

IPACO expert report

Expert name

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Report date

October 02, 2012

Last update

07/04/2013

Type

IFO

Classe

A

Explanation

Advertising banner

Complement

Plane trailing

Document

Photos

Shoot place

Manhattan, New York

USA

Shoot date

September 17, 2011 between
04:19:22.11 and 04:19:26.07pm
local time



Photo n°5714



Photo n°5715



Photo n°5716



Photo n°5717

I. Shoot circumstances

The photos were taken by an amateur photographer with a high quality camera but at a far distance. The statement from the witness is listed below.

The four photos that the photographer took are each 6meg in size and were taken with a Canon Rebel in the raw mode; he converted them to jpeg.

The photographer was scanning the Manhattan skyline to make photos related to the building of the Twin Tower monuments that were destroyed on 9-11-2001 and was creating a panoramic view of the skyline. When he put his photos together is when he noticed this unusual object. He was located at the top of 238 Bowery Street in Manhattan.

“The event occurred last Saturday 9-17-2011 in the early afternoon. I was taking digital photographs from the roof terrace of the new Museum located on Bowery in Manhattan's Lower East Side. I was shooting a series of images of the downtown Manhattan skyline to get some pictures of the Freedom tower construction.

Because I had no tripod I was shooting at a very fast exposure rate 1/500th of a second. In addition I was shooting in continuous mode at a frame rate of about 4 Frames per second. I took my pictures and left the location.

Last night upon looking at the images, I noticed a diamond shaped object moving very close to the horizon in four frames of my images. On closer inspection I noticed what appeared to be regular markings and windows on the craft. I had to be moving at an incredible rate of speed for it to have moved as far as it did give the frame rate it was captured at. It seems to be faintly emitting both blue and red light from the openings on its back area. A helicopter was also present in the nearby vicinity.

At first I thought it was a flag or something, but soon realized there was no flag pole and from frame to frame its shape stays regular.

I'm hoping an expert in this type of thing can help me to rule out any other possible explanations for what they think this might be. Please contact me A.S.A.P. as I am curious to get another opinion, especially an expert one. The three images I have supplied are lower resolution details of the actual four images that were taken as described above. »

II. Camera settings

The camera model that was used is a Canon EOS 550D, also called « Rebel T2i »:



This model came out in February 2008 and is an 18.0 megapixels compact SLR, with a max resolution of 5184 x 3456.

Technical specifications can be read [here](#).

The four original photos were made using the following common technical settings:

- Shutter speed 1/512
- ISO 800
- Flash off
- Resolution of 5184 x 3456
- No zoom
- Firmware version 1.0.6

The two format versions, JPEG and RAW (.CR2 for Canon) were provided for the complete analysis.

III. Data examination

1- Photos authentication

The photographer provides us original shoots, without modifying their names (« *_MG_571x.jpg* »), in both .jpeg and .cr2 formats.

- Comparison of EXIF data extracted from the photos with other taken off another original photo (named « *Test* ») from the same camera model does not show any difference, except, of course for the value of the various technical EXIF tags that depends of the shoot conditions (ISO, *f* number, exposure time, etc.).

ExifTool Version Number : 8.51	ExifTool Version Number : 8.51
File Name : 32025_report_file3__MG_5716.CR2	File Name : canon-550d-exemple1.CR2
Directory : C:\Users\maison\Desktop	Directory : C:\Users\maison\Desktop\canon EOS
File Size : 22 MB	File Size : 24 MB
File Modification Date/Time : 2011:10:03 16:20:14+02:00	File Modification Date/Time : 2011:10:16 13:11:27+02:00
File Permissions : rw-rw-rw-	File Permissions : rw-rw-rw-
File Type : CR2	File Type : CR2
MIME Type : image/x-canon-cr2	MIME Type : image/x-canon-cr2
Exif Byte Order : Little-endian (Intel, II)	Exif Byte Order : Little-endian (Intel, II)
Image Width : 5184	Image Width : 5184
Image Height : 3456	Image Height : 3456
Bits Per Sample : 8 8 8	Bits Per Sample : 8 8 8
Compression : JPEG (old-style)	Compression : JPEG (old-style)
Make : Canon	Make : Canon
Camera Model Name : Canon EOS REBEL T2i	Camera Model Name : Canon EOS 550D
Preview Image Start : 56132	Preview Image Start : 65252
Orientation : Horizontal (normal)	Orientation : Rotate 90 CW
Preview Image Length : 1520152	Preview Image Length : 2191429
X Resolution : 72	X Resolution : 72
Y Resolution : 72	Y Resolution : 72
Resolution Unit : inches	Resolution Unit : inches
Modify Date : 2011:09:17 16:19:24	Modify Date : 2010:01:20 22:42:24
Artist : Ian P.Clifford	Artist : Labracherie Renaud
Copyright : All Rights Reserved.C&P Ian P. Clifford	Copyright : Focus-Numerique.com
Exposure Time : 1/500	Exposure Time : 1/100
F Number : 14.0	F Number : 5.6
Exposure Program : Program AE	Exposure Program : Aperture-priority AE
ISO : 800	ISO : 1600
Exif Version : 0221	Exif Version : 0221
Date/Time Original : 2011:09:17 16:19:24	Date/Time Original : 2010:01:20 22:42:24
Create Date : 2011:09:17 16:19:24	Create Date : 2010:01:20 22:42:24
Components Configuration : Y, Cb, Cr, -	Components Configuration : Y, Cb, Cr, -
Shutter Speed Value : 1/512	Shutter Speed Value : 1/29
Aperture Value : 14.1	Aperture Value : 5.7
Flash : Off, Did not fire	Flash : Off, Did not fire
Focal Length : 59.0 mm	Focal Length : 53.0 mm
Macro Mode : Normal	Macro Mode : Normal
Self Timer : Off	Self Timer : Off
Quality : RAW	Quality : RAW
Canon Flash Mode : Off	Canon Flash Mode : Off
Continuous Drive : Continuous	Continuous Drive : Single
Focus Mode : One-shot AF	Focus Mode : One-shot AF
Record Mode : CR2+JPEG	Record Mode : CR2+JPEG
Canon Image Size : Large	Canon Image Size : Large
Easy Mode : Manual	Easy Mode : Manual
Digital Zoom : None	Digital Zoom : None
Contrast : Normal	Contrast : Normal
Saturation : Normal	Saturation : Normal
Metering Mode : Evaluative	Camera ISO : Auto
Focus Range : Not Known	Metering Mode : Evaluative
Canon Exposure Mode : Program AE	Focus Range : Not Known
Lens Type : Canon EF-S 17-85mm f4-5.6 IS USM	Canon Exposure Mode : Aperture-priority AE
Long Focal : 85 mm	Lens Type : Canon EF-S 18-135mm f/3.5-5.6 IS
Short Focal : 17 mm	Long Focal : 135 mm
Focal Units : 1/mm	Short Focal : 18 mm
Max Aperture : 5.7	Focal Units : 1/mm
Min Aperture : 32	Max Aperture : 5.2
Flash Activity : 0	Min Aperture : 33
Flash Bits : (none)	Flash Activity : 0
Zoom Source Width : 0	Flash Bits : (none)
Zoom Target Width : 0	Zoom Source Width : 0
Manual Flash Output : n/a	Zoom Target Width : 0
Color Tone : Normal	Manual Flash Output : n/a
SRAW Quality : n/a	Color Tone : Normal
Auto ISO : 100	SRAW Quality : n/a
Base ISO : 800	Auto ISO : 100
Measured EV : 13.63	Base ISO : 1600
Target Aperture : 14	Measured EV : 7.38
Target Exposure Time : 1/512	Target Aperture : 5.7
Exposure Compensation : 0	Target Exposure Time : 1/102
White Balance : Daylight	Exposure Compensation : 0
Slow Shutter : None	White Balance : Auto
Shot Number In Continuous Burst : 0	Slow Shutter : None
Optical Zoom Code : n/a	Shot Number In Continuous Burst : 0
Camera Temperature : 29 C	Optical Zoom Code : n/a
Flash Guide Number : 0	Camera Temperature : 23 C
Flash Exposure Compensation : 0	Flash Guide Number : 0
Auto Exposure Bracketing : Off	Flash Exposure Compensation : 0
AE Bracket Value : 0	Auto Exposure Bracketing : Off
Control Mode : Camera Local Control	AE Bracket Value : 0
Measured EV 2 : 14.125	Control Mode : Camera Local Control
Bulb Duration : 0	Measured EV 2 : 6.875
Camera Type : EOS High-end	Bulb Duration : 0
ND Filter : n/a	Camera Type : EOS High-end

- Photos were taken at the max possible resolution, which is 5184x 3456, ratio 1.5, with the « *RAW*» quality for the .CR2 format and « *Fine* » for the .jpeg format, which is conform to the possibilities and specifications for the Canon EOS 550D.

- Comparison of the data obtained using the software *JPEGSnoop* on a panel of 10 original photos taken at the same resolution is conclusive. In each case, the same .jpeg compression signature is found ; only the name of the camera changes (from « EOS 550D » to « Rebel T2i »), which is not of any impact on this parameter:

*** Searching Compression Signatures ***

```
Signature:          01A5A96C366F3E76B00DA5ED55BB3238
Signature (Rotated): 018F98F7BF412181D34F86F1A3BCD26F
File Offset:       0 bytes
Chroma subsampling: 2x1
EXIF Make/Model:   OK   [Canon] [Canon EOS 550D]
EXIF Makernotes:   OK
EXIF Software:     NONE
```

Searching Compression Signatures: (3327 built-in, 2 user(*))

EXIF.Make / Software	EXIF.Model	Quality	Subsamp Match?
CAM:[Canon	] [Canon EOS 40D	] [fine	] Yes
CAM:[Canon	] [Canon EOS 5D	] [fine	] Yes
CAM:[Canon	] [Canon EOS-1D Mark III	] [fine	] Yes
*CAM:[Canon	] [Canon EOS 550D	] [fine	] Yes

Based on the analysis of compression characteristics and EXIF metadata:

ASSESSMENT: Class 3 - Image has high probability of being original



Image (RGB, DC) @ 12.5% (1/8)



*** Searching Compression Signatures ***

Signature: 01A5A96C366F3E76B00DA5ED55BB3238
Signature (Rotated): 018F98F7BF412181D34F86F1A3BCD26F
File Offset: 0 bytes
Chroma subsampling: 2x1
EXIF Make/Model: OK [Canon] [Canon EOS REBEL T2i]
EXIF Makernotes: OK
EXIF Software: NONE

Searching Compression Signatures: (3327 built-in, 2 user(*))

EXIF.Make / Software	EXIF.Model	Quality	Subsamp Match?
CAM:[Canon]	[Canon EOS 40D]	[fine]	Yes
CAM:[Canon]	[Canon EOS 5D]	[fine]	Yes
CAM:[Canon]	[Canon EOS-1D Mark III]	[fine]	Yes
*CAM:[Canon]	[Canon EOS 550D]	[fine]	Yes

Based on the analysis of compression characteristics and EXIF metadata:

ASSESSMENT: Class 4 - Uncertain if processed or original

While the EXIF fields indicate original, no compression signatures

Image (RGB, DC) @ 12.5% (1/8)



In conclusion, the photos are very likely originals and haven't been tampered with.

2- Determination of the actual presence of either a physical object or a photographic artifact in the scene

Clearly, the photographed phenomenon is not luminous, and doesn't show any kinetic or focus blur.



The photographer did not move – or very little - during the exposure time, the photographed scene being sharp, by the way.

We probably have to deal with an external stimulus, thus with the effective presence of a material object in the scene.

3- Attempts to identify the phenomenon

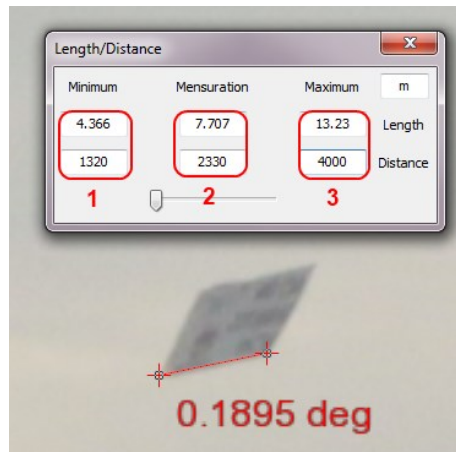
The most probable hypothesis at this stage is the passage in the field of view of the camera of a trailed banner by a plane or a helicopter, this one being invisible, hidden behind the close buildings since the beginning of the photo sequence.

Let's take now a closer look at this hypothesis.

a- Geometric measurements

- Size and distance estimations :

With the help of IPACO, we can do various angle measurements in order to evaluate both the possible size of the object and its distance from the camera:

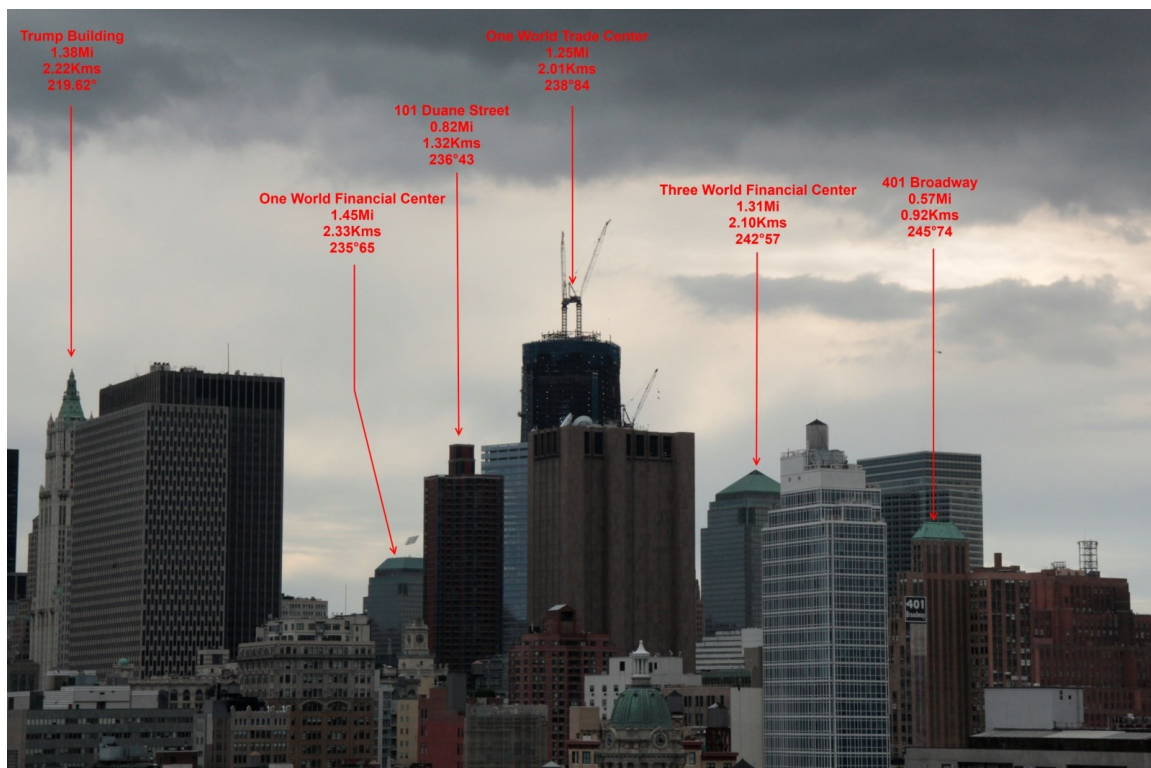


These measurements give an angular size of 0.1895° ; then, if the object is located at:

- 1320 m (0.82 miles) away from the camera, its length is then 4.36 m (14.3 feet),
- 2330 m, (1.45 miles), its length is then 7.70 m (25.26 feet)
- 4000 m, (2.49 miles), its length is then 13.23 m (43.41 feet)

It is worth noting that for a big 200 feet (61 m) long banner, the corresponding distance from the camera would be about... 18.4 km! (11.43 miles)

These values were not arbitrarily chosen, but according to the measured distances between the photographer and the buildings:



Then, if the object is located between the two buildings « *101 Duane Street* » and « *One World Financial Center* », its length is comprised between 4.36 m (14.3 feet) and 7.70 m (25.26 feet), and obviously more if it is farther away.

- Speed estimate

The “UFO” being « frozen » in its displacement, captured at a 1/512^e speed, we can logically think that it moves at a relatively slow speed, if not located hundreds of miles away of course.

Let’s see if this apparent move between the pictures could be compatible with the average speed of a plane towing a banner.

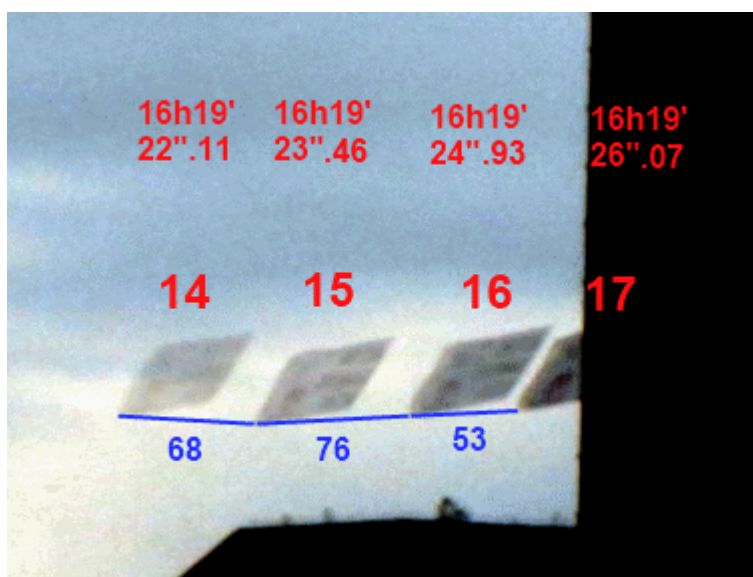
Fortunately, the camera that was used registered the hour of the shoot *at hundredth of seconds*. So for the four photos, here are the exact times for each one:

- n°5714: **16h19'22".11**
- n°5715: **16h19'23".46**
- n°5716: **16h19'24".93**
- n°5717: **16h19'26".07**

...visible under the EXIF data like this:

```
Shooting Mode      : Program HE
Shutter Speed     : 1/500
Create Date       : 2011:09:17 16:19:23.46
Date/Time Original : 2011:09:17 16:19:23.46
Modify Date       : 2011:09:17 16:19:23.46
Thumbnail Image   : <Binary data 9604 bytes,
```

First step is to do a composite of the four photos using the closest building as a reference and report on it these hours (in red) plus the distance in pixels between each object (in blue):



Next, it's possible to check the regularity of the move of the object:

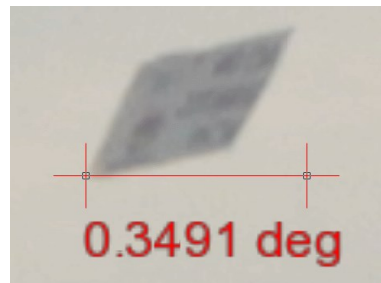
- Interval 1: between shoot n°5714 and 5715: **68 pixels in 1".35**
- Interval 2: between shoot n°5715 and 5716: **76 pixels in 1".47**
- Interval 3: between shoot n°5716 and 5717: **53 pixels in 1".14**

Now let's compute the average speed per pixel for each interval:

- Interval 1: **0.19" per pixel**
- Interval 2: **0.19" per pixel**
- Interval 3: **0.21" per pixel**

I guess that we can already say that **the speed WAS constant.**

Second step is to directly measure on the photo one of these intervals in degrees: (let's take the first one, for example)



68 pixels make **0.3491°**

Third step is to compute all the possible banner size/distance possibilities according to the already known distances, and according to some random more far away:





The red lines materialize the distance and the line of sight between the photographer and the various visible buildings.

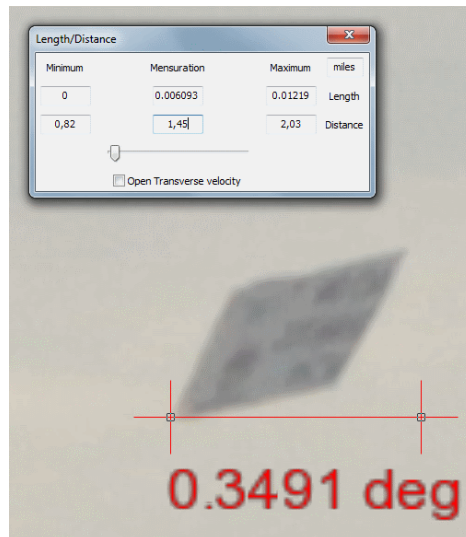
The green line materializes the line of sight of the object.

The object cannot be closer than 0.82 miles, since it's passing behind the 101 Duane Street building, so let's take as distances references these values:

- 1- 0.82 miles: 101 Duane Street building
- 2- 1.45 miles: One World Financial Center
- 3- 2.03 miles: Over the Hudson River (approx. in the middle)
- 4- 2.93 miles: Over Elis Island
- 5- 5.00 miles: Over Bayonne 1
- 6- 7.00 miles: Over Bayonne 2

Fourth step is to compute the apparent movement of the object according to the estimated distances above:

- 1- If the object was located 0.82 miles away, then it's move was of **0.004996 miles - 23 ft - 7.23 m**
- 2- If the object was located 1.45 miles away, then it's move was of **0.006093 miles - 32 ft - 9.80 m**
- 3- If the object was located 2.03 miles away, then it's move was of **0.01219 miles - 64 ft - 19.61 m**
- 4- If the object was located 2.93 miles away, then it's move was of **0.01785 miles - 94 ft - 28.72 m**
- 5- If the object was located 5.00 miles away, then it's move was of **0.03046 miles - 160 ft - 49.02 m**
- 6- If the object was located 7.00 miles away, then it's move was of **0.04265 miles - 225 ft - 68.63 m**



Fifth step is to compute the average speed for each possibility, knowing that there was 1.35" during interval 1:

- 1- 0.004996 miles during 1.35" makes an average speed of **13.32 mph**
- 2- 0.006093 miles during 1.35" makes an average speed of **16.24 mph**
- 3- 0.01219 miles during 1.35" makes an average speed of **32.50 mph**
- 4- 0.01785 miles during 1.35" makes an average speed of **47.59 mph**
- 5- 0.03046 miles during 1.35" makes an average speed of **81.22 mph**
- 6- 0.04265 miles during 1.35" makes an average speed of **113.73 mph**

Now that we have our estimated speed according to estimated distances, we may wonder what the average speed of a plane towing a banner is.

I tried to find this info on-line and there are various data:

- [This document](#) is saying that ***"normal towing speed is 60 to 70 mph"***
- [This other document](#) do not exactly gives the same data: ***"Typically, depending on the type of aircraft, it will cruise at speeds between 45 and 75 mph"***
- [Here](#), you can read that the average speed is comprised ***between 60 and 65 mph.***

Now, let's take the larger range of speed, **45 to 75 mph**, from these three sources.

That means that the distance should be, for a typical plane towing a banner at these average speeds, comprised between the number 4 and 5 of our estimations above, i-e **between 2.93 and 5.00 miles** away from the camera.

2.93 miles away is over Elis Island and 5.00 miles is over Bayonne.

- **Conclusion 1:**

Calculations show that the distance and speed of the object is consistent with those of a plane trailing a banner.

For an average estimated speed comprised between 45 and 75 mph, the object is located at an estimated distance comprised between 2.93 and 5.00 miles away from the camera, then between Elis Island and Bayonne.

- **Altitude estimation**

In order to conform to the general FAA regulation rules and to the Temporary Flight Restrictions as well, the supposed plane has to fly:

- For the Temporary Flight Restriction in place through September 30th, 2011: *“outside a 2 nautical miles radius that include airspace from the surface up to but not including 7000 feet MSL, centered on the LA GUARDIA VOR/DME (LGA) 258° radial at 5 nautical miles (Latitude: 40°44’59”N, Longitude 73°58’08”W)”*, which is the UN head quarters position (centered in the middle of the red circle in the TFR map below).



- For the general FAA rules for the trailing banners: “over 1000 feet above the highest obstacle”, for any craft at any time.

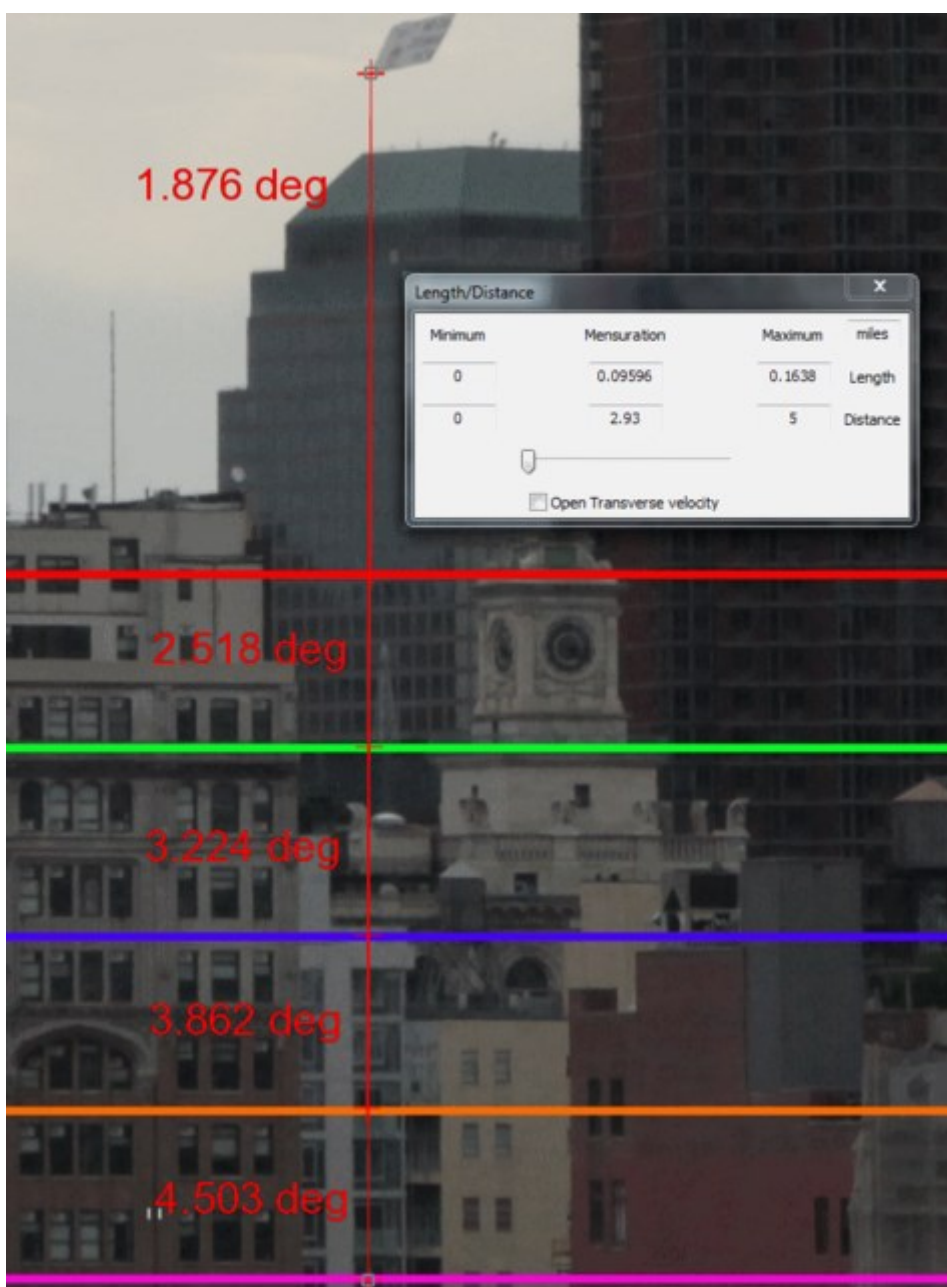
The photographer is located ca. 2.5 miles south of the center of the restricted area, and the object, if we take again our conclusion n°1, is located between 2.93 and 5 miles SW from the photographer. This put the object position outside the TFR area.

Now, to conform to the general FAA rules as explained above, the object, if a plane with a banner, should be no less than 1000 ft above the highest obstacle.

Next step now would be to determine, using the previous speed/distance object estimation, if such an altitude is possible and still consistent with the towed banner theory.

Assuming that the camera was nearly horizontal, let’s compute the various possibilities about the horizon line position, since it’s not visible in any photography.

In order to do this, I draw five reference lines in one of the photography and, with IPACO, measured for each one of them the angular size between these and the object, which materialize in fact its altitude, in degrees:



This allows me to create a table that gives all the possible altitudes above sea level in feet, according to the previous estimations of the distance of the object, in miles:

	2.93 mi	5.00 mi
1.876°	506 ft	864 ft
2.518°	682 ft	1165 ft
3.224°	870 ft	1486 ft
3.862°	1043 ft	1778 ft
4.503°	1214 ft	2073 ft

Table 1

All the above results in orange are consistent with a distant object that flies over 1000 ft above sea level.

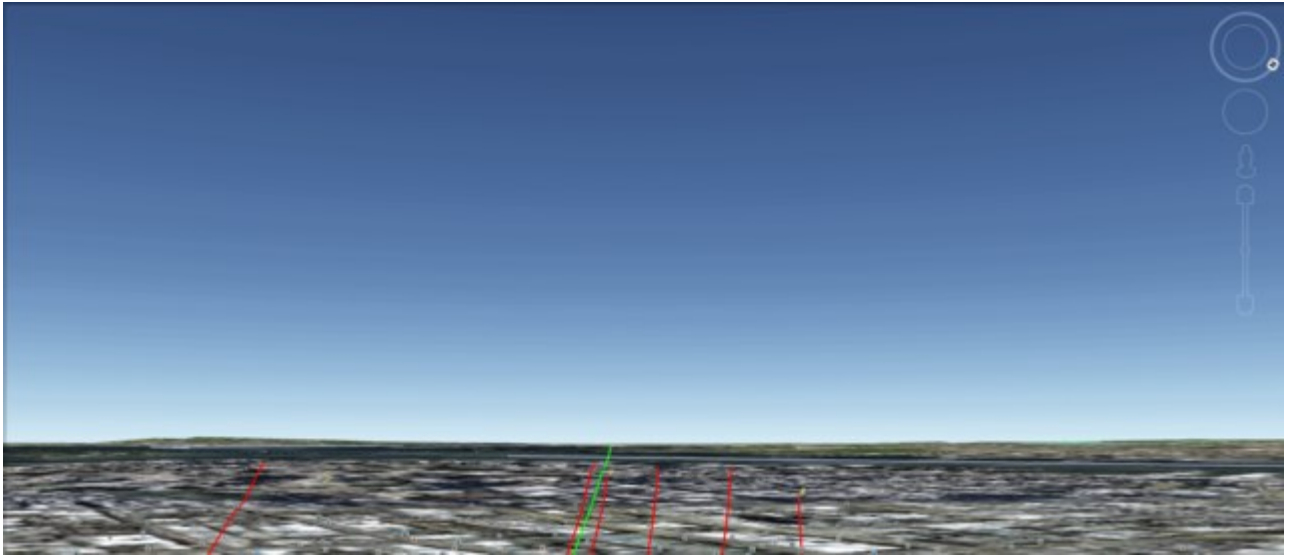
However, **could it be possible to determine the exact position of the horizon line?**

There's an interesting feature in Google Earth that could help us to find it. It's the 3D buildings feature.

Firstly, I placed myself as if I was the photographer, at the top of the New Museum, 238 Bowery Street, trying to reproduce the best possible way, the exact relative positions of the background buildings, then I took a screen-shoot of the general view:



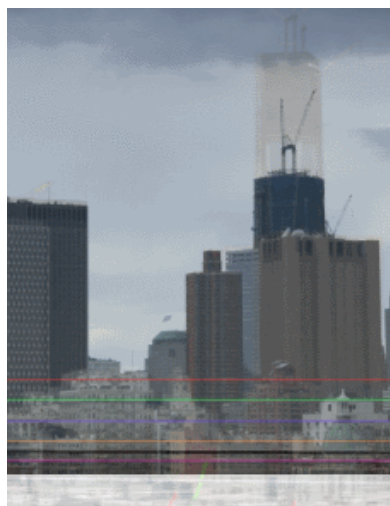
Next step is, without modifying anything else, to remove the 3D feature to let appear the horizon line, as seen from the photographer position, then take another screen-shoot:



Finally, adding the two screen-shoots using layers gives me the exact position of the horizon line relative to the position of the buildings:



This, reported to my previous estimations of this horizon line position, gives the following result, with the “*real*” horizon line in black:



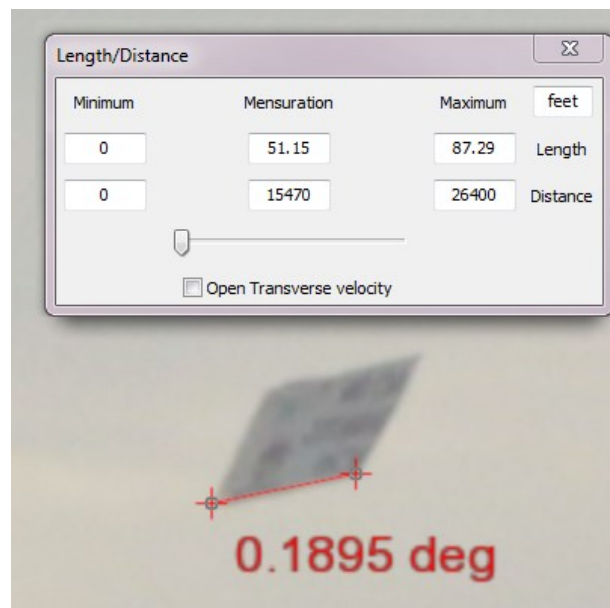
As it can be seen, this line is located between the orange and the pink line, so that the object's angular altitude is comprised between 3.862° and 4.503° , then that the object altitude is comprised between 1043 ft and 2073 ft. (the two last lines of table 1)

- **Conclusion 2:**

Calculations show that the **object altitude could be comprised between 1043 ft and 2073 ft above sea level, for a distance to the camera between 2.93 and 5 miles**, then that both its position and altitude are conform to the FAA regulation rules.

- **New sizes estimations**

At the light of the previous results, we can re-evaluate the possible size of the object, using the Length/Distance IPACO tool:



So, for the object located 2.93 miles away from the camera (15470 ft), it will have a visible **length of 51 ft**, and if 5 miles away (26400 ft), it will have a **length of 87 ft**. Even if we take account of the perspective effect (roughly 10-15% here), these data are still compatible with the aerial banner dimensions. (Mainly [between 40 ft and 125 ft long](#))

- **Why are the ropes of the trailed banner not visible?**

It depends on several factors that include thickness of the towing cables of course, but also the distance of the banner and the camera resolving power as well.

- Distance of the banner: between 2.93 (15470 ft) and 5 miles (26400 ft) as estimated above.
- Thickness of the towing cables: for a [View Piper PA-25 PAWNEE Installation](#), for example, the towing cable is 6mm in diameter.
- Camera resolving power: the [Circle of Confusion \(CoC\)](#) (which is the largest blur spot that will still be perceived by the human eye as a point) with the related hyper-focal distance for a Canon Rebel T2i can be precisely defined using the technical data of the photo:

- focal Length: 59
- f/stop: 14.3
- subject distance: between 15470 ft and 26400 ft

This involves some math, but [this DOF calculator](#) can give you in an easy way those values. As the camera focused on infinite, they stay the same for both distance estimations, i-e:

- Coc: 0.019 mm
- Hyperfocal distance: 42.4 ft

That means that 42.4 ft away, the far limit resolving power is of **0.019 mm**. A quick computation of these values for the estimated distances gives:

- Ca. **7 mm** for the banner to be 15470 ft (2.93 miles) away
- Ca. **12 mm** for the banner to be 26400 ft (5 miles) away

In other words, if the ropes aren't visible in the photos, that means that they can't be resolved by the resolving power of the camera if they are under 7 mm in diameter for the banner to be 2.93 miles away and if they are under 12 mm in diameter for the banner to be 5 miles away.

6 mm in diameter put the far resolving distance up to 13.389 ft (2.94 miles). So if the ropes aren't visible, it's because the banner is more far away than this distance, which is compatible with my previous distance/speed/size estimations above.

b- Radiometric measurements

No useful radiometric measurements can be done here, as the object is not considered as a "black body".

c- Additional research

After some research on the Internet, I finally succeeded in finding the banner in question, confirming then the initial hypothesis.

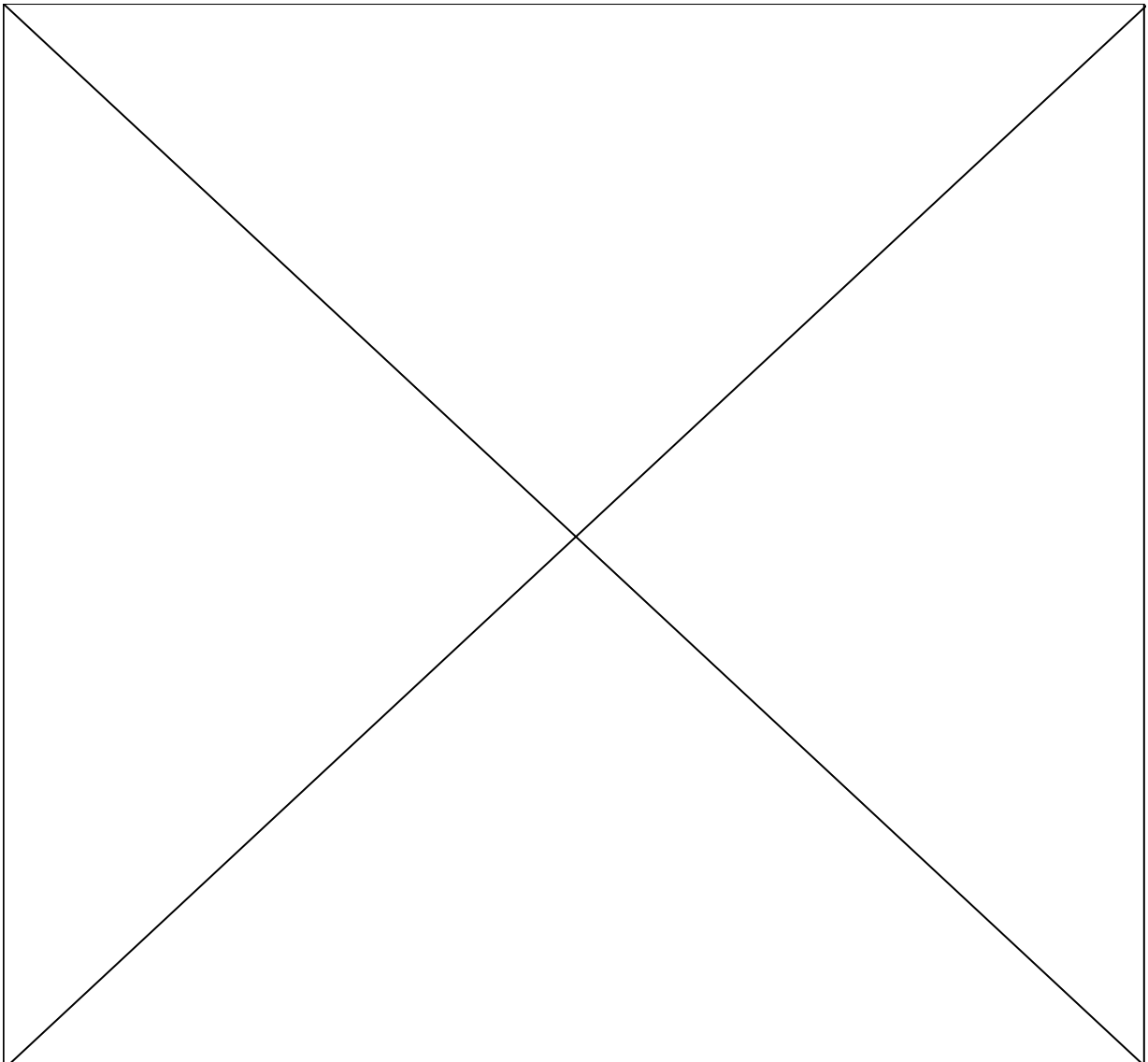
Between September 17 and 21, 2011, a summit in New-York City brought together leading experts in the diabetes problems and, on this occasion, an advertising campaign was launched, jointly by the [International Diabetes Federation \(IDF\)](#) and "[LIVESTRONG](#)", The Lance Armstrong foundation.

This advertising campaign planned, among other things, to turn over New-York, the first day of the event, four planes equipped with the following banner:



The plane is not visible on the photos, hidden by the buildings, and the cables that trailed this banner weren't visible, due to their thinness, as demonstrated above.

A brief description of this campaign can be read on [this PDF report, p18](#). Furthermore, this banner can be seen on the [IDF's Flickr page](#). To close this analysis, an animated flash allows us to better visualize this banner, both in its original version and in its "degraded" version in the photos:



IV. Conclusion

Given the objective data collected through the examination of the photos and the subsequent Internet research, we can conclude that this object is a **51/87 ft long** advertising banner trailed by a plane flying at a **constant speed** comprised **between 45 and 75 mph**, and located **between 2.93 miles and 5 miles away** from the camera, **between 1043 ft and 2073 ft** above sea level, over a position between Elis Island and Bayonne (New Jersey).

V. Sources – Photos credits – Acknowledgments

Original photos were provided by Robert Powell.

- (1) [Ephotozine.com - Canon EOS 550D tests](#)
[TFRs during the UN General Assembly - September 2011](#)

Thanks for their help in this investigation to:

- Robert Powell, SRB MUFON Director
- The team of the [Outpost Forum](#), and especially Lillian E. Waters and “*Dragonfire*”.
- The team of the French forum « [UFO Scepticisme](#) » : « *Nablator* » and « *Sébastien* »
- To « *FLAM* » of the French forum « [Ufologie et paranormal](#) » for the creation of the animated flash.