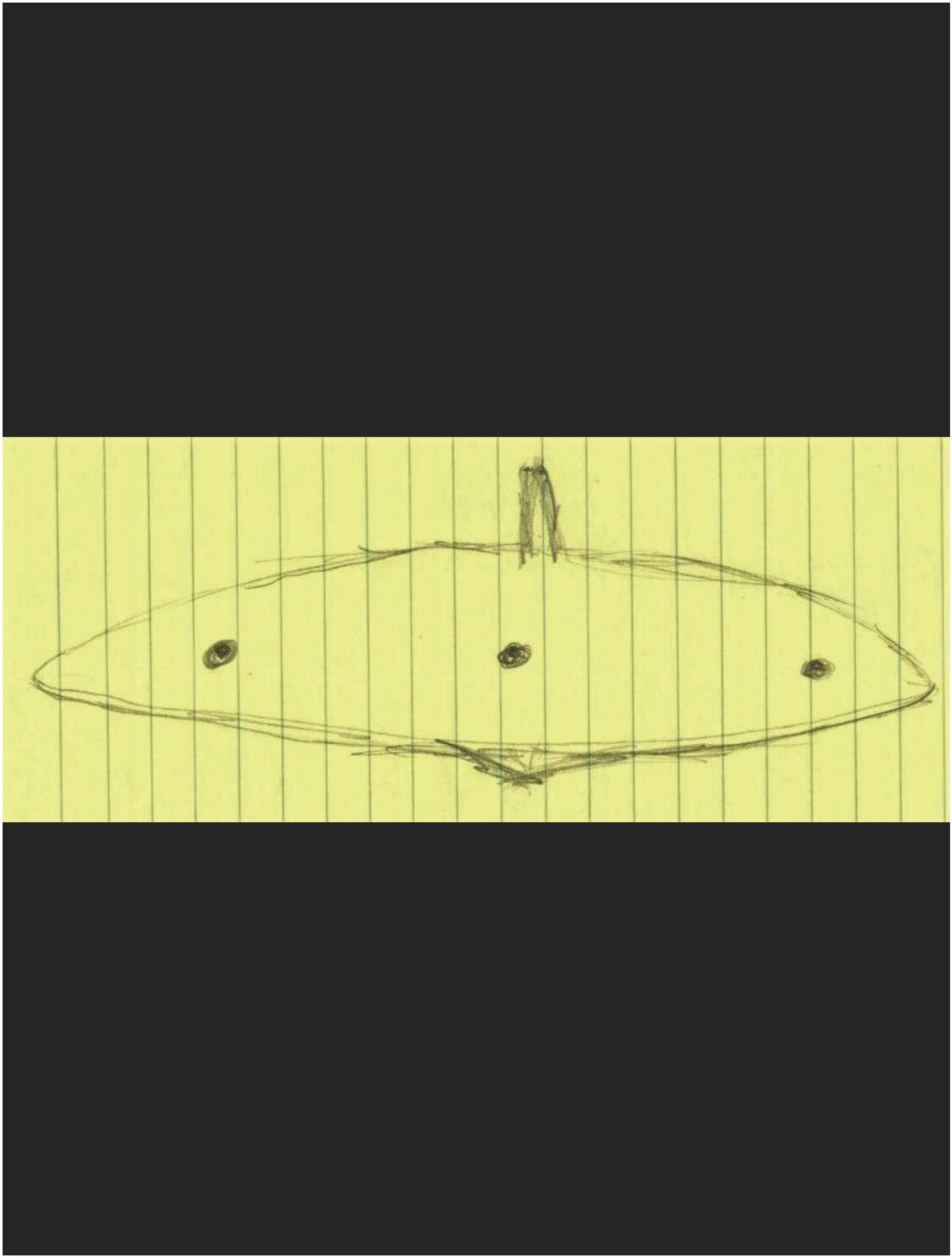
When the object was first sighted, it was traveling ESE then it moved closer and turned E at a walking pace (or slower). The object was about 1- 2 miles away. It passed behind the trees and streetlamp. It continued E then turned slightly to the NNE headed toward the NW corner of the Pasco Airport. Its flightpath was level and formed a rough U shape.

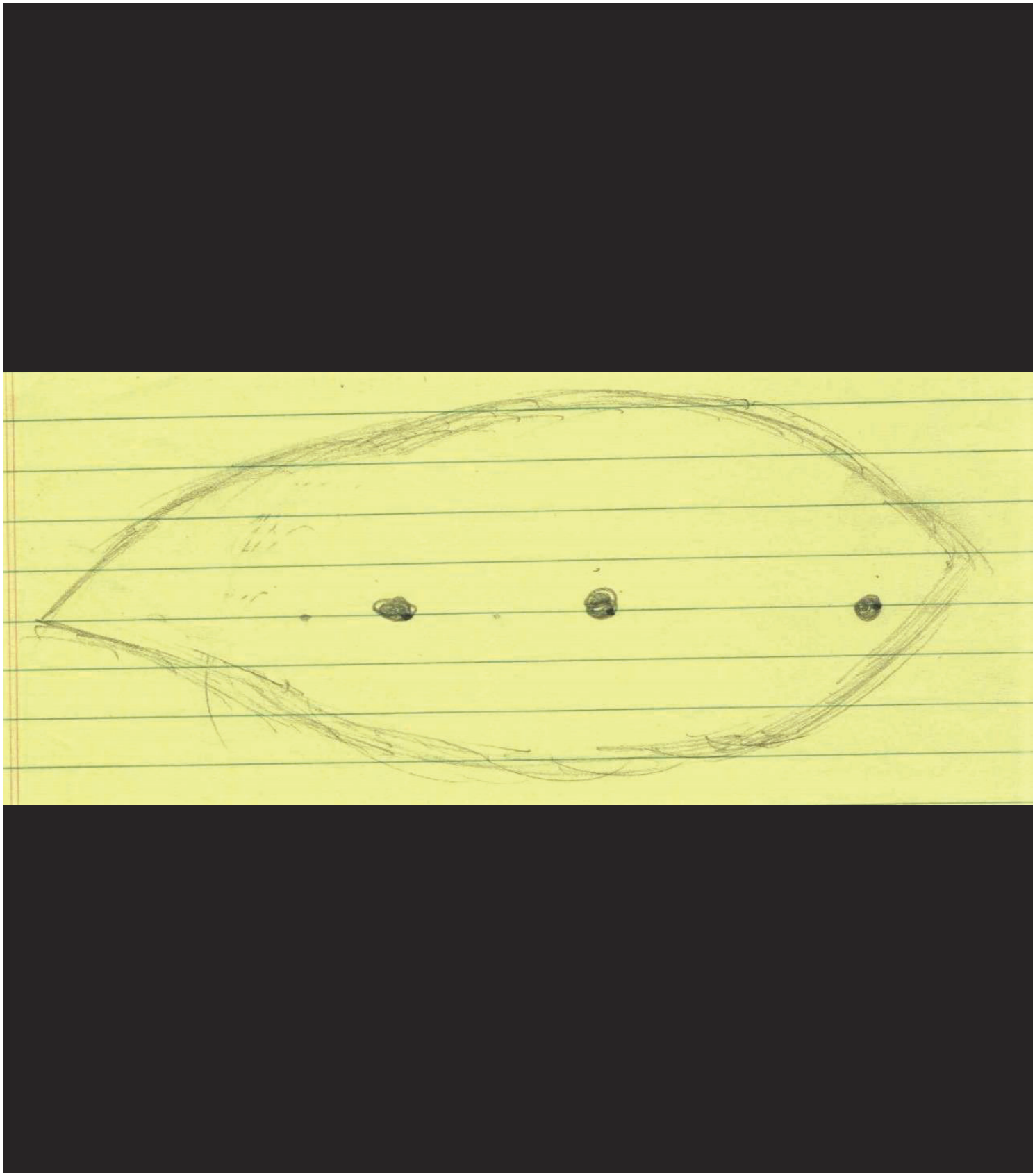
This depiction is based an a post-interview discussion with the witness. The photos presented here were taken in daylight whereas the sighting occurred at night. The three orange-red lights were blinking in a sequence that continually repeated. Either the craft kept the same face toward the witness or it rotated in such a manner that three lights were always visible.

[redacted]









INVESTIGATION LOG: 12/16/2016 - 12/21/2016

The sighting was officially assigned to the FI by e-mail at 9:09 AM on 15 Dec. 2016. It was accepted by the FI by e-mail at 10:49 pm 14 Dec. 2016..

The initial attempt to contact the witness was telephone at 8:24 PM Thur. 15 Dec 2016 . There was no answer and a message was left

The second attempt was at. 5:16 PM Sat. 17 Dec. 2016. The telephone was answered by the first 2 witnesses and the interview ensued

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FINAL REPORT DATE: 12/21/2016
Field Investigator ID #: 13110
CASE#: 80933
BGE Results: Total Certainty Index is 19.14%"
LONGITUDE/LATITUDE: (+29.6888, -82.3497)

SYNOPSIS

While driving home from dinner, the primary witness (the driver), the secondary witness (the primary witness's wife), ad their 2 children saw what was described as a huge triangular shape hovering over a residential area on the side of the road. The triangle was described as having 3 large white lights and a red light they assumed to be at the back of the triangle. The witnesses turned into the area to get a better look. Soon after entering the area, the triangle tipped some and zoomed up into the sky and out of sight.

OBJECT DESCRIPTION:

The object was describes as a large triangular shape with 3 white lights at the corners of the triangle and a single red light assumed to be at the rear of the triangle.

POSSIBLE NATURAL PHENOMENON OR MAN MADE:

1. Secret Terrestrial Vehicle: It would be possible to build a large triangle with the capability of silently hovering. It would also be possible to make it fly at great speeds. However, due to Newtonian mechanics, it would be impossible for any terrestrial object (or pilot) to withstand the reactive force from the implied acceleration. This possibility is therefore discarded..

1. Projected Image: Since this would be a non-material object, it would not have the problem discussed above. It will be discussed in the EVIDENCE/INVESTIGATION section.

NET SOURCES:

LOCATION: http://www.latlon.net.
SUN & MOON: http://aa.usno.navy.mil/data/index.php

WEATHER: http://www.wunderground.com/history/
CLOUD BASE: http://www.csgnetwork.com/cloudaltcalc.html
MAP: https://www.google.com/maps

WEATHER

Time (EDT)	7:53 PM	8:53 PM	
Temp.	69.1 °F	66.0 °F	
Heat Index	-	-	
Dew Point	59.0 °F	59.0 °F	
Humidity	70 %	78 %	
Pressure	30.21 in	30.20 in	
Visibility	10.0 mi	10.0 mi	
Wind Dir	E	Calm	
Wind Speed	4.6 mph	Calm	
Gust Speed	-	-	
Precip	N/A	N/A	
Events	-	-	
Conditions	Overcast	Partly Cloudy	
Cloud Base	2736.57 ft	2047.68 ft	@ 150 ft alt

LOCATION:

NW 20 Terrace Gainesville Florida
Latitude = 29.6888, Longitude = -82.3497
Lat = 29 degrees, 41.3 minutes North
Long = 82 degrees, 21.0 minutes West

SUN & MOON:

Friday, November 11, 2016 EST

Sun

Sunset	5:33 p.m.
End civil twilight	5:57 p.m.

Moon

Moonrise	3:38 p.m.
Moon transit	9:55 p.m.

WITNESS INTERVIEWS/STATEMENTS:

The interview was by telephone. This portion of the investigation lasted almost 2 hours. Although there were 4 witnesses 2 were very young children and were not interviewed. The primary witness (PW) is the initiator of the report and was the driver of the automobile. The secondary witness (SW) is the wife of the primary witness and was sitting in the front passenger seat. The SW was the first to see the triangle. The primary and secondary witnesses were interviewed separately. Each witness was asked to draw what they say. There was also a short interview with the SW when the FI picked up the sketches.

The following outlines the results of the interviews.

The time of the sighting was approximately 8:30 PM. The family had gone out to dinner and was returning home when the sighting occurred. At the time of the sighting they were driving in a Westerly direction on NW 39th Avenue (the black arrow on Map.jpg). The PW was concentrating o driving and did not immediately see the triangle. The initial sighting by the SW was through the front window of the automobile .(It would be approximately located in the black circle on Map.jpg.) At the time of the sighting the PW they would be just east of NW 20th Terrace.

Upon hearing of the sighting, the PW immediately turned north into the first road available. At the time of the interview he wasn't sure if that road was NW 20th Terrace or NW 21st ST. He did remember there was a large canopy of of tree branches overhead. (The FI later chose NW 20th Terrace due to the larger tree canopy over that road. It is shown on Map.jpg as a red dashed oblong.) Although partially cover by foliage, the both witnesses had a good view (the PW through the front window and the SW through the side window) of the triangle after stopping in the side road. It was stated the object seemed to be moving very slowly but it was not certain.

The object was described as having a matte type finish and being "blacker than the sky". Both witnesses stated it had 3 white lights at the corners of the triangle. The PW said these lights seemed to wrap around the sides but all 3 could be seen from the witnesses location. The triangle also had a red light in the middle of one of the sides (the witnesses assumed this was in the rear of the triangle). The white lights were constant and the red light was flashing (one witness described it as a strobe). Interestingly the red light was stated to be on the top and the bottom but not around the side. There will be some more discussion of the triangles at the end of this section.

The FI mentioned that the altitude quoted in the report was over 500 feet and asked if it could be narrowed a little. The PW said it was no more that 1000 feet

When questioned about the sides, it was stated they seemed to be beveled. They also were described as consisting of 3 indented tiers. The sides were described as having a height that was approximately 10% of their length. When the PW was asked how far apart would his fingers be to cover the length of one side at arms length he replied they couldn't be covered by fingers, it would take the distance from elbow to hand to cover the length (FI note: It is assumed this is approximately 1 foot.)

After watching for a few seconds, it was seen the triangle rotated some. At this point the PW jumped out of the car to get a better look. It was stated that just as he got out the triangle zoomed up in the sky and out of sight. When questioned about how much time this took, it was stated it was less than a second. (FI comment: Although it is accepted the time was very short, it is believed that this was may be an overstatement due to excitement.)

As with all multi-witness sightings, there are things gotten from one of the witnesses that were not noted by the others. In this case, while discussing what she saw, the SW stated to the FI that light seemed to go around the object. When asked what she meant by that, she stated, it was dark and the triangle was black but the edges of the triangle seemed to be cut out from the sky but the sky also seemed to be there. The FI asked if she was referring to an effect such as seen in the Predator movies. (FI comment: It is admitted that the above was a leading question.) The SW immediately said yes that is what she was trying to say.

As can be seen in the drawings (Witness 1.jpg is by the PW and Witness 2,jpg is by the SW) the object is not a simple triangle. There is a piece cut out of the back. Also both drawings show the red light (in the indented side) to actually be 2 lights. Interestingly the SW's drawing also shows 3 additional objects along the top. When the FI asked if they were windows, she said no, they were whitish lights (her words).

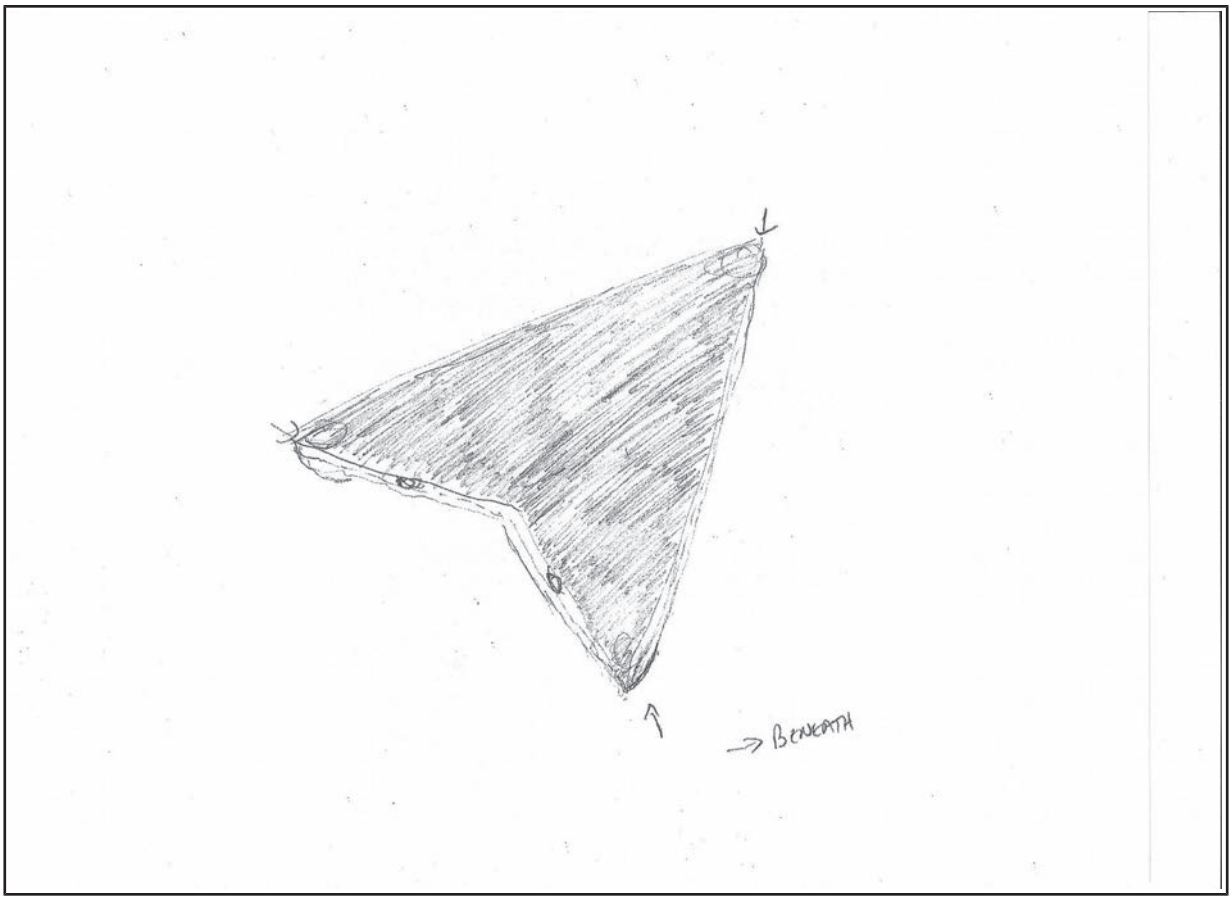


Figure 1.1 Witness One Drawing

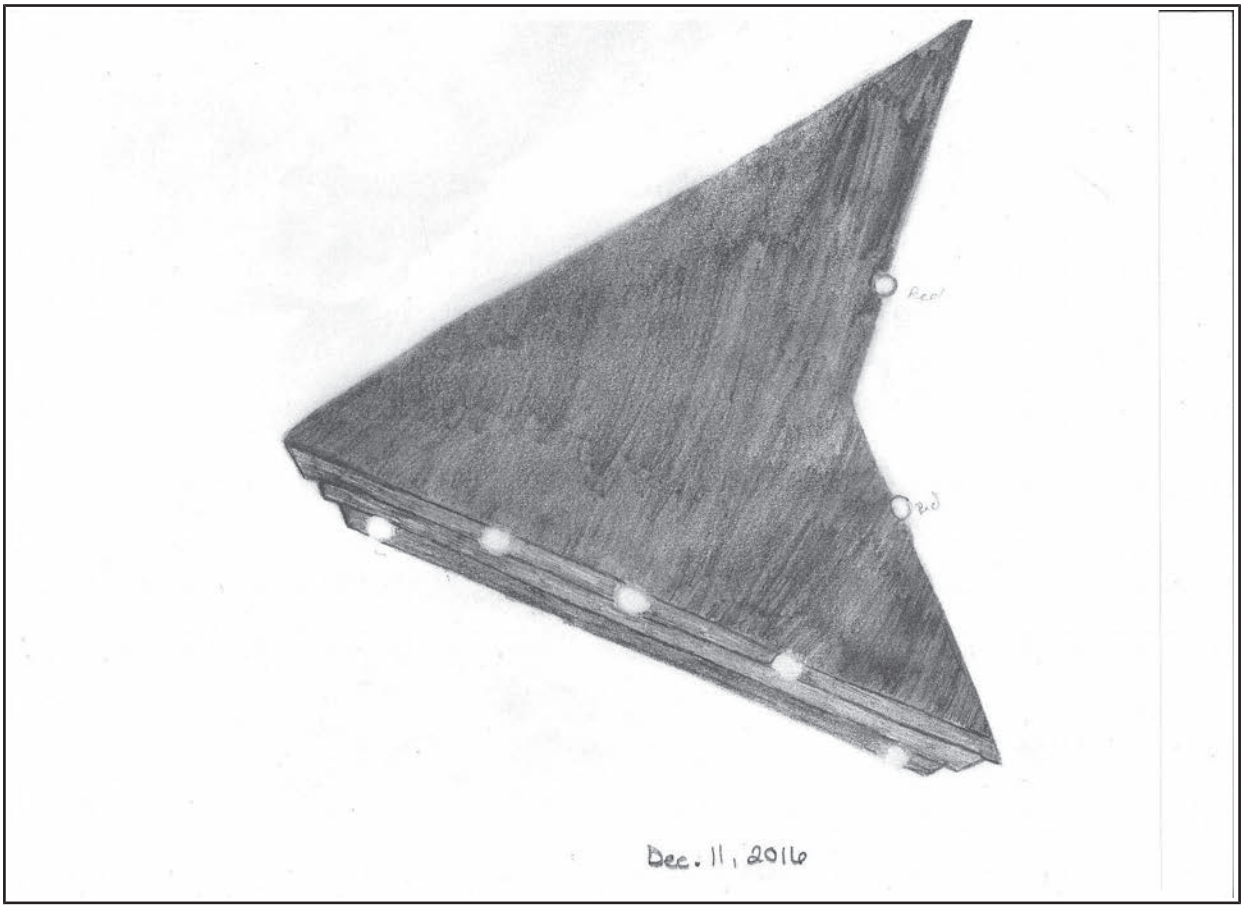


Figure 1.2 Witness 2 Drawing

EVIDENCE/INVESTIGATION:

1) Image on cloud:

There are 2 arguments against this possibility.

A. (The following is a paraphrasing of witness number 2's statement.) Witness #2 was the first to see the object. She initially saw it through trees and remembers thinking it was lit like a football stadium. She then realized there was no stadium where she was looking. The difference in cross section between a projector lens and the image on the clouds argues against any specific location in the image having enough light to look like a stadium lights.

B. The second problem with the image possibility is it doesn't fit the quoted distances and angles quoted by the witnesses. The maximum assumed height for the object prior to its leaving was provided by the witnesses as 1000 ft. The cloud base shown above is greater than 2000 feet. It is known the clouds could be lower and witnesses could be wrong, but this is not the fundamental reason for discarding the image possibility. It is the secondary (or additional) reason

.

The FI therefore believes this possible is highly unlikely and discards it.

2. Invisibility

The description of light seeming to travel around the triangle is reminiscent of some cloaking papers in the literature. The first such paper seen was from a group at Duke University ("Controlling Electromagnetic Fields " by Pendry, Surig, and Smith). The paper describes a methodology called Coordinate Transform Optics (TO) to guide EM waves around an object in a meta-material shell surrounding the object. The initial demonstration of the theory proved it worked for a single frequency.

That paper was followed by a flurry of activity in both the US and China. Some of the later papers followed the same process (TO) as above while others used Conformal Mapping. One exceptionally impressive breakthrough was by use of a calcite. Calcite is a natural material and is much cheaper than meta-materials. It was shown a calcite blanket could transfer an entire spectrum of TE (Transverse Electric) or TM (Transverse Magnetic) waves Unfortunately not both at the same time.

Interestingly publications discussing new advances in this area seemed to stop around 2011. It is not reasonable to believe everyone lost interest simultaneously. It is more likely the subject just went dark.

It is the experience of this FI that it takes approximately 10 - 15 years to implement scientific concepts after the concept is first seen in reputable journals. It is therefore believed invisibility is reasonable in terrestrial physics.

3. Triangle Data:

Assuming a stationary triangle, the following equations can be written for the initial sighting on NW 39th street and the final sighting on NW 20 terrace.

(direct distance to triangle "di") $\tan 20 = h / d1$ & $\tan 45 = h / d2$

Since h doesn't change this yields a relationship between the 2 distances: $d1 \approx 2.0 * d2$

The report stated the minimum altitude of the triangle was 500ft or less and the distance to the triangle (direct distance) was 501 ft to 1 mile. Since the minimum distance to the triangle occurred when it was on 20th Terr (the larger elevation angle) and the tangent of 45 degrees is unity the direct distance d2 will be equal to any assumed height. Additionally from the above the direct distance d1 will be twice the assumed altitude. Finally by similar triangles the length of a side of the triangle will be half the direct distance to the triangle and from above the height of a side will be approximately one tenth of the side length. This is all shown in the following table.

Altitude (ft)	20th Terr Direct Dis d2 (ft)	39th Ave Direct Dis d1 (ft)	Triangle Side Length (ft)	Triangle Side Height
500	500	1000	250	25
600	600	1200	300	30
700	700	1400	350	35
800	800	1600	400	40
900	900	1800	450	45
1000	1000	2000	500	50

Since the witness estimated the object to be over 300 feet in the report and the maximum altitude to be 1000 ft, the data in the above table for row 1 should be eliminated. That leaves row 2 through 6 for acceptable parameters for the triangle data.

4. Triangle Motion:

It is assumed the path followed by the triangle would be continuous, single valued, and differentiable over span of interest. If so, a Taylor series can be used to describe it. That series is an expansion of the distance function D(t) in terms of its derivatives about a point in its path.

$$D(t) = \sum D(n)(t)\, tn / n!$$

In this equation the factor D(n) is the nth derivative of D evaluated at time t and the n! in the denominator indicates the factorial of integer n..

Obviously the first term in the series is the initial point of the path; the second term contains the average velocity; the third term contains the average acceleration; and the fourth term the average Jerk. All parameters are averaged over the time of flight.

$$D(t) = D0 + \langle v \rangle (t - t0) / 2 + \langle a \rangle (t - t0)2 / 6 + \langle J \rangle (t - t0)3 / 24 + O(4)$$

The last term "O(4)" indicates terms or order 4 and above have been left out.

The remainder of this portion of the investigation will attempt to determine if there is a propulsion method capable of generating the motion needed without either killing the crew of the triangle or violating terrestrial science The scenarios considered will be:

a. constant velocity:. (minimum velocity & maximum peak acceleration) and
b, constant acceleration" (maximum velocity & minimum peak acceleration).

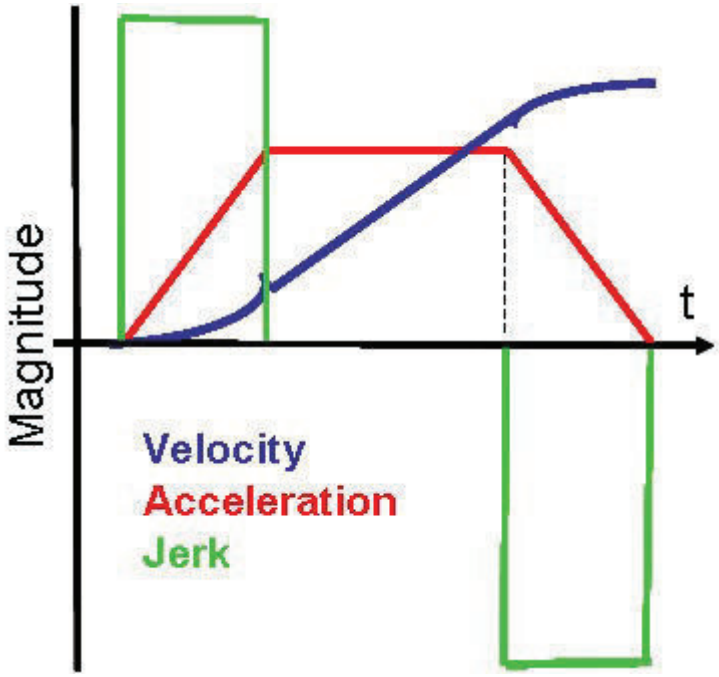
Both will be seen to fail in today's terrestrial science.

4a. Constant Velocity

Since it is a given that the triangle must at least reach the clouds, the average acceleration must be zero or above. A value of zero indicates the triangle reaches the clouds with no additional velocity. Therefore if the distance to travel and the travel time are known, the minimum triangle velocity is also known { V = d / t }.

Since the weather data we have is for 7:53 pm and 8:53 pm and the sighting time is approximately 8:30 PM, the cloud base used was the algebraic mean (2392 ft) of the bases shown in the WEATHER Section. In the following table the velocity was calculated by

Altitude (ft)	Dist. to Ave Cloud Base (feet)	<V> to average. cloud base (mph)	Time to Reduce <V> (sec)
500	1892	1290	1.63
600	1792	1222	1.61
700	1692	1154	1.52
800	1592	1085	1.43
900	1492	1017	1.34
1000	1392	949	1.25



The first item to notice is that all of the velocities are higher than the speed of sound (~760 mph at sea level). Since no sonic boom was heard, this indicates a problem. The distance is set by the clouds, therefore the above speed can only be reduced by increasing the assumed time. Column 4 shows the flight time that reduces the speed to just under 760 mph.

The time numbers for this portion had already increased the time for the upwards movement from fractions of a second to a full second. Although it is still a very short time, an alert witness could easily see the difference. It is therefore difficult to increase this even more but will be accepted for now. It will however be stated that the FI considers a full time of 2 seconds the maximum to be considered

There is also another problem with this method. To attain the velocities needed above, would require a large acceleration impulse (probably followed by a constant low acceleration to account for any dissipation). If it is assumed the initial acceleration impulse is a step function lasting for a tenth of a second

a = ΔV / Δt = 759*5280 / (0.1*3600 = 11132 ft /sec2

To see how this would affect people convert it to G force.

1 G = 32.174 ft/sec/sec .

Therefore an acceleration of 11132 ft/sec/sec converts to 347.9 Gs. Regardless of how short it is, a force of this magnitude would crush anyone. Perhaps more importantly, it would also crush any electronics. In terms of the electronics (and any machinery) there will be 2 "jerks" on everything in the vehicle. The first occurs when the acceleration starts and push everything backwards where its weight will be 347.9 times its normal weight, the second in the forward direction would occur when the acceleration ends and weights go back to (almost) normal. If anything wasn't already crushed parts of it would oscillate wildly and probably rip apart.

The minimum velocity possibility is therefore unrealistic.

4b. Constant Acceleration

The G force can be reduced by spreading out the acceleration. The simplest method would be to apply a constant acceleration over the entire trip. Integrating it would then yield a velocity that increases from 0 to its maximum value at the cloud base linearly.

a = K ---> vfinal = K t --> D = K t2/2

Since the distance traveled in 4a is exactly the same as the distance traveled here, the final velocity here will be twice that determined in 4a. Therefore the time correction needed to eliminate a sonic boom will also be twice the times determined 4a The minimum which occurs with an initial altitude of 1000 ft will then be 2.5 seconds. It is believed that this result is too long to be confused with fractions of a second..

With this possibility the acceleration will be applied during the entire trip. Since the overall acceleration has to be the same, the G force will be less by a factor of (0.1/trip time) than found in 4a. Therefore for the initial height of 1000 ft., the acceleration of 11132 ft/sec/sec becomes 635.75 ft/sec/sec. That converts to 19.8 Gs.

Although it is possible to live through forces of this magnitude if they are short enough, this is very high. Pilots are normally are capable of withstanding ≈ 9 Gs. Even with a g-suit this is only raised ≈ 1 G. The 20 G figure is therefore twice that. Effectively this value means that the weight of everything experiencing it (including blood) is instantaneously raised to 20 times its nominal value.

The constant acceleration possibility is also considered unrealistic.

WITNESS CREDIBILITY:

The FI believes the witnesses to be credible. Throughout the interview both the PW and the SW (the PW more) kept mentioning that they couldn't believe that no-one else had reported the triangle. It was noted that the area was directly in the path of airline takeoffs and landings Additionally the SW told of

how the sighting had badly affected her young daughter.

An additional reason for discounting any possibility of a hoax, was the differences found between the interview and the drawings. By the time the witnesses made the drawing, they knew what they had said. If they were perpetrating a hoax, their drawings would show exactly what was said
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CORRELATING CASES:

None at this point.

CONCLUSIONS:

The FI recommends that this sighting be classified "UNKNOWN-UAV".

FINAL REPORT DATE: 12/**/2016
Field Investigator ID#:: 13110
CASE#: 80933

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Reviewed and approved by John A. Gagnon, Florida Chief Investigator, 21790 12/21/2016.