ALLEGED UFO CAPTURED BY INFRARED CAMERA FROM U.S. CUSTOMS & BORDER PROTECTION AIRPLANE OVER AGUADILLA, PUERTO RICO

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Background

On the night of April 25, 2013 at about 09:22 PM (local time), a Bombardier DHC 8 airplane operated by the U.S. Customs & Border Protection equipped with an Infrared camera, captured and followed a very peculiar flying object which yielded a fluctuating infrared signature over Rafael Hernández airport, Aguadilla (Puerto Rico). The object at times seemed to disappear (which was interpreted by some ufologists as "splashing into the ocean") and also split into two pieces **(1)**.
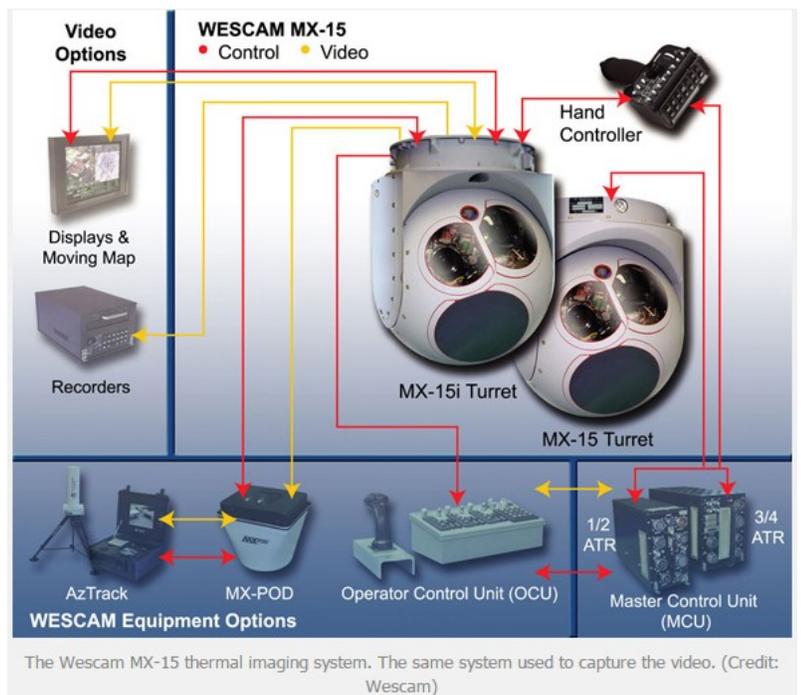

A U.S. Customs and Border Protection Bombardier DHC-8Q200. (Credit: U.S. Customs and Border Protection)

The Aguadilla UFO video has been uploaded to many websites. Here is one in higher resolution: https://www.youtube.om/watch?v=PJpyJ_G9WVA

Equipment involved

The Infrared rotating camera used by the Bombardier DHC 8 airplane was a Wescam MX-15 (a gimbal scanning type of system based on a rotating and elevating portholed turret).
Full details are depicted here: https://www.wescam.com/products-services/airborne-surveillance-and-reconnaissance/mx-15/

The Wescam MX-15 thermal imaging system. The same system used to capture the video. (Credit: Wescam)

Analysis Circumstances

While attending a course on IPACO photo/video analysis software under Dr. Eng. François Louange, I was shown by my instructor a copy of the Infrared video of the Aguadilla UFO. Even though it initially seemed rather difficult to interpret (since I had never seen it before), after viewing it a few times and gathering enough evidence, I could come up with the explanation of what (I would later realize) for many UFO researchers was a true example of *"unidentified aerial phenomena."*

Making theories to fit the facts

One thing that really helped me a lot to quickly interpret this alleged UFO as a wind-driven object was my former military pilot experience, having shot several airborne videos during hundreds of hours of test flights. But to avoid imposing here any "argument from authority" and to make this work completely scientific, I still had to demonstrate that the conditions for this object to be wind-driven must be met.

So… no matter how familiar a wind-driven object would look to me, I started to work assuming this is a theory (not an obvious fact) so I would not contaminate my analysis with preconceived assumptions, thus following Arthur Conan Doyle's famous character (Sherlock Holmes) who quoted: *"It is a capital mistake to theorize before one has data. Insensibly one begins to twist facts to suit theories, instead theories to suit facts"*.

I then started to direct my investigation towards the evidence at hand (the video itself) to see if among all the many theories that could apply, there was also room for that of a wind-driven object.

So I worked on this case analysis based on four questions:

1) Was the Aguadilla UFO self-propelled?
2) Was it one object… or two?
3) In case they were two lanterns, is it normal that sometimes they fly in pairs?
4) Where did they come from?

After I watched the video I immediately started to search the Internet to gather together all the pieces of the puzzle.

Question 1: Was the Aguadilla UFO a self-propelled object? In an extensive report, Robert Powell *et al* refer to this object as being *"…not similar to any known natural or man-made object"* and also attribute a self-propulsion system to the UFO **(1)**. By looking at other studies on this case, I noticed that some analysts had already suggested that the Aguadilla UFO was a wind-driven object: Andrés Duarte, Chile, July 2015 **(2)**, Bob Bixler, USA, January 2016 **(3)** and Gilles Fernandez, France, August 2015 (in his last work, Fernandez properly debunked statements by Powell *et al* about the UFO deliberately changing directions) **(4)**.

Before we get into the real analysis and, as stated above, without any intention of imposing here any "argument from authority" to demonstrate a theory, let me point out that I have ten years flying experience as an experimental test pilot, shooting all kinds of airborne photographs and videos chasing many flying objects, from test prototypes to small drones released from the pylons of test airplanes, and from airborne-launched rockets to parachute-delayed bombs (which demanded flying in circles around them). My initial opinion on this alleged UFO being not self-propelled is that any attempt to make a video chasing another self-maneuvering/self-propelled flying object, especially at night, would have been not only exceedingly difficult to execute but also nearly impossible for the cameraman to hold the object steadily centered for so many minutes (as it was this case). Just flying at night very close to another self-propelled object is a delicate air operation that could rapidly lead to a midair collision due to a complete lack of depth perception. In the best case, the self-propelled object could disappear from the line of sight and never be captured again. At this point I recall how hard was to rejoin a section of military jet airplanes at night after breaking the formation. In those cases the squadron leader must keep flying at a constant altitude, performing a very steady smooth turn while patiently waiting for the wingman to rejoin him.   In other words, the only way the Aguadilla UFO would have "let itself" be recorded in video so steadily and for such a long time at night, was in a hovering flight or, at the most, behaving as any wind-driven object would do, that is, following a linear path.

Back to the many attempts carried out by former analysts to calculate the air speed of the alleged Aguadilla UFO (some of them even using vector analysis approaches). Just for readers to have a complete perception on how difficult it is to measure transverse velocity of a given body working only with assumed angular velocities of the background (as a result of one body orbiting around the other) let´s consider, for example, the case of a pair of ice skate dancers filmed by a cameraman who is also skating (and circling) around them.

photo credit: CBC Montreal

For the following exercise we will assume we are always looking not from the outside (as shown in the photo above) but only through the camera lens. Furthermore, the camera will be constantly aiming slightly upwards (just as in the photo) never showing the dancers legs, so we´ll assume that we never know if the dancers are moving or are standing still.

With this in mind, first let´s imagine a scenario where the dancers move straight forward and the cameraman circles counterclockwise, like shown in the photo. If the dancers move forward it is obvious the cameraman´s orbiting speed must not always be the same. He must accelerate his circling in order to catch up with the dancers when passing by in their same direction and also must slow down when passing by in the opposite direction (to avoid being left behind).   No matter how fast the dancers and the cameraman move, the white poles in the background are always going to move at different speeds in the opposite direction as the cameraman (that is: clockwise, or from left to right, within the frame, if you prefer). Now the question is: can the dancers´ forward linear velocity be calculated just by measuring the only reference we have (that is: the angular velocity of the white poles in the background which is dependent on the cameraman´s varying speed)?

Now let´s make it even simpler. The dancers have come to a full stop, now they are standing still, but the cameraman continues circling fast around them (so the white poles on the background continue moving). How can we tell if the background poles are moving just due to the cameraman´s circling velocity alone or because the dancers are also moving? (remember that we didn´t know the dancers were standing still).

Now let´s complicate things a little bit more. Suppose the dancers resume moving forward but very, very slowly. At this point we wonder: Will the white poles in the background now tell us precisely which the real velocity of the dancers is? Consider that for any (infinite) combination of dancer/cameraman velocities, there will also be infinite angular velocities for the white poles on the background. Want to feel even more frustrated? There will also be infinite dancer/cameraman velocity combinations for the white poles to appear moving exactly at the same velocity in all those infinite cases, if the proper combination of relative speeds is met in each one of them!

A similar scenario applies to the Aguadilla Infrared video, the cameraman being the airplane, the dancers being the alleged UFO and the white poles being the background scenery (water or land). Except that it gets twice as complicated every time the object is zoomed in and out.

Playing with velocity vectors to try to measure the dancers´ speeds, based solely on background angular velocity is (in my humble opinion) a waste of time, unless we really get into complex differential equations or end up building two line element sets (just like with artificial satellites orbiting the Earth) using Keplerian parameters, which (to discourage you even more) can neither be applicable here since the dancers´ and cameraman bodies are not gravity dependent to orbit around each other, nor can be applied to objects moving under the laws of aerodynamics, as it was the case of the Puerto Rico aircraft.

Considering how frustrating it could become trying to demonstrate the wind-driven-object theory by vector analysis alone, then it will be easy to understand that the first question will, in fact, be indirectly answered throughout the analysis, providing that the other three answers would converge to support this theory.
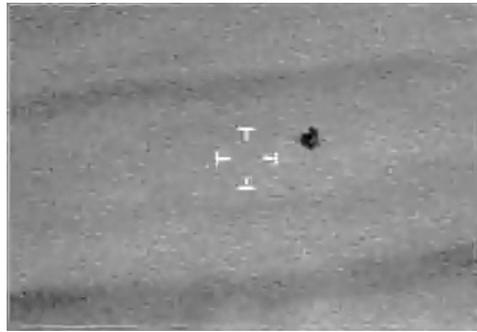
With this in mind, I then focused attention to carefully study the evidence at hand, starting by closely inspecting the thermal images themselves.

Question 2: Is it one object… or two? The timeframe of the video that shows the object splitting into two was crucial to determine its true nature. Far from being the result of a single image "duplicated" by atmospheric diffraction, as Bob Bixler suggested: *"Some or all of the 9 factors above could lead to image shimmering and signal variability, mirages (double mirages) and signal loss"* **(3)** or even the most bizarre explanation about an extraordinary flying object duplicating itself, the two objects do not show reciprocating (mirror) images, as some kinds of mirages usually do. They are identical in shape and size and also bear exactly the same Infrared signature. The upper "lobes" show hotter (darker) spots as much as at the bottom areas (where lantern´s fires are usually located).

Under close inspection, it can be easily seen that <u>each one of them is unmistakably manufactured in the shape of a heart</u>.
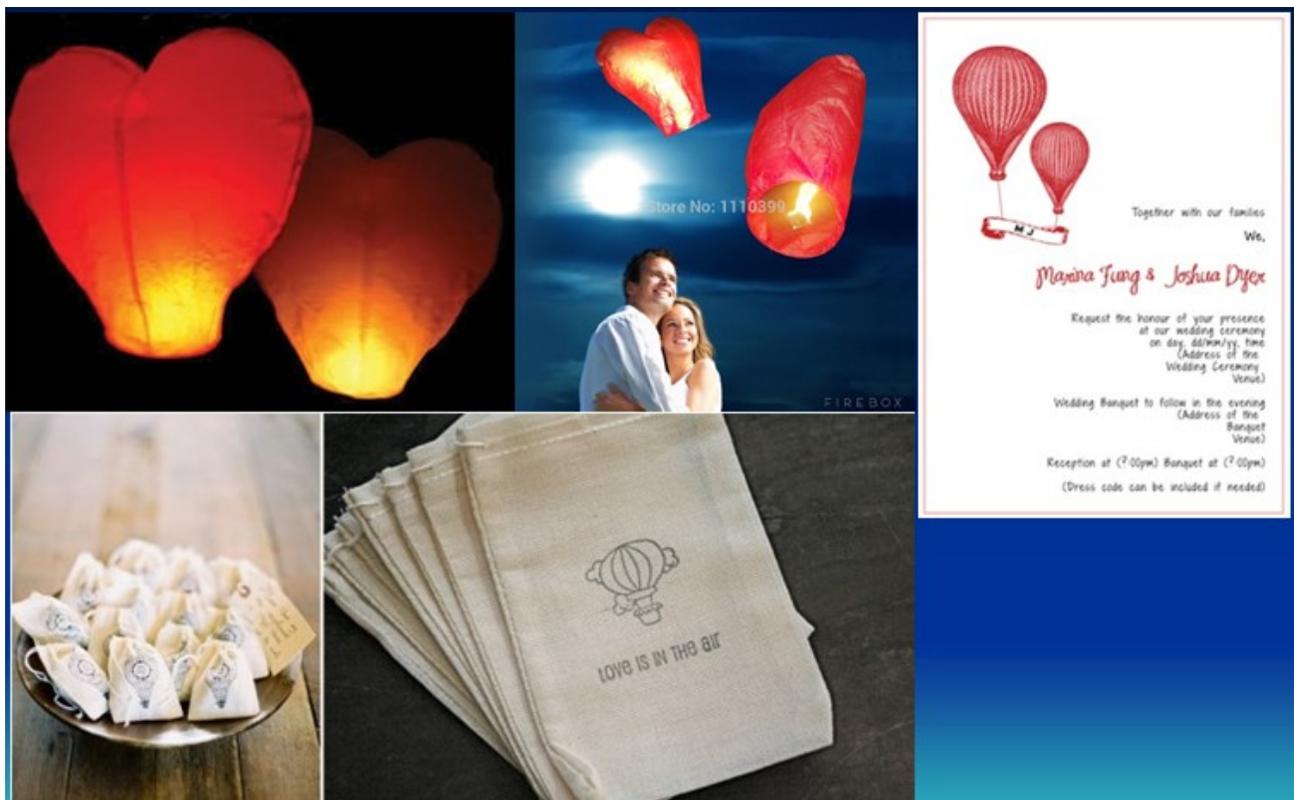
Their truncated bottoms owe their shape to the circular openings for the air intake right below the candles.
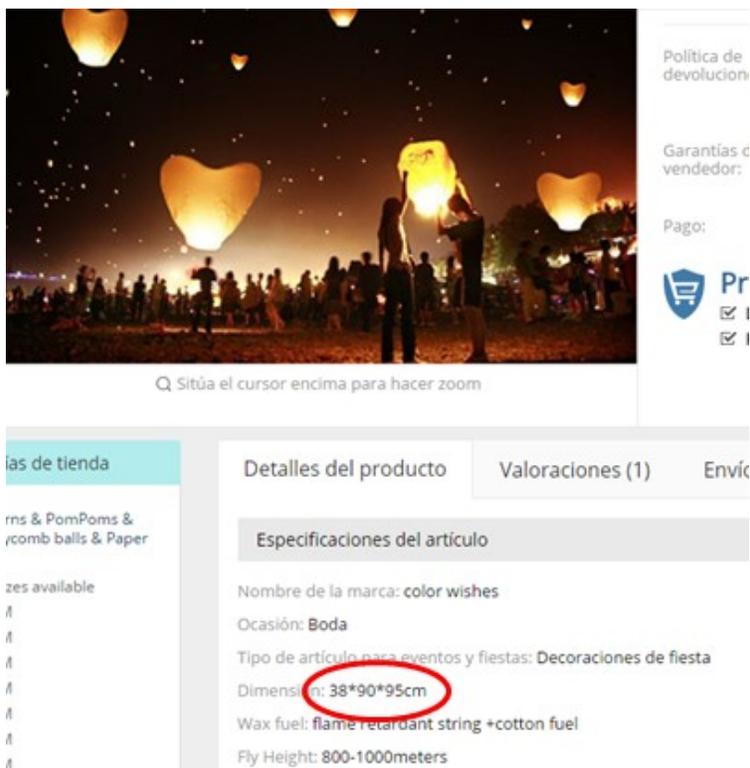

Question 3: In case they were two lanterns, is it normal that sometimes they fly in pairs? The answer is YES. Applying Ockham´s razor principle, by approaching this UFO case starting from simpler to more complicated theories, and considering the humans´ social behavior <u>before</u> thinking about any non-human flying object theory, I believe this case might have been easily solved a long time ago, just if we bore in mind that heart-shaped hot air balloons are, in fact, released tied in pairs during some earthlings´ wedding parties.

Indeed… there exist companies which sell pairs of lanterns in the shape of hearts paraphrasing the song *"Love is in the air"* (George Young and Harry Vanda, 1978) and offering the balloons tied up holding a banner with the names of the just married.

I found on the Internet a listing which shows the crucial information on the size of the lanterns. Most of them are about 3 feet tall and almost the same width (see data encircled in red):

Next, I looked for the weather report for that day at Puerto Rico´s Rafael Hernández airport (www.wunderground.com). According to the historical weather records, that night the wind was blowing from the East North-East quadrant.

Hourly Weather History & Observations

Hora (AST)	Temp.	Índice de calor	Punto de rocío	Humedad	Presión	Visibilidad	Wind Dir	Velocidad del viento
7:50 PM	26.0 ° C	-	21.0 ° C	74%	1016.8 hPa	16.1 km	ENE	22.2 km/h / 6.2 m/s
8:50 PM	26.0 ° C	-	21.0 ° C	74%	1017.2 hPa	16.1 km	(ENE)	13.0 km/h / 3.6 m/s
9:50 PM	26.0 ° C	-	21.0 ° C	74%	1017.5 hPa	16.1 km	Este	13.0 km/h / 3.6 m/s
10:50 PM	26.0 ° C	-	22.0 ° C	78%	1017.8 hPa	16.1 km	Este	11.1 km/h / 3.1 m/s
11:50 PM	26.0 ° C	-	21.0 ° C	74%	1017.8 hPa	16.1 km	Este	9.3 km/h / 2.6 m/s

Mostrar METARS completo | METAR FAQ

Thanks to the opportune suggestion from Tonio Cousyn, the above historical weather data could be also corroborated by the Official METAR issued for the Aguadilla airport (https://www.ogimet.com):

Time interval: from 04/26/2013 00:00 to 04/26/2013 01:59 UTC

TJBQ, Aquadilla, Rafael Hernandez Airport (United States).
WMO index: 78514. Latitude 18-30N. Longitude 067-08W. Altitude 72 m.

METAR/SPECI from TJBQ, Aquadilla, Rafael Hernandez Airport (United States).

SA 26/04/2013 01:50-> METAR TJBQ 260150Z 09007KT 10SM SCT030 26/21 A3005 RMK RWY08
ATIS B=

SA 26/04/2013 00:50-> METAR TJBQ 260050Z 07007KT 10SM SCT030 26/21 A3004 RMK RWY08
ATIS A=

Where:
TJBQ: is the ICAO designation of the airport
26 0050 Z: date and time (UTC). Puerto Rico´s local time is UTC (- 4), or 08:50 PM.
070 07 KT: Wind direction and speed (from the 070°, 07 knots).
10SM: Horizontal visibility 10 Statute Miles (about 16 Km.)
SCT030: Scattered (partly cloudy) 3000 ft. altitude of cloud base
26/21: Temperature / dew point (in °C)
A 3004: Barometric pressure in inches of mercury
RMK RWY08: Remarks, runway in use is 08

The red oval shows the earlier wind direction and speed, just half an hour before the video was shot. The red arrow represents the tendency of the surface wind, from the first (earlier) METAR on to the second. At 00:50 (08:50 PM local time) the wind was blowing from 070° and one hour later (01:50 UTC or 09:50 PM local time, that is: half an hour after the video was shot) it started to rotate blowing from the East (090°).

Question 4: Where did they come from?   Many resorts in Puerto Rico offer their facilities for wedding parties. Among the most known is the Mansion Hacienda Villa Bonita, less than 10 km South East of the airport (www.mansionvillabonita.com/bodas):
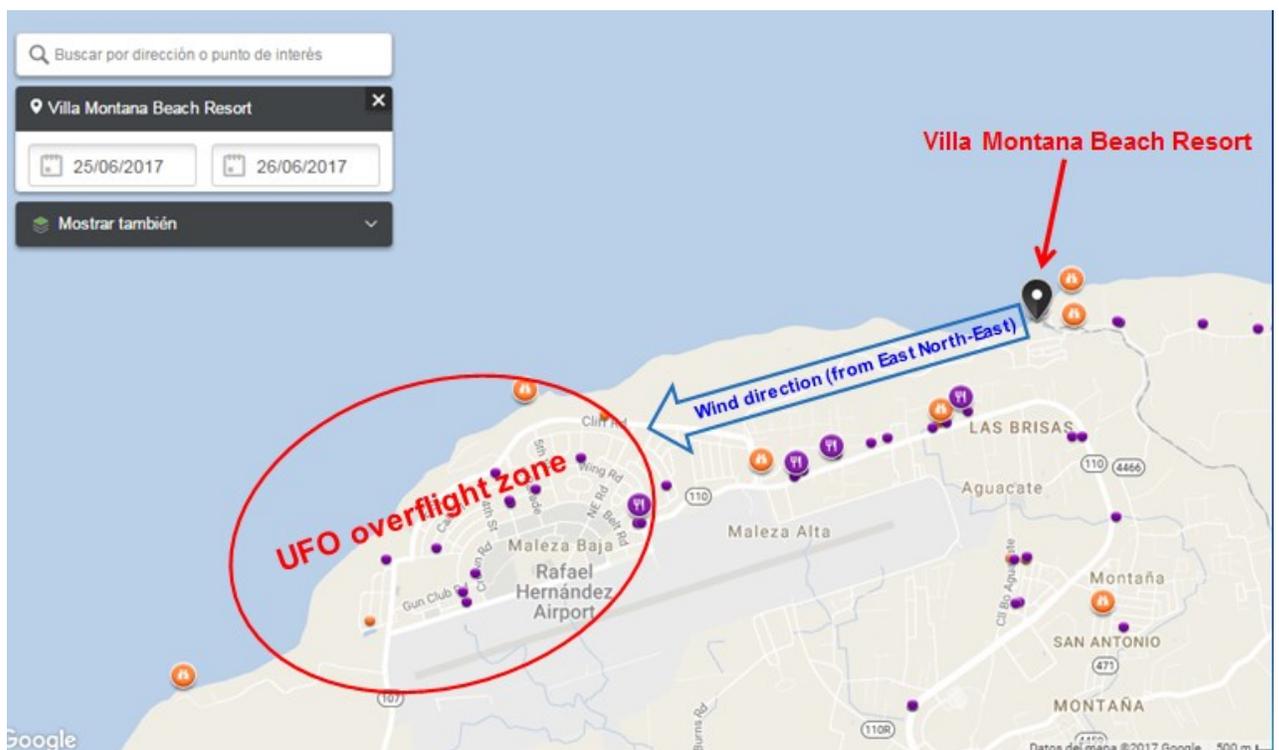

There are also many Beach Resorts where wedding parties take place. One of them located on the beach near Villa Montana shows in the Internet pictures of people releasing (you guessed) wedding lanterns (https://ar.pinterest.com/pin/350788258448744602/):

The Villa Montana Beach is located right to the East North-East of the Aguadilla airport, exactly the direction the wind was blowing from the night of April 26, 2013! In the map below we can see the area where the alleged UFO was captured in video and the relative position of Villa Montana Beach Resort.

I wrote an e-mail to Villa Montana staffers and got a quick and kind reply from their General Manager, Alain Tiphaine: "*Mr. Lianza, I cannot confirm the exact date, but in fact, those kinds of balloons were launched from our beach in the past. However, those practices have been discontinued two years ago.* (2015)*. If you have any further questions, please let me know. Sincerely, Alain Tiphaine".* **(5)**

<u>When trying to make facts to fit wild theories</u>
The interpretation of some ufologists that the alleged UFO ditched into the ocean in a controlled flight, to continue "flying" underwater for a short distance and to finally take off again **(1)** was triggered by the optical illusion caused by the IR camera itself, temporarily losing track while trying to adjust to the fluctuating intensity of the IR signature of such a dim flame, which is typical in these kinds of lanterns (see candle system on the right).

This camera limitation resulting in <u>losing track of a weak IR signature showed up more than once throughout the video</u> and not only with the object having the sea in the background. The proof that the sensors <u>also</u> lost the lanterns even at times when the background was the terrain (not the water, but a solid landscape behind) can be easily seen in the frames between 01:23:56 and 01:24:01.

Why could this IR camera temporarily lose track on the UFO? The problem most IR cameras are facing is that not always the sensor output is linear with the IR target signature, especially every time the sensors become saturated or the object is too far away, too faint or any combination in between that will not yield a clear "black spot". <u>The base of the scattered clouds can also partially hide the IR signature of a distant target if the aircraft (thus, the camera) is flying between 2600 and 3200 feet with a cloud base roughly calculated in 3000 feet</u> (see METAR data on page 8). The scattered clouds the aircraft could have encountered did not show at all on the screen because they were too close to the camera (they crossed the FOV at almost the same speed as the aircraft), but they were "noisy" enough to temporary hide the IR signal even of a very hot target.

As a matter of fact, the Chilean Investigator and photo analysis expert: Andres Duarte (apparently the first analyst suspecting that the Aguadilla UFO must have been a sky lantern), pointed out: "*the fact that a thermal emission does not appear very bright in the image (or very dark if the image were set to ´black hot´ mode) does not necessarily mean that the object couldn´t still be very hot".* **(2)**

Indeed, in total agreement with Duarte´s comments, it is not unreasonable to think that the crew of the DHC 8 must have had the faint orange lights in sight with their naked eyes all the time, even though they disappeared for the eye of the camera, otherwise the pilot would have never been able to continue circling around the exact object´s position in those crucial transients where the UFO apparently vanished from the IR sensors.

Something else must be said regarding the misinterpretation of the object "ditching" into the ocean. There is a major perspective misperception when stating something like that. In the frame the UFO apparently starts to ditch (01:24:13), it may have not necessarily be flying over water, especially if we consider the field of view (FOV) of the camera at that point. It is important to consider here, that just a few seconds earlier (on frame 01:24:04) the object can be seen clearly flying over land with the sea shore on the distance. Just two seconds later (01:24:06) the cameraman sets a higher zoom and now the water on the distant background fills up the entire field of view. That effect is not because the object all of the sudden flew an extra mile towards the ocean, but because after suddenly zooming, the new FOV had a much narrower angle allowing only a portion of the background (water) to fill the entire frame.

Then how could we possibly know the geographical position of the object at this time in the video? The answer is: by doing accurate measurements using the UFO angular dimensions which, in turn, would allow us to calculate the UFO/camera distance. But first we need to choose a favorable frame where the object shows its complete side towards the camera, so we can bracket its true length and width with the dimensions advertised on Internet (assuming we are dealing with a heart-shaped Chinese lantern).

In their report, Robert Powell *et al* (1) assign a diameter of about 3 feet (1 m.) to the object, a figure I agree with, and, as stated above, those dimensions are also advertised in the Internet.

By choosing the proper frame where the shape of the "heart" could be bracketed and using IPACO software measurements Dr. François Louange could accurately calculate the possible distance from the UFO to the camera in the slant line of sight.
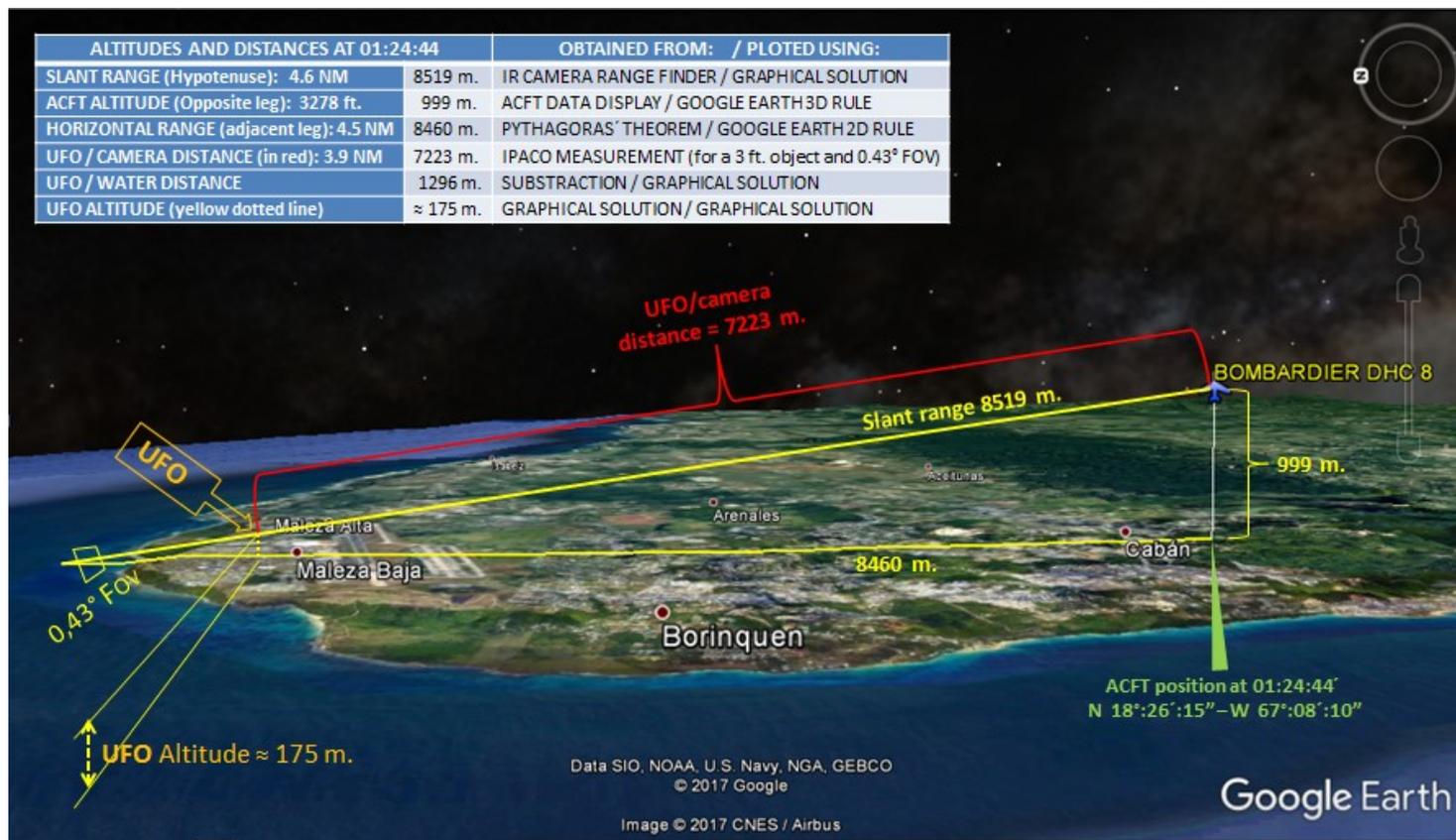

On the right we see the frame chosen for object´s measurements (frame´s top display was pasted and lantern´s sides were slightly enhanced for clarity).

 Just like Geoff Quick wisely pointed out: *"The fact that the lobes of the balloon can be easily differentiated, demonstrates that the Infrared system is determining the target shape very well due to a fine pixel resolution (´small pixels´ covering the target.). This allows for a credible range resolution bracket by deduction".* (6)

Even though the complete IPACO report can be read on Annex A, we can here anticipate the conclusion that for a UFO size of about 3 feet (1 m.) of transverse height and width, the camera-UFO distance was calculated in 3.9 NM (7,223 m.).

In the graphics below, I have superimposed the most relevant data of frame 01:24:44 on a 3D Google Earth (satellite) view in order to help the readers have a complete spatial perception of the distances, angles and especially the fact that <u>the UFO was, indeed, flying over land, although the frame showed only water in the background</u>. All data were converted to the metric system for accuracy. Dimensions of the FOV have been exaggerated for readability.

ALTITUDES AND DISTANCES AT 01:24:44		OBTAINED FROM: / PLOTED USING:
SLANT RANGE (Hypotenuse): 4.6 NM	8519 m.	IR CAMERA RANGE FINDER / GRAPHICAL SOLUTION
ACFT ALTITUDE (Opposite leg): 3278 ft.	999 m.	ACFT DATA DISPLAY / GOOGLE EARTH 3D RULE
HORIZONTAL RANGE (adjacent leg): 4.5 NM	8460 m.	PYTHAGORAS´ THEOREM / GOOGLE EARTH 2D RULE
UFO / CAMERA DISTANCE (in red): 3.9 NM	7223 m.	IPACO MEASUREMENT (for a 3 ft. object and 0.43° FOV)
UFO / WATER DISTANCE	1296 m.	SUBSTRACTION / GRAPHICAL SOLUTION
UFO ALTITUDE (yellow dotted line)	≈ 175 m.	GRAPHICAL SOLUTION / GRAPHICAL SOLUTION

CONCLUSIONS:

Summarizing all the reports written on this strange UFO case, in addition to my recent IR image interpretation plus having identified a wedding lantern release scenario in perfect coincidence with the prevailing winds the night of April 25, 2013, I can conclude with a decent margin of certainty that a simple explanation does exist for the objects captured by the Wescam Infrared camera over the Rafael Hernández airport.

The alleged UFO was a simple pair of wind-driven hot air lanterns in the shape of hearts, tied together, very likely released during a wedding party, from a beach near Villa Montana Resort (or any place upwind from the Airport).

The fact that the objects were heart-shaped Chinese lanterns explains why they suddenly showed themselves as two. The answer is very simple: they were just two… all along!

Both lanterns flew alternatively close to each other or partially split by the upper winds. Their tumbling lateral motions (where one of them appears shyly peering behind the other) can be seen between timeframes 01:22:40 and 01:23:03. But just like the ice skate dancers in the photo on page 3, the "flying hearts" were so close to each other that most of the time, they appeared as a single object to the eyes of the IR camera.

Why did they eventually disappear from the scene? I agree with Bob Bixler´s final words in his report: *"… hot air could have been injected prior to lift off of the object or could be generated in flight by candles or other heat sources which may burn out in flight"* **(3)**.

At this point all that remains to be said is that the gradual disappearance of the two "flying hearts" from the scene was due to the obvious reason that eventually their "engines" flamed out, one first, then the other, ending up (this time really) splashing down into the Caribbean sea… to never take off again.

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References

(1) Robert Powell *et al*, "2013 Aguadilla Puerto Rico UAP,"
http://media.wix.com/ugd/299316_9a12b53f67554a008c32d48eff9be5cd.pdf

(2) Andrés Duarte, e-mail to Vicente-Juan Ballester Olmos, July 1, 2015.

(3) Bob Bixler, "2013 Aguadilla Puerto Rico analysis of an Infrared video showing Unidentified Anomalous Phenomenon captured by the Department of Homeland Security,"
http://www.astronomyufo.com/UFO/SUNlite8_4.pdf, pages 5-7.

 (4) Gilles Fernandez, "La Vidéo d'Aguadilla, Puerto Rico, 25 avril 2013: Quelques Contre-Tons," http://skepticversustheflyingsaucers.blogspot.com.es/2015/08/la-video-daguadilla-porto-rico-2013.html

(5) Alain Tiphaine, e-mail to the author, June 25, 2017.

(6) Geoff Quick, e-mail to the author, June 28, 2017.

Annexes:

Annex A: IPACO Expert´s Report – "Attempts to perform measurement on the Aguadilla Infrared video using the IPACO software."

Annex B: Brief summary about the author and the Argentine Air Force´s Center for Aerospace Identification (CIAE).

Annex A: Attempts to perform measurement on the Aguadilla Infrared video using the IPACO software

François Louange, 4ᵗʰ July 2017

Introduction

The Aguadilla video appeared at once as a "perfect case" for an in-depth quantitative analysis, since the infrared camera operator managed to follow the object during quite a long time.

The initial idea was to obtain the necessary technical data of the camera, so as to perform angular measurement, then to infer size/distance ratios and, if possible, to assess the object's transverse velocity/distance ratio, using the usual tools available with IPACO for video analysis.

However it became rapidly obvious that most of the measurements would be meaningless, due to the complexity of the respective movements of the plane, the camera and the object (see Rubén Lianza's theory of ice skaters).

Transverse velocity can by no means be assessed, unless we assume, for instance, that the object was permanently very close to the ground/sea, which is not proven.

It appeared that the most meaningful length/distance ratio that could be extracted from this video concerned the distance between the two heat sources, where they split apart. This piece of data may help supporting one explanation or the other. In particular, with Rubén Lianza's theory of two heart-shaped Chinese lanterns tied together, knowing the order of magnitude of the possible distance between both lanterns may give an indication on the object's distance range from the camera.

The size/distance ratio concerning the object by itself is more tricky to assess, given the fluctuating nature of this object's appearance in thermal infrared (the size of a flame or of a reactor has little to do with the actual size of a lantern or of a jet). However, in the frame of Rubén Lianza's theory, and using carefully selected frames, such a measurement could be performed.

Measurement of the two hot spots

After careful visualization of the video, three frames were extracted, where two distinct heat sources are visible, corresponding respectively to the following video times (according to IPACO's counter): 158282 ms, 160911 ms and 162101 ms.

Referring to the available technical documentation of the MX-15 camera's thermal imager, it was assumed that the horizontal field of view had, in this part of the video, its smallest possible value of 0.36° (corresponding to the indication "IR 2024" on top of the screen and to the maximum zoom factor). This value was converted into the standard diagonal field of view used in IPACO: 0.43°, which was then introduced into the technical data associated with each of the three images.

For each image, the angular distance between the two hot spots was measured, and the length/distance function was used to show values of object-to-camera distance for three particular values of the transverse distance between hot spots: **3 ft**, **5 ft** and **10ft**.

Image 158282

Distances from the camera to the object, expressed in nautical miles (nm) are to be compared to the distance from the camera to the ground along the line of sight, indicated at the bottom of the screen:
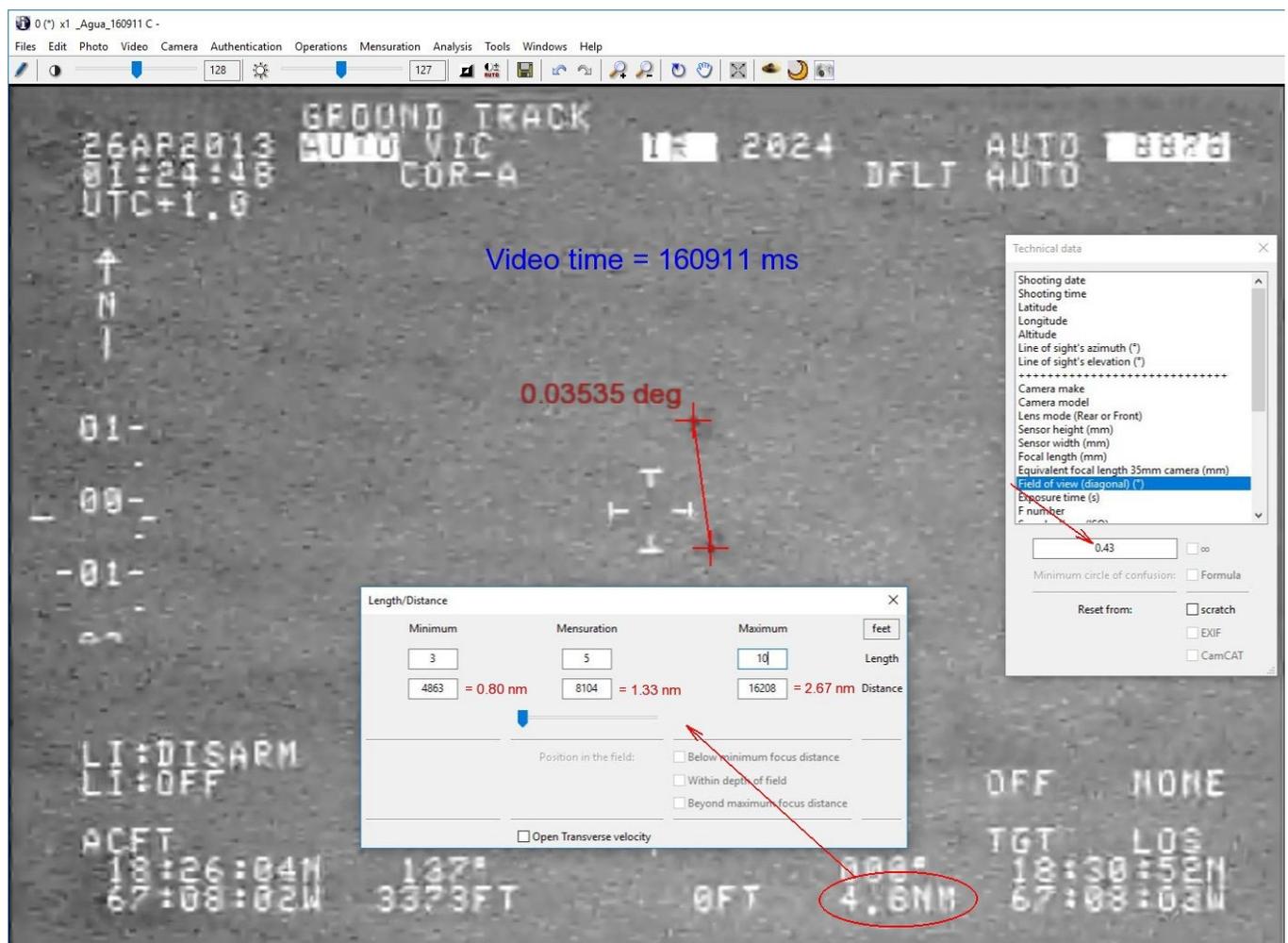
For **3 ft** transverse distance between hot spots: **1.79 nm**   camera-object distance

For **5 ft** transverse distance between hot spots: **2.99 nm**   camera-object distance

For **10 ft** transverse distance between hot spots: **5.97 nm**   camera-object distance
(most improbable)

-> to be compared to: **4.7 nm**   camera-ground distance
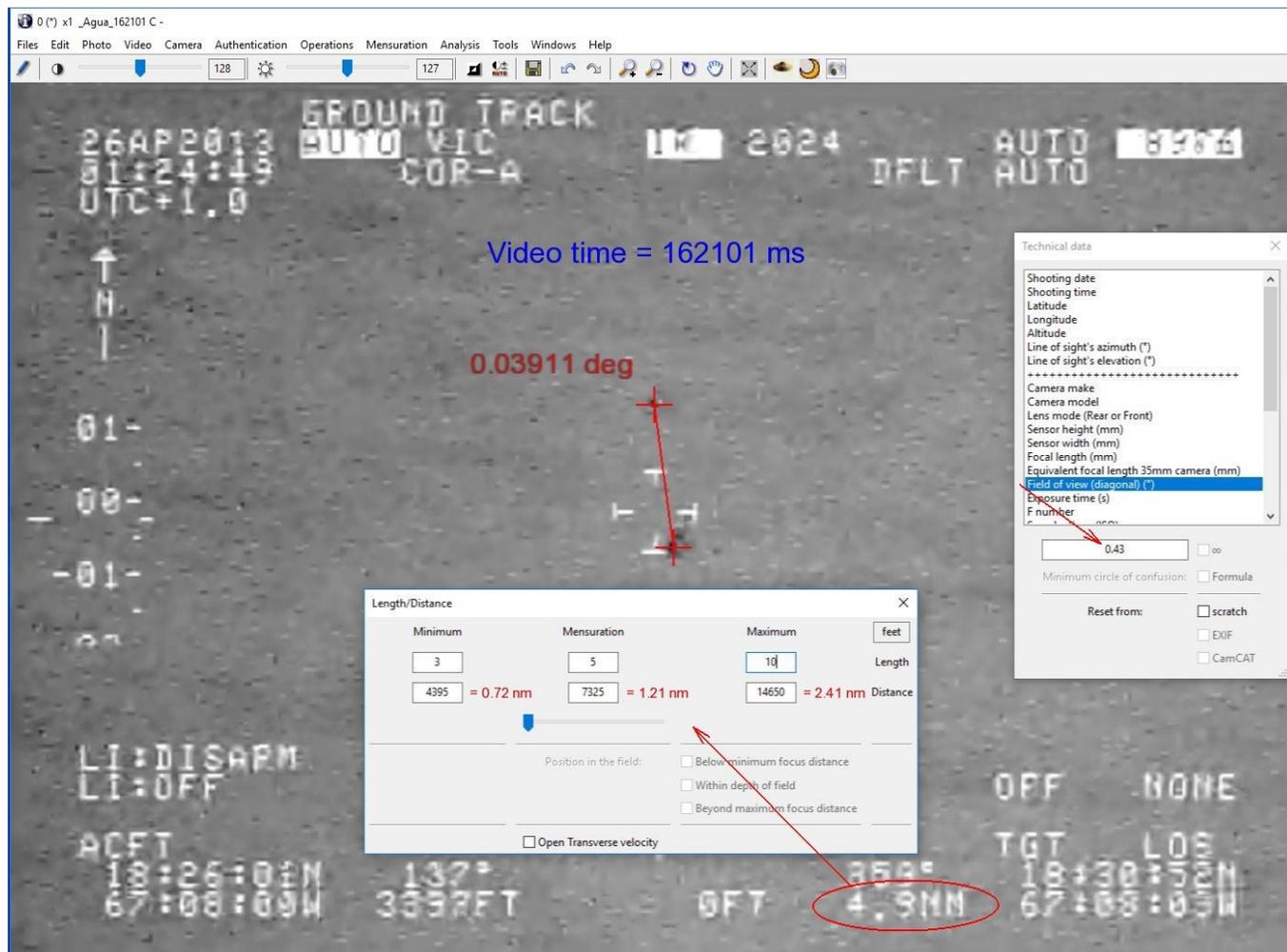(along the line of sight)

Image 160911

For **3 ft** transverse distance between hot spots: **0.80 nm** camera-object distance

For **5 ft** transverse distance between hot spots: **1.33 nm** camera-object distance

For **10 ft** transverse distance between hot spots: **2.67 nm** camera-object distance

           -> to be compared to: **4.6 nm**   camera-ground distance
                                                       (along the line of sight)

Image 162101

For **3 ft** transverse distance between hot spots: **0.72 nm** camera-object distance

For **5 ft** transverse distance between hot spots: **1.21 nm** camera-object distance

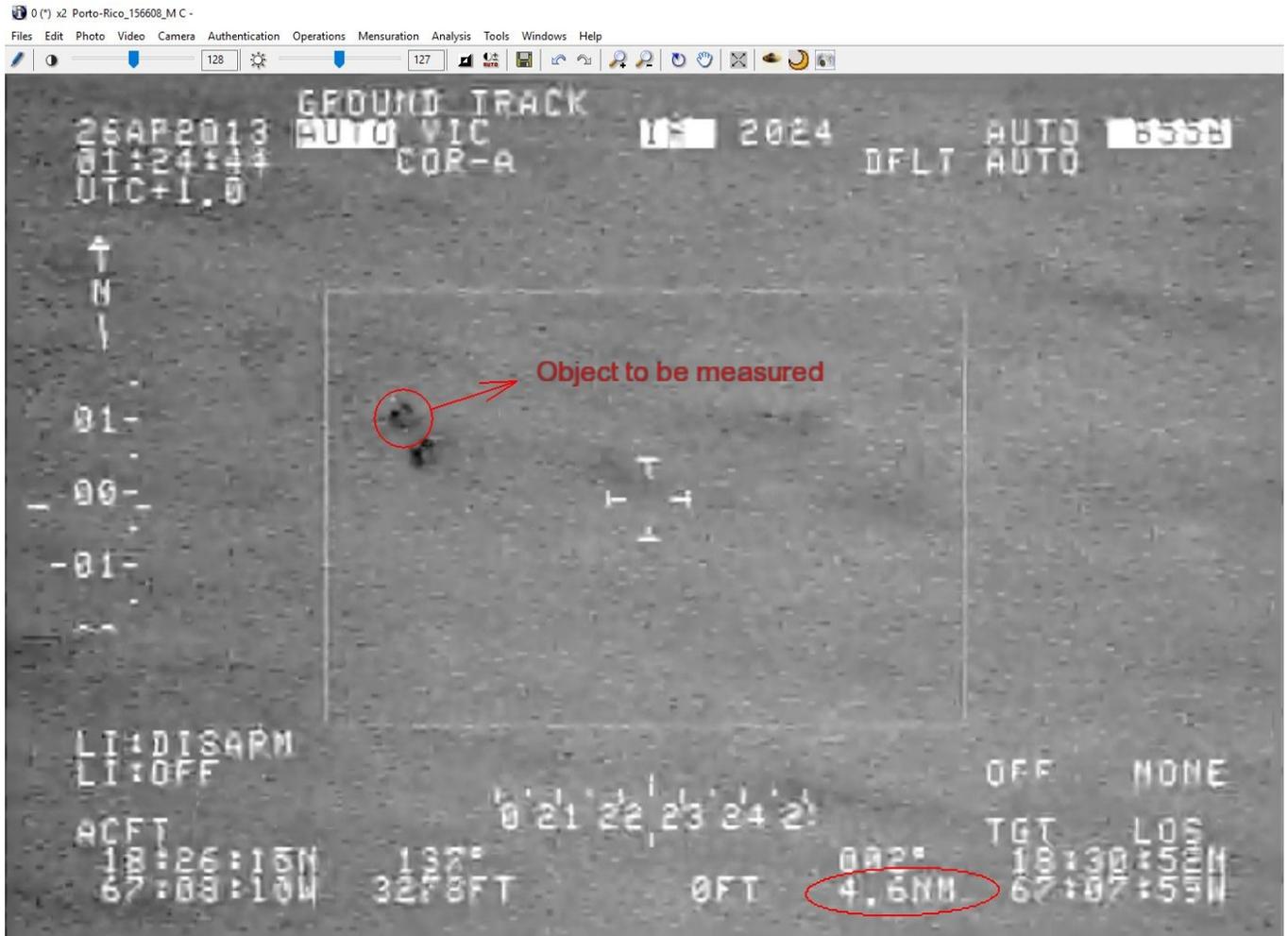For **10 ft** transverse distance between hot spots: **2.41 nm** camera-object distance

           -> to be compared to: **4.9 nm**   camera-ground distance
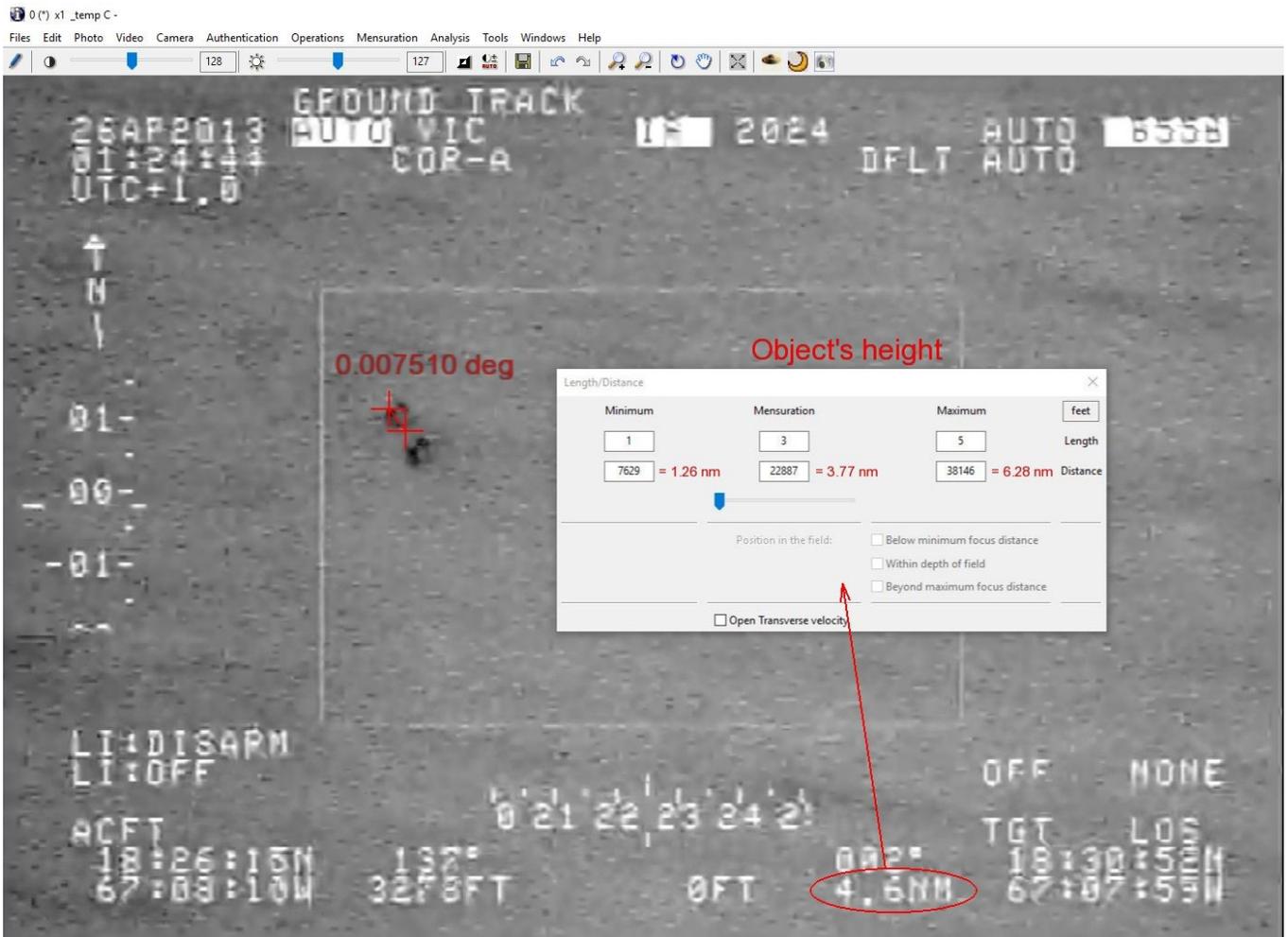   (along the line of sight)

Measurement of one object

One frame was selected, showing the two separate hot spots with the maximum zoom factor, at the video time (according to IPACO's counter) of 156608 ms. The upper object, if assumed to be one of Rubén Lianza's two "flying hearts", seems to be facing the camera, which is the best possible configuration for comparison with the known dimensions of such a specific balloon.
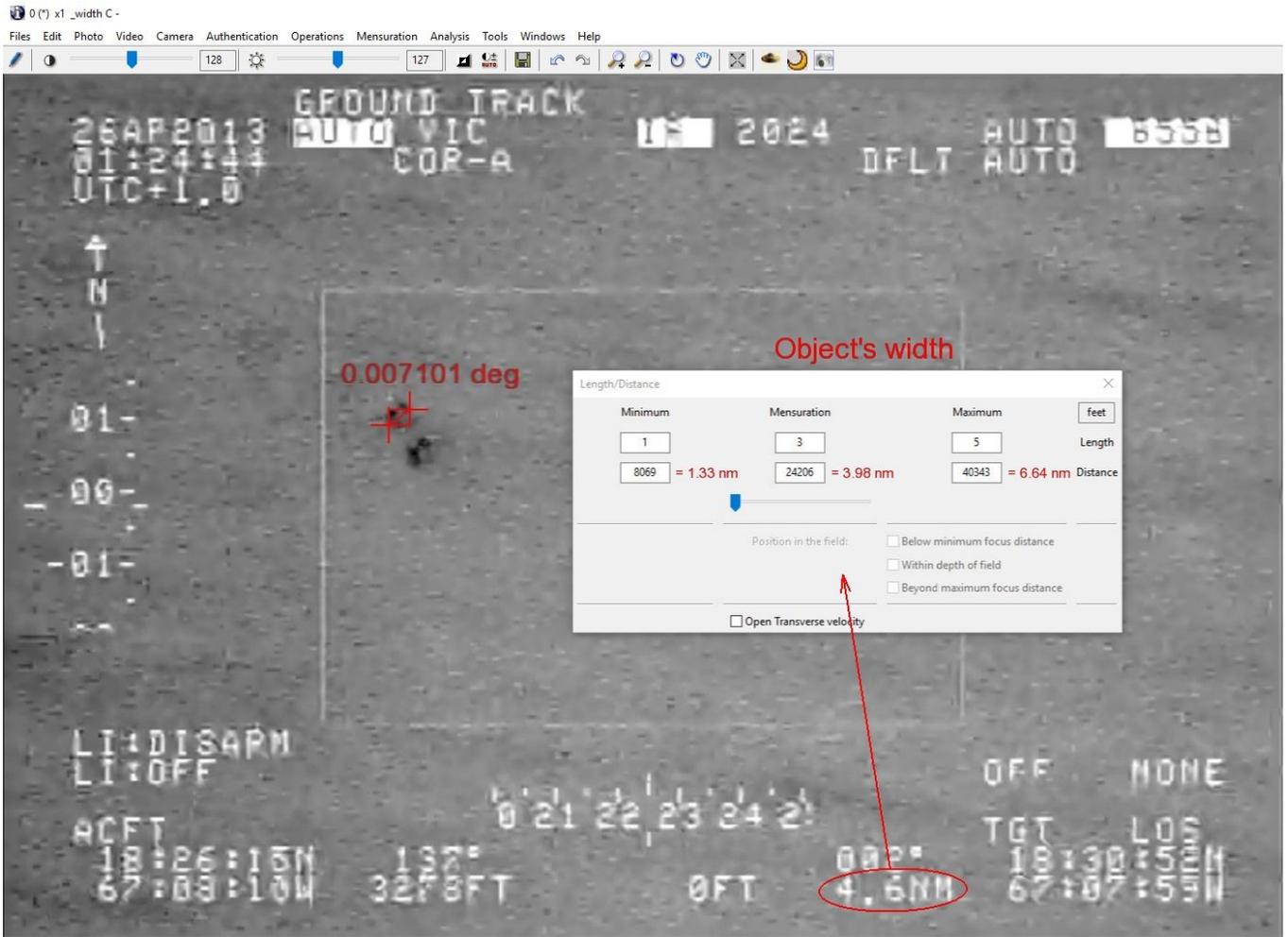
Image 156608

Two angles were measured on that particular frame, corresponding respectively to the height and the width of the object, in the same way as in the previous paragraph. "Transverse size/Distance from the camera" ratios were then easily obtained from IPACO.

Object's angular height = **0.0075 deg**

For **1 ft** transverse height: **1.26 nm**   camera-object distance

For **3 ft** transverse height: **3.77 nm**   camera-object distance

For **5 ft** transverse height: **6.28 nm**   camera-object distance
(most improbable)

-> to be compared to: **4.6 nm**   camera-ground distance
(along the line of sight)

Object's angular width = **0.0071 deg**

For **1 ft** transverse width: **1.33 nm**   camera-object distance

For **3 ft** transverse width: **3.98 nm**   camera-object distance

For **5 ft** transverse width: **6.64 nm**   camera-object distance
                                                   (most improbable)

-> to be compared to: **4.6 nm**   camera-ground distance
                                                   (along the line of sight)

If we consider specifically Rubén Lianza's explanation, we are dealing with a pair of heart-shaped Chinese lanterns, each of which has the following dimensions, according to the manufacturer:

Height = 95 cm = 3.12 ft

Width = 90 cm = 2.95 ft

Using IPACO with the two already measured angles, we obtain from both measurements the same approximate result:

Camera-object distance ≈ 3.9 nm

-> to be compared to:

Camera-ground distance ≈ 4.6 nm
(along the line of sight)

Note: *Assuming the distance between the plane and the object remained about constant (≈ 3.9 nm) in the 4 different frames selected above (only separated by a few seconds), we can infer the assessed respective values of the transverse distance between the two hot spots:*

Frame 156608 ms: 5.2 ft

Frame 158282 ms: 6.6 ft

Frame 160911 ms: 14.7 ft

Frame 162101 ms: 16.2 ft

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[1] *Conversion from FOV$_H$ horizontal into FOV$_D$ diagonal for an image of height H and width L (pixels) :*

$$FOV_D = 2 \text{ atan } \{\sqrt{[1 + (H/L)^2} \times \tan (FOV_H / 2)\}$$

Commodore Ruben Lianza is a retired military pilot whose career was mostly oriented to Research & Development. He holds a License Degree in Aerospace Systems and logged more than 3000 hours of flying time in 20 different kinds of aircraft. Latest assignments include: Argentine air force Flight Test Center´s Chief Test Pilot; Test and Project Pilot in the J.P.A.T.S. Program at Vought Aircraft (Dallas, Texas, US); Director of Certification for the Argentine air force Directorate of Research and Development (Cordoba, Argentina); Head of the Pampa Program´s Liaison Office at Lockheed Martin Argentina S.A, (Cordoba, Argentina); Marambio Antarctic Station Leader (Antarctica) for a full year Campaign; Head of the Institutional Communications Department and spokesman of the air force at the Argentine air force´s Headquarters (Buenos Aires).

During his 30 (+) year career, Lianza was the Commissioned Officer sent to conduct field research and witness interviews on every alleged UFO case reported to the Argentine air force. He developed his own investigative methods based on scientific premises and has built up an invaluable file with his conclusions. From 1978 to 2016 he has thoroughly analyzed nearly one hundred cases, all of which could be solved as misinterpretations and hoaxes, including two famous Argentine UFO "vintage" cases and one case which made headlines news in 1995 since it involved highly professional airline and Gendarmerie pilots, both crews corroborating the sighting of each other.

After 7 years into retirement, Commodore Lianza was recalled for duty as Head of the Argentine air force´s Aerospace Phenomena Research Committee, officially taking charge on January 2015.

In April 2019, considering its added tools and capacities plus its rate of success in identifying aerospace optical elements, the Chief of Staff of the Argentinian Air force raised CEFAE`s organic level to that of a Department, renaming it as "Center for Aerospace Identification" (CIAE). Its new mission is: "Organize, coordinate and execute the investigation and analysis of events, activities or elements present or originated in the Aerospace of interest; identify their causes and report the conclusions to the pertinent agencies that require them".

Even though CIAE is now committed to provide information to other Government Agencies, it will continue providing, as a secondary task, the public service to analyze and resolve UFO cases submitted by the citizens and to continue publishing an Annual UFO Case Resolution Report on its renewed website.

All annual reports (from 2015 on) can be read (in Spanish) under the Titles: Informe Resolución de casos (and the year you are looking for) at the bottom of the text on the following link:

https://www.argentina.gob.ar/fuerzaaerea/centro-de-identificacion-aeroespacial