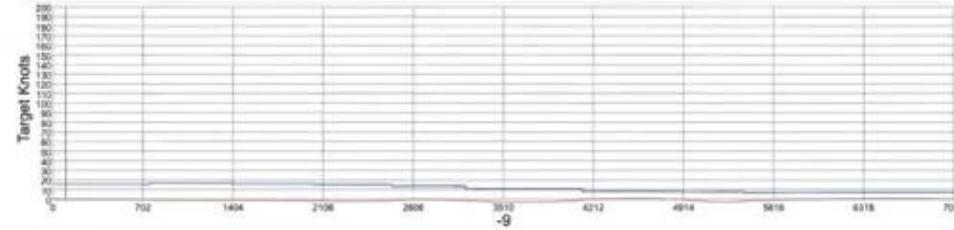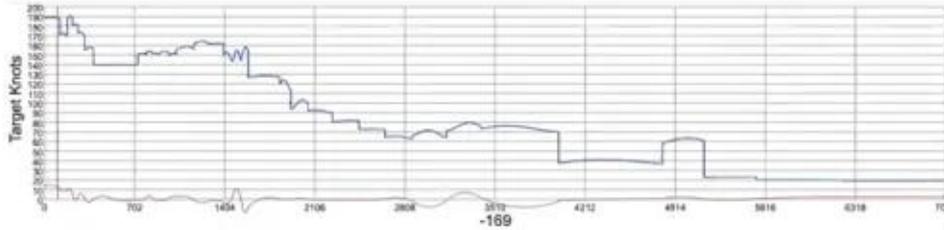# AGUADILLA - LINES OF SIGHT

1
00:00:06,289 --> 00:00:03,770
so now we're going to switch gears to

2
00:00:08,570 --> 00:00:06,299
our next speaker

3
00:00:12,049 --> 00:00:08,580
for this morning

4
00:00:13,490 --> 00:00:12,059
or afternoon respectively or even more

5
00:00:15,289 --> 00:00:13,500
um next with us

6
00:00:21,470 --> 00:00:15,299
is

7
00:00:23,870 --> 00:00:21,480
the author of Escaping The Rabbit Hole

8
00:00:26,689 --> 00:00:23,880
how to debunk conspiracy theories using

9
00:00:29,450 --> 00:00:26,699
facts logic and respect

10
00:00:31,749 --> 00:00:29,460
a retired software engineer he is the

11
00:00:34,490 --> 00:00:31,759
creator of the site

12
00:00:36,889 --> 00:00:34,500
metabunk which utilizes crowdsourcing

13
00:00:38,470 --> 00:00:36,899

14
00:00:41,450 --> 00:00:38,480
UAP cases

15
00:00:44,170 --> 00:00:41,460
Nick uses his background in coding 3D

16
00:00:46,369 --> 00:00:44,180
Graphics physics and linear algebra

17
00:00:49,549 --> 00:00:46,379
honed by decades in the video game

18
00:00:52,610 --> 00:00:49,559
industry to create custom tools uh with

19
00:00:56,330 --> 00:00:52,620
which to recreate simulate visualize and

20
00:01:00,229 --> 00:00:56,340
analyze various UAP videos

21
00:01:01,209 --> 00:01:00,239
many of uh mixed results are published

22
00:01:04,609 --> 00:01:01,219
on

23
00:01:07,190 --> 00:01:04,619
metabunk.org and at YouTube that is uh

24
00:01:13,130 --> 00:01:07,200
YouTube channel as well uh we're

25
00:01:15,289 --> 00:01:13,140
delighted to welcome Mick West please

26
00:01:17,510 --> 00:01:15,299
thank you very much Michael thank you

27
00:01:25,249 --> 00:01:17,520
for that introduction and I'm just going

28
00:01:30,050 --> 00:01:27,230
okie dokie so

29
00:01:31,969 --> 00:01:30,060
here is my talk and I apologize for the

30
00:01:33,649 --> 00:01:31,979
uh the long title I'll try to make it as

31
00:01:37,550 --> 00:01:33,659
interesting and as accessible as

32
00:01:40,429 --> 00:01:37,560
possible and let's get right into it

33
00:01:42,649 --> 00:01:40,439
what is a line of sight uh in three

34
00:01:44,810 --> 00:01:42,659
dimensions a line of sight is a line

35
00:01:48,109 --> 00:01:44,820
that connects your eye or your camera to

36
00:01:50,749 --> 00:01:48,119
a point in the world in two dimensions a

37
00:01:53,810 --> 00:01:50,759
line of sight is a point on an image

38
00:01:55,910 --> 00:01:53,820

because uh your eye or your camera is

39
00:01:58,010 --> 00:01:55,920
always at one end of a line of sight so

40
00:01:59,210 --> 00:01:58,020
if you're looking out at something you

41
00:02:00,590 --> 00:01:59,220
can't actually see the lines of sight

42
00:02:02,450 --> 00:02:00,600
because they're all emanating from your

43
00:02:04,310 --> 00:02:02,460
eye or your camera but if you were to

44
00:02:06,170 --> 00:02:04,320
kind of imagine it looking from the side

45
00:02:07,670 --> 00:02:06,180
you can kind of visualize all these

46
00:02:10,669 --> 00:02:07,680
lines kind of shooting out from the

47
00:02:13,970 --> 00:02:10,679
camera to points in the scene

48
00:02:17,390 --> 00:02:13,980
uh this this connection between 3D lines

49
00:02:21,110 --> 00:02:17,400
of sight and 2D lines of sight is

50
00:02:24,589 --> 00:02:21,120
illustrated by this this 1525 woodcut

51
00:02:26,630 --> 00:02:24,599
which is kind of a a manual camera the

52
00:02:28,250 --> 00:02:26,640
focal point of this manual camera is on

53
00:02:31,610 --> 00:02:28,260
the wall on the right and the line of

54
00:02:33,890 --> 00:02:31,620
sight here is this string this assistant

55
00:02:35,990 --> 00:02:33,900
here is moving the line of sights to

56
00:02:38,869 --> 00:02:36,000
points on this object and then the

57
00:02:41,449 --> 00:02:38,879
artist is going to plot a

58
00:02:45,470 --> 00:02:41,459
two-dimensional point on the image local

59
00:02:48,170 --> 00:02:45,480
the image focal plane which is right

60
00:02:51,290 --> 00:02:48,180
here so each three-dimensional line of

61
00:02:53,589 --> 00:02:51,300
sight corresponds to a 2d dot on the

62
00:02:56,750 --> 00:02:53,599
image

63
00:02:58,430 --> 00:02:56,760

and why do we use lines of sites in UAP

64
00:03:00,229 --> 00:02:58,440
investigations well it's a very kind of

65
00:03:01,850 --> 00:03:00,239
fundamental thing in in UAP

66
00:03:05,290 --> 00:03:01,860
investigations

67
00:03:08,570 --> 00:03:05,300
most UAP data we have is two-dimensional

68
00:03:10,790 --> 00:03:08,580
we have uh photos or we have videos

69
00:03:12,589 --> 00:03:10,800
which only show you a two-dimensional

70
00:03:15,470 --> 00:03:12,599
view of the scene but what we really

71
00:03:17,210 --> 00:03:15,480
want is three-dimensional data and the

72
00:03:19,190 --> 00:03:17,220
reason we want three-dimensional data is

73
00:03:21,290 --> 00:03:19,200
that we're looking for anomalies we're

74
00:03:23,149 --> 00:03:21,300
looking for unidentified anomalous

75
00:03:25,309 --> 00:03:23,159
phenomena we're looking for the the

76
00:03:27,470 --> 00:03:25,319
Black Swan that was talked about earlier

77
00:03:30,350 --> 00:03:27,480
something that is different from from

78
00:03:32,149 --> 00:03:30,360
the norm and to do that we need to

79
00:03:34,369 --> 00:03:32,159
figure out things in three-dimension we

80
00:03:37,369 --> 00:03:34,379
need to figure out how big the UAP is

81
00:03:39,470 --> 00:03:37,379
and how far away it is and that gives us

82
00:03:42,110 --> 00:03:39,480
how fast it's moving and the velocity

83
00:03:44,990 --> 00:03:42,120
and the acceleration are the things that

84
00:03:47,149 --> 00:03:45,000
will actually show whether something is

85
00:03:50,210 --> 00:03:47,159
anomalous like you've just heard about

86
00:03:52,309 --> 00:03:50,220
the Jal case where things appear to be

87
00:03:54,470 --> 00:03:52,319
moving in three dimensions very very

88
00:03:56,570 --> 00:03:54,480

rapidly in a way that if it was accurate

89
00:03:58,789 --> 00:03:56,580
would actually be anomalous

90
00:04:01,670 --> 00:03:58,799
so that's what we're looking for in a

91
00:04:04,850 --> 00:04:01,680
UAP investigation anomalous behavior and

92
00:04:07,009 --> 00:04:04,860
to do that we use line of sight and line

93
00:04:09,770 --> 00:04:07,019
of sight we get from video and from

94
00:04:11,630 --> 00:04:09,780
photos a photo only has one line of

95
00:04:13,789 --> 00:04:11,640
sight you can see in my little example

96
00:04:16,009 --> 00:04:13,799
here with me down in the corner looking

97
00:04:17,689 --> 00:04:16,019
up at a European estate that's just uh

98
00:04:21,530 --> 00:04:17,699
in the sky there's only one line of

99
00:04:23,749 --> 00:04:21,540
sight and this is uh a video would have

100
00:04:25,909 --> 00:04:23,759
thousands of lines of sight because

101
00:04:28,310 --> 00:04:25,919
each frame of the video has its own

102
00:04:30,950 --> 00:04:28,320
individual line from your camera to the

103
00:04:32,030 --> 00:04:30,960
UAP this is all fairly basic stuff but I

104
00:04:33,350 --> 00:04:32,040
want to make sure everyone knows what

105
00:04:35,689 --> 00:04:33,360
we're talking about

106
00:04:37,430 --> 00:04:35,699
there's three ways you can specify a

107
00:04:38,749 --> 00:04:37,440
line of sites there's probably more but

108
00:04:40,129 --> 00:04:38,759
they all boil down to essentially the

109
00:04:41,990 --> 00:04:40,139
same thing I'm not going to get into too

110
00:04:43,909 --> 00:04:42,000
much technical detail with this but you

111
00:04:47,510 --> 00:04:43,919
will notice that each of these three

112
00:04:49,909 --> 00:04:47,520
ways all starts with a camera position

113
00:04:52,550 --> 00:04:49,919

yeah camera position obviously is the

114
00:04:55,189 --> 00:04:52,560
position of the camera in the world it's

115
00:04:58,790 --> 00:04:55,199
what is its location on a map and how

116
00:05:01,129 --> 00:04:58,800
high is it uh for for analysis we

117
00:05:03,249 --> 00:05:01,139
usually want the what's we refer to

118
00:05:06,290 --> 00:05:03,259
normally nowadays as the GPS position

119
00:05:11,150 --> 00:05:06,300
which is the latitude the longitude and

120
00:05:13,070 --> 00:05:11,160
the altitude of the camera and uh we do

121
00:05:15,830 --> 00:05:13,080
sometimes use other coordinate systems

122
00:05:19,249 --> 00:05:15,840
you might see these mentions like ecef

123
00:05:21,830 --> 00:05:19,259
and enu earth center Earth fixed and

124
00:05:24,110 --> 00:05:21,840
East North up but these are things that

125
00:05:26,510 --> 00:05:24,120
you use for the actual analysis the

126
00:05:28,670 --> 00:05:26,520
starting point is your latitude

127
00:05:31,670 --> 00:05:28,680
longitude and altitude

128
00:05:33,890 --> 00:05:31,680
for good analysis of line of sight you

129
00:05:35,930 --> 00:05:33,900
want your coordinates to be as accurate

130
00:05:38,090 --> 00:05:35,940
as possible so you want the degrees the

131
00:05:41,390 --> 00:05:38,100
minutes and the seconds and you want if

132
00:05:43,490 --> 00:05:41,400
possible to have several decimal places

133
00:05:44,689 --> 00:05:43,500
so how do you get a camera position well

134
00:05:46,430 --> 00:05:44,699
there's a whole bunch of different ways

135
00:05:49,189 --> 00:05:46,440
you can do it I'll quickly go through

136
00:05:52,730 --> 00:05:49,199
all of them here you can use the exit

137
00:05:55,490 --> 00:05:52,740
data cameras often have lature and

138
00:05:58,670 --> 00:05:55,500

longitude recorded in the image itself

139
00:06:00,890 --> 00:05:58,680
in the photo or in the video although

140
00:06:03,230 --> 00:06:00,900
with videos normally all you're getting

141
00:06:05,390 --> 00:06:03,240
a video is just the position of the

142
00:06:06,890 --> 00:06:05,400
start of the the camera sometimes you

143
00:06:09,650 --> 00:06:06,900
don't even get that with planes

144
00:06:12,230 --> 00:06:09,660
sometimes you just get the uh you can

145
00:06:15,730 --> 00:06:12,240
record it where the camera just happened

146
00:06:19,010 --> 00:06:15,740
to last latch onto a GPS signal

147
00:06:21,469 --> 00:06:19,020
uh sometimes you get your GPS

148
00:06:23,270 --> 00:06:21,479
coordinates on screen this is a

149
00:06:25,430 --> 00:06:23,280
wonderful thing when it actually happens

150
00:06:27,290 --> 00:06:25,440
you can actually see on every single

151
00:06:30,050 --> 00:06:27,300
frame of the video

152
00:06:31,610 --> 00:06:30,060
there is a GPS coordinates here here's

153
00:06:34,010 --> 00:06:31,620
latitude and longitudes for the aircraft

154
00:06:34,909 --> 00:06:34,020
and there's also the altitude and this

155
00:06:36,650 --> 00:06:34,919
is for

156
00:06:38,210 --> 00:06:36,660
every single frame so it's a wonderful

157
00:06:40,790 --> 00:06:38,220
resource if it's something you actually

158
00:06:42,770 --> 00:06:40,800
have on the video

159
00:06:45,650 --> 00:06:42,780
if you don't have that then you can use

160
00:06:48,590 --> 00:06:45,660
geolocation and geolocation basically

161
00:06:51,650 --> 00:06:48,600
means taking any and all information you

162
00:06:54,469 --> 00:06:51,660
have about the video and what you can

163
00:06:56,629 --> 00:06:54,479

see visually in the video and then using

164
00:07:00,110 --> 00:06:56,639
that to track down the camera location

165
00:07:02,450 --> 00:07:00,120
manually like in this example here this

166
00:07:03,650 --> 00:07:02,460
was a video of a of a missile test and

167
00:07:05,510 --> 00:07:03,660
we knew that it was in Southern

168
00:07:08,450 --> 00:07:05,520
California because of the that's where

169
00:07:09,770 --> 00:07:08,460
they're testing the missile and uh we

170
00:07:11,270 --> 00:07:09,780
knew it we could see from looking at the

171
00:07:13,129 --> 00:07:11,280
video that it was flying over an island

172
00:07:15,170 --> 00:07:13,139
and it wasn't that hard to just look at

173
00:07:16,010 --> 00:07:15,180
all the islands in the vicinity track

174
00:07:18,230 --> 00:07:16,020
down

175
00:07:20,749 --> 00:07:18,240
uh which one it was this N1 ended up

176
00:07:22,790 --> 00:07:20,759
being San Clemente then this is Google

177
00:07:24,770 --> 00:07:22,800
Earth on the right here and what you do

178
00:07:26,210 --> 00:07:24,780
in Google Earth is you move around the

179
00:07:28,249 --> 00:07:26,220
camera until you get something that

180
00:07:29,749 --> 00:07:28,259
matches this isn't an exact match here

181
00:07:31,309 --> 00:07:29,759
you see it slightly off but it's you

182
00:07:33,830 --> 00:07:31,319
know it's a good start we would adjust

183
00:07:35,650 --> 00:07:33,840
this a little bit more until we've got a

184
00:07:38,749 --> 00:07:35,660
perfect match for the camera

185
00:07:41,450 --> 00:07:38,759
and what we see matches and that gives

186
00:07:43,850 --> 00:07:41,460
us a very precise camera location just

187
00:07:46,969 --> 00:07:43,860
from geolocation and no other no other

188
00:07:50,390 --> 00:07:46,979

data now geolocation is the ultimate

189
00:07:52,430 --> 00:07:50,400
Arbiter of location if your

190
00:07:55,730 --> 00:07:52,440
reconstruction is not matching what you

191
00:07:58,070 --> 00:07:55,740
see in the uh the original photo or

192
00:08:00,950 --> 00:07:58,080
video then it's wrong so it's a good

193
00:08:05,870 --> 00:08:00,960
idea to geolocate as well even if you

194
00:08:10,430 --> 00:08:08,689
sometimes uh UAP I videoed from planes

195
00:08:12,230 --> 00:08:10,440
or photos are taken from Planes and if

196
00:08:14,930 --> 00:08:12,240
you can figure out the flight number and

197
00:08:17,510 --> 00:08:14,940
the date you can download the adsb data

198
00:08:19,309 --> 00:08:17,520
which is the uh the the track of the

199
00:08:22,249 --> 00:08:19,319
actual location and then you can either

200
00:08:24,650 --> 00:08:22,259
use the exact time from the exit data or

201
00:08:26,330 --> 00:08:24,660
you can geolocate uh the position simply

202
00:08:28,969 --> 00:08:26,340
by looking out the window often there

203
00:08:30,529 --> 00:08:28,979
are distinctive patterns of fields roads

204
00:08:32,389 --> 00:08:30,539
and mountains and you can use this to

205
00:08:34,310 --> 00:08:32,399
find the exact location this is

206
00:08:37,250 --> 00:08:34,320
something that comes up quite a bit

207
00:08:38,449 --> 00:08:37,260
sometimes you don't have a location and

208
00:08:40,490 --> 00:08:38,459
you're probably not going to find out

209
00:08:42,230 --> 00:08:40,500
the location this is the ghostbust video

210
00:08:43,730 --> 00:08:42,240
here and we knew it was somewhere off

211
00:08:47,570 --> 00:08:43,740
the coast of Florida and we knew its

212
00:08:49,670 --> 00:08:47,580
altitude so what we do in in lieu of

213
00:08:51,110 --> 00:08:49,680

having the location which isn't really

214
00:08:52,910 --> 00:08:51,120
that important because it's just out

215
00:08:54,829 --> 00:08:52,920
over the ocean is we just pick an

216
00:08:57,230 --> 00:08:54,839
arbitrary location as a start point in

217
00:08:58,910 --> 00:08:57,240
that general area and then we just go

218
00:09:00,290 --> 00:08:58,920
from there the subsequent points are

219
00:09:03,170 --> 00:09:00,300
going to be relative to that and they're

220
00:09:05,750 --> 00:09:03,180
going to be a high accuracy relative and

221
00:09:07,550 --> 00:09:05,760
we have the altitude as well so it works

222
00:09:09,530 --> 00:09:07,560
out

223
00:09:12,050 --> 00:09:09,540
uh so the three ways that we have of

224
00:09:14,030 --> 00:09:12,060
specifying a line of sight I'll start

225
00:09:17,210 --> 00:09:14,040
with camera position but then there are

226
00:09:18,769 --> 00:09:17,220
uh additional things we tell you which

227
00:09:20,509 --> 00:09:18,779
what direction you're looking in and

228
00:09:24,050 --> 00:09:20,519
I'll look at the first two of those here

229
00:09:25,850 --> 00:09:24,060
the first one position and Direction uh

230
00:09:28,370 --> 00:09:25,860
position and Direction means you don't

231
00:09:29,810 --> 00:09:28,380
know a specific point that the camera is

232
00:09:32,630 --> 00:09:29,820
pointing at you just know what direction

233
00:09:35,630 --> 00:09:32,640
it's pointing at and here this is

234
00:09:38,269 --> 00:09:35,640
specified by Azimuth and elevation the

235
00:09:41,210 --> 00:09:38,279
the top number here 49 degrees left is

236
00:09:44,329 --> 00:09:41,220
the Azimuth and the number on the left

237
00:09:46,490 --> 00:09:44,339
uh minus 28 degrees is the elevation

238
00:09:48,550 --> 00:09:46,500

which is just how much you're looking up

239
00:09:52,310 --> 00:09:48,560
or down down in this case

240
00:09:54,590 --> 00:09:52,320
sometimes the Azimuth is relative to

241
00:09:56,449 --> 00:09:54,600
North so it's how far north or east or

242
00:09:58,610 --> 00:09:56,459
west from North you are sometimes it's

243
00:10:01,190 --> 00:09:58,620
relative to the position of the plane so

244
00:10:03,530 --> 00:10:01,200
it's uh it's actually yeah it will vary

245
00:10:04,730 --> 00:10:03,540
as the plane actually turns so you need

246
00:10:08,210 --> 00:10:04,740
to know which one you're thinking about

247
00:10:12,769 --> 00:10:08,220
this isn't very accurate this is only

248
00:10:14,389 --> 00:10:12,779
one degree of uh um of accuracy so it's

249
00:10:17,389 --> 00:10:14,399
we don't have any minutes or seconds or

250
00:10:18,769 --> 00:10:17,399
decimal places and uh to use it in a

251
00:10:21,110 --> 00:10:18,779
simulation though you're probably going

252
00:10:22,610 --> 00:10:21,120
to want to

253
00:10:25,310 --> 00:10:22,620
um interpolate between these various

254
00:10:27,470 --> 00:10:25,320
positions because it's uh 10 miles away

255
00:10:30,710 --> 00:10:27,480
half a degree of error is going to give

256
00:10:32,509 --> 00:10:30,720
you an error of 500 feet in position so

257
00:10:34,550 --> 00:10:32,519
because we don't have that accuracy you

258
00:10:36,470 --> 00:10:34,560
really need to interpolate apply

259
00:10:39,170 --> 00:10:36,480
smoothing

260
00:10:41,090 --> 00:10:39,180
position and Target is where you know

261
00:10:43,250 --> 00:10:41,100
the camera position and you know what

262
00:10:44,930 --> 00:10:43,260
you're looking at and you could know

263
00:10:47,569 --> 00:10:44,940

what you're looking at from a number of

264
00:10:49,970 --> 00:10:47,579
ways some videos give an on-screen

265
00:10:52,130 --> 00:10:49,980
display of both the camera position and

266
00:10:53,990 --> 00:10:52,140
the target position and in this example

267
00:10:57,710 --> 00:10:54,000
here which is from the the infamous

268
00:10:59,990 --> 00:10:57,720
rubber duck UAP video we have a camera

269
00:11:02,210 --> 00:11:00,000
position over here which is the position

270
00:11:04,490 --> 00:11:02,220
of a plane a latitude longitude and

271
00:11:07,430 --> 00:11:04,500
altitude and we also have over in the

272
00:11:09,949 --> 00:11:07,440
top right corner a target's position

273
00:11:13,870 --> 00:11:09,959
which gives you a latitude and a

274
00:11:16,970 --> 00:11:13,880
longitude yeah I believe also elevation

275
00:11:19,850 --> 00:11:16,980
uh this isn't necessarily the object

276
00:11:22,670 --> 00:11:19,860
this is actually the coordinates uh

277
00:11:24,470 --> 00:11:22,680
supposedly of the ground underneath this

278
00:11:25,730 --> 00:11:24,480
Crosshair so it should be this point on

279
00:11:28,730 --> 00:11:25,740
the map right here what we're actually

280
00:11:30,590 --> 00:11:28,740
interested in in terms of uaps is the

281
00:11:31,850 --> 00:11:30,600
object itself which is over here which

282
00:11:35,690 --> 00:11:31,860
we could of course we could find out

283
00:11:36,949 --> 00:11:35,700
relative to this but uh when you

284
00:11:40,130 --> 00:11:36,959
actually

285
00:11:42,050 --> 00:11:40,140
look into it you find that these

286
00:11:44,030 --> 00:11:42,060
coordinates here are typically not very

287
00:11:46,069 --> 00:11:44,040
accurate they're often not exactly what

288
00:11:49,130 --> 00:11:46,079

we're looking at so you really got to

289
00:11:50,870 --> 00:11:49,140
use geolocation in addition to these

290
00:11:53,269 --> 00:11:50,880
coordinates and if you look at what we

291
00:11:55,970 --> 00:11:53,279
have behind this you will see that the

292
00:11:58,670 --> 00:11:55,980
the true position of

293
00:12:00,590 --> 00:11:58,680
um the object is right here now the

294
00:12:02,030 --> 00:12:00,600
crosshairs were over here if we just go

295
00:12:05,449 --> 00:12:02,040
back you see this crosshairs are over

296
00:12:09,050 --> 00:12:05,459
here but these numbers over here

297
00:12:10,910 --> 00:12:09,060
refer to something that is uh about 200

298
00:12:12,530 --> 00:12:10,920
feet over in this direction

299
00:12:14,990 --> 00:12:12,540
so if we were to kind of use the

300
00:12:16,430 --> 00:12:15,000
crosshairs as a relative position for

301
00:12:18,050 --> 00:12:16,440
our true position we'd end up way over

302
00:12:23,150 --> 00:12:18,060
here so you've really got to use

303
00:12:26,990 --> 00:12:23,160
geolocation in addition to Target uh GPS

304
00:12:31,730 --> 00:12:29,150
so uh what do we do with line of sight

305
00:12:34,190 --> 00:12:31,740
in UAP investigations well

306
00:12:35,990 --> 00:12:34,200
a goal in Europe investigations is to

307
00:12:38,030 --> 00:12:36,000
find if something is anomalous

308
00:12:39,769 --> 00:12:38,040
unambiguously anomalous meaning that

309
00:12:41,810 --> 00:12:39,779
it's something we can't identify by

310
00:12:43,970 --> 00:12:41,820
conventional means we want to

311
00:12:46,190 --> 00:12:43,980
we have when we have a video we want to

312
00:12:47,690 --> 00:12:46,200
try to use all the frames in the video

313
00:12:50,150 --> 00:12:47,700

we don't want to just pick a couple of

314
00:12:51,650 --> 00:12:50,160
frames and analyze those frames we've

315
00:12:53,030 --> 00:12:51,660
got every single frame we want to use as

316
00:12:55,310 --> 00:12:53,040
much of it as possible

317
00:12:57,470 --> 00:12:55,320
step one in this process is to extract

318
00:13:01,370 --> 00:12:57,480
the line of sight step two is to

319
00:13:02,810 --> 00:13:01,380
reconstruct the potential traversals for

320
00:13:04,610 --> 00:13:02,820
any set of lines of sight there's

321
00:13:06,949 --> 00:13:04,620
multiple ways of going across that that

322
00:13:08,629 --> 00:13:06,959
set of possible line of sights you want

323
00:13:10,370 --> 00:13:08,639
to find the ones that make the most

324
00:13:11,750 --> 00:13:10,380
sense

325
00:13:13,550 --> 00:13:11,760
um then step three is to visualize and

326
00:13:15,410 --> 00:13:13,560
explore the potential Solutions in the

327
00:13:17,509 --> 00:13:15,420
competing hypotheses

328
00:13:19,970 --> 00:13:17,519
step four is to check against all

329
00:13:21,350 --> 00:13:19,980
available information step five don't

330
00:13:24,290 --> 00:13:21,360
eliminate anything just move it down the

331
00:13:27,050 --> 00:13:24,300
list this is a kind of a pet topic of

332
00:13:29,930 --> 00:13:27,060
mine anyway so example number one this

333
00:13:31,790 --> 00:13:29,940
is a video from a webcam in Hale Beach

334
00:13:34,310 --> 00:13:31,800
Saint Ives California it's showing a

335
00:13:36,230 --> 00:13:34,320
light moving across the Horizon right

336
00:13:37,730 --> 00:13:36,240
here and then that lights a little bit

337
00:13:39,710 --> 00:13:37,740
later in the video shoots up into the

338
00:13:41,690 --> 00:13:39,720

sky you can see it's shooting up there

339
00:13:43,970 --> 00:13:41,700
so this seems like a very impressive

340
00:13:46,490 --> 00:13:43,980
video but the question here is is it

341
00:13:48,050 --> 00:13:46,500
near or is it far away is it actually

342
00:13:49,910 --> 00:13:48,060
close to the Horizon if it's close to

343
00:13:52,009 --> 00:13:49,920
the Horizon then it's an amazing uh

344
00:13:53,329 --> 00:13:52,019
unidentified flying object if it's

345
00:13:54,889 --> 00:13:53,339
something closer then it's a bit more

346
00:13:56,750 --> 00:13:54,899
mundane so how can we actually figure

347
00:13:59,930 --> 00:13:56,760
this out

348
00:14:02,030 --> 00:13:59,940
now somebody did a simple analysis by

349
00:14:05,629 --> 00:14:02,040
taking two simple measurements from the

350
00:14:07,190 --> 00:14:05,639
video and saying uh using this person's

351
00:14:09,290 --> 00:14:07,200
height in the corner then using that to

352
00:14:10,670 --> 00:14:09,300
try to determine uh how fast it was

353
00:14:12,410 --> 00:14:10,680
moving and it's you know it kind of

354
00:14:14,750 --> 00:14:12,420
works it gives you some ballpark figures

355
00:14:15,769 --> 00:14:14,760
but uh we can probably do better than

356
00:14:19,370 --> 00:14:15,779
this

357
00:14:22,250 --> 00:14:19,380
so step one here was to locate the

358
00:14:24,170 --> 00:14:22,260
position of the camera and we know

359
00:14:26,930 --> 00:14:24,180
roughly where it is we can geolocate it

360
00:14:28,610 --> 00:14:26,940
we can find the position in in Google

361
00:14:29,930 --> 00:14:28,620
Earth we can set the camera to that

362
00:14:32,870 --> 00:14:29,940
position we can check that the Field

363
00:14:35,690 --> 00:14:32,880

view is correct and here I've I've set

364
00:14:38,329 --> 00:14:35,700
up a camera that matches that particular

365
00:14:39,889 --> 00:14:38,339
video we've got a 45 degree vertical

366
00:14:42,590 --> 00:14:39,899
field of view

367
00:14:45,050 --> 00:14:42,600
then we want to extract the the lines of

368
00:14:46,790 --> 00:14:45,060
sight and we can do that uh in an

369
00:14:48,829 --> 00:14:46,800
automated way we can use Adobe After

370
00:14:50,449 --> 00:14:48,839
Effects to do motion tracking of the

371
00:14:54,410 --> 00:14:50,459
point and then we can extract the per

372
00:14:56,269 --> 00:14:54,420
frame X and Y coordinates uh and that

373
00:14:58,009 --> 00:14:56,279
then gives us

374
00:14:59,629 --> 00:14:58,019
um the lines of sight we can then apply

375
00:15:01,009 --> 00:14:59,639
that and I'm going to do a quick

376
00:15:03,290 --> 00:15:01,019
demonstration of what that actually

377
00:15:04,250 --> 00:15:03,300
looks like once we put it into my my

378
00:15:06,410 --> 00:15:04,260
software

379
00:15:08,269 --> 00:15:06,420
now this is a tool I wrote and it's

380
00:15:12,350 --> 00:15:08,279
called set Rec which is short for

381
00:15:17,210 --> 00:15:12,360
situation Recreation and it's basically

382
00:15:19,490 --> 00:15:17,220
the top right here is the uh the actual

383
00:15:23,090 --> 00:15:19,500
original video the bottom

384
00:15:25,490 --> 00:15:23,100
uh bottom right here is the simulation

385
00:15:27,650 --> 00:15:25,500
and this is a 3D view of the world

386
00:15:30,110 --> 00:15:27,660
showing all of the lines of sight

387
00:15:32,210 --> 00:15:30,120
and we can skip through the video and we

388
00:15:34,730 --> 00:15:32,220

can see the object moving around along

389
00:15:37,670 --> 00:15:34,740
these lines of sight and this top graph

390
00:15:39,710 --> 00:15:37,680
here shows the speed of the object in

391
00:15:40,870 --> 00:15:39,720
this particular setup and we can explore

392
00:15:44,150 --> 00:15:40,880
the various

393
00:15:45,710 --> 00:15:44,160
scenarios by changing the start distance

394
00:15:48,170 --> 00:15:45,720
of the object we can move it further

395
00:15:49,790 --> 00:15:48,180
away and we will see that you know when

396
00:15:52,730 --> 00:15:49,800
it's way over there when it's like I

397
00:15:54,470 --> 00:15:52,740
think that's about a mile away it's now

398
00:15:57,290 --> 00:15:54,480
moving at about 100 miles per hour and

399
00:15:59,150 --> 00:15:57,300
it zooms upwards also at about a 100

400
00:16:00,889 --> 00:15:59,160
miles an hour so we can see it very

401
00:16:03,530 --> 00:16:00,899
quickly becomes much more impressive as

402
00:16:04,850 --> 00:16:03,540
it gets further away but as it gets

403
00:16:09,949 --> 00:16:04,860
closer

404
00:16:11,569 --> 00:16:09,959
we can see that it slows down and as it

405
00:16:13,850 --> 00:16:11,579
gets really close we can see that it

406
00:16:16,389 --> 00:16:13,860
will actually get much bigger in size so

407
00:16:20,629 --> 00:16:16,399
we want to have something that matches

408
00:16:22,670 --> 00:16:20,639
uh the actual video itself and see what

409
00:16:24,590 --> 00:16:22,680
the the possible solutions are and it

410
00:16:28,250 --> 00:16:24,600
turns out that a very reasonable

411
00:16:30,350 --> 00:16:28,260
solution for this particular case is uh

412
00:16:34,129 --> 00:16:30,360
that it something that's drone sized

413
00:16:38,449 --> 00:16:36,290

so does this disprove anomalous Behavior

414
00:16:41,810 --> 00:16:38,459
well no I mean the existence of a

415
00:16:43,490 --> 00:16:41,820
mundane explanation doesn't uh disprove

416
00:16:46,370 --> 00:16:43,500
it it could well be something that's far

417
00:16:48,410 --> 00:16:46,380
away but the mundane solution exists and

418
00:16:50,930 --> 00:16:48,420
I think whenever a mundane solution

419
00:16:52,490 --> 00:16:50,940
actually exists it kind of gravitates

420
00:16:53,629 --> 00:16:52,500
towards the top of the list yeah we've

421
00:16:55,430 --> 00:16:53,639
got to look at the other data that's

422
00:16:58,310 --> 00:16:55,440
around this case like do other people

423
00:16:59,810 --> 00:16:58,320
fly drones there at Sunset turns out yes

424
00:17:03,110 --> 00:16:59,820
they do it's a very popular place for

425
00:17:07,069 --> 00:17:03,120
flying flying drones

426
00:17:10,929 --> 00:17:07,079
uh so example two aguadier Aguadilla was

427
00:17:13,909 --> 00:17:10,939
a U.S Coast Guard I believe for videos

428
00:17:15,289 --> 00:17:13,919
filmed in 2013 in Puerto Rico it's a

429
00:17:17,150 --> 00:17:15,299
thermal camera we're looking at infrared

430
00:17:20,030 --> 00:17:17,160
footage showing hot and cold things

431
00:17:22,429 --> 00:17:20,040
black things here are hot it's taken at

432
00:17:24,470 --> 00:17:22,439
night uh there's an object here that's

433
00:17:26,630 --> 00:17:24,480
moving along it has hot and cooler

434
00:17:28,909 --> 00:17:26,640
regions you can see the cooler regions

435
00:17:31,010 --> 00:17:28,919
when the background is there sometimes

436
00:17:32,750 --> 00:17:31,020
you can't see them sometimes it vanishes

437
00:17:34,970 --> 00:17:32,760
entirely when there's water behind it

438
00:17:36,830 --> 00:17:34,980

and some people have interpreted this as

439
00:17:38,690 --> 00:17:36,840
being a

440
00:17:41,390 --> 00:17:38,700
a trans medium object here going

441
00:17:43,250 --> 00:17:41,400
underwater excuse me

442
00:17:45,470 --> 00:17:43,260
uh there's two main hypotheses to

443
00:17:47,390 --> 00:17:45,480
explain this video a hypothesis one is

444
00:17:49,070 --> 00:17:47,400
that it is some kind of anomalous object

445
00:17:50,990 --> 00:17:49,080
a fast object close to the ground

446
00:17:53,330 --> 00:17:51,000
circling the airport at over 100 miles

447
00:17:54,710 --> 00:17:53,340
per hour going behind trees descending

448
00:17:56,810 --> 00:17:54,720
to the water traveling underwater

449
00:17:58,630 --> 00:17:56,820
without a proportionate Splash or any

450
00:18:01,310 --> 00:17:58,640
slow down at 50 miles per hour

451
00:18:04,010 --> 00:18:01,320
re-emerging splitting into two uh

452
00:18:05,810 --> 00:18:04,020
hypothesis two is that it's a pair of

453
00:18:07,850 --> 00:18:05,820
connected wedding lanterns drifting in

454
00:18:10,130 --> 00:18:07,860
the window at the airport the apparent

455
00:18:12,169 --> 00:18:10,140
motion is mostly from Parallax uh they

456
00:18:14,810 --> 00:18:12,179
don't go behind anything they vanish

457
00:18:16,870 --> 00:18:14,820
when the heat source is not visible and

458
00:18:20,270 --> 00:18:16,880
the background is similar in temperature

459
00:18:21,890 --> 00:18:20,280
and there's also other hypotheses like

460
00:18:24,169 --> 00:18:21,900
balloons and things like that but these

461
00:18:25,610 --> 00:18:24,179
are the main two hypotheses just to be

462
00:18:27,529 --> 00:18:25,620
real clear what a wedding Lantern is

463
00:18:29,810 --> 00:18:27,539

it's also called a Chinese lantern or a

464
00:18:31,490 --> 00:18:29,820
sky lantern it's a small hot air powered

465
00:18:33,350 --> 00:18:31,500
paper balloon with a small flame at the

466
00:18:36,049 --> 00:18:33,360
base and as it moves around sometimes

467
00:18:37,909 --> 00:18:36,059
the flame is uh is hidden and in thermal

468
00:18:41,450 --> 00:18:37,919
camera footage the the flame will be

469
00:18:43,730 --> 00:18:41,460
black and the canopy would be Gray

470
00:18:46,669 --> 00:18:43,740
now we've got a lot of data we've got a

471
00:18:48,230 --> 00:18:46,679
lot of data in this video uh it's we've

472
00:18:51,409 --> 00:18:48,240
got camera position we've got the target

473
00:18:53,270 --> 00:18:51,419
position and we have a very detailed

474
00:18:55,250 --> 00:18:53,280
background here so we can do very

475
00:18:57,830 --> 00:18:55,260
accurate geolocation It's a Wonderful

476
00:18:59,870 --> 00:18:57,840
video for extracting data from but the

477
00:19:02,390 --> 00:18:59,880
7000 frames there's over seven thousand

478
00:19:04,070 --> 00:19:02,400
frames of data and it's a lot of work to

479
00:19:06,169 --> 00:19:04,080
get in and extract all of that so how do

480
00:19:08,690 --> 00:19:06,179
we do it well it turns out somebody

481
00:19:11,630 --> 00:19:08,700
already did this was a Monumental effort

482
00:19:15,370 --> 00:19:11,640
organized on the Above Top Secret Forum

483
00:19:17,690 --> 00:19:15,380
by Isaac Coy back in 2015 and a

484
00:19:20,630 --> 00:19:17,700
crowdsourced the extraction of the data

485
00:19:23,029 --> 00:19:20,640
and created this 7000 plus line

486
00:19:25,190 --> 00:19:23,039
spreadsheet of all the coordinates it's

487
00:19:27,590 --> 00:19:25,200
a wonderful wonderful thing the big

488
00:19:31,610 --> 00:19:27,600

issue with this data is that like most

489
00:19:34,010 --> 00:19:31,620
data uh it's very noisy here we see the

490
00:19:35,330 --> 00:19:34,020
the two tracks that are relevant the

491
00:19:37,549 --> 00:19:35,340
green track is the track of the airplane

492
00:19:40,250 --> 00:19:37,559
flying around the airport the red track

493
00:19:43,430 --> 00:19:40,260
is the ground track

494
00:19:44,990 --> 00:19:43,440
and it's also very very noisy

495
00:19:47,750 --> 00:19:45,000
uh

496
00:19:50,870 --> 00:19:47,760
oops excuse me

497
00:19:54,650 --> 00:19:50,880
wrong slide

498
00:19:55,730 --> 00:19:54,660
okay so uh we have to denoise it we have

499
00:19:58,730 --> 00:19:55,740
to smooth it out we have to get into

500
00:20:00,830 --> 00:19:58,740
something usable this here is the data

501
00:20:01,970 --> 00:20:00,840
from the camera position the white dots

502
00:20:03,669 --> 00:20:01,980
here are the positions of the plane

503
00:20:06,289 --> 00:20:03,679
essentially the positions of the camera

504
00:20:08,270 --> 00:20:06,299
and you can I'll go and get into

505
00:20:11,090 --> 00:20:08,280
technical detail but basically all I did

506
00:20:14,510 --> 00:20:11,100
was create a path that was a physically

507
00:20:17,270 --> 00:20:14,520
plausible path through these these white

508
00:20:19,190 --> 00:20:17,280
dots so it moves at the same speed and

509
00:20:20,810 --> 00:20:19,200
in the same direction as if it was the

510
00:20:23,750 --> 00:20:20,820
plane but it gives us a lovely smooth

511
00:20:26,150 --> 00:20:23,760
path from which we can do a recreation

512
00:20:28,310 --> 00:20:26,160
of this video

513
00:20:29,990 --> 00:20:28,320

now the target track unfortunately is

514
00:20:31,490 --> 00:20:30,000
very noisy you look at it there it's

515
00:20:33,770 --> 00:20:31,500
just going all over the place it doesn't

516
00:20:35,750 --> 00:20:33,780
actually have a good correlation with

517
00:20:37,430 --> 00:20:35,760
what we actually see in the video and so

518
00:20:39,409 --> 00:20:37,440
it's not really that usable and you

519
00:20:41,270 --> 00:20:39,419
can't even really smooth it out and get

520
00:20:44,870 --> 00:20:41,280
anything useful out of it so what I did

521
00:20:46,730 --> 00:20:44,880
was I started with uh that track and

522
00:20:50,870 --> 00:20:46,740
used that as a rough location and I

523
00:20:52,630 --> 00:20:50,880
created a 3D spline an edited curved

524
00:20:55,010 --> 00:20:52,640
path that went through the general area

525
00:20:56,930 --> 00:20:55,020
I then looked at that path from the

526
00:20:58,789 --> 00:20:56,940
camera position which I have down here

527
00:21:00,770 --> 00:20:58,799
in the the bottom right with my

528
00:21:02,510 --> 00:21:00,780
simulation and compare that against what

529
00:21:05,029 --> 00:21:02,520
we see in the actual video in the the

530
00:21:07,070 --> 00:21:05,039
top right here and then I edited the

531
00:21:09,230 --> 00:21:07,080
path with these little widgets here

532
00:21:11,930 --> 00:21:09,240
until I've got something that was

533
00:21:14,690 --> 00:21:11,940
essentially a perfect match we see the

534
00:21:16,370 --> 00:21:14,700
the object moving and this doesn't

535
00:21:17,870 --> 00:21:16,380
create a path of the object this is just

536
00:21:20,630 --> 00:21:17,880
creating the lines of sight we don't

537
00:21:23,090 --> 00:21:20,640
actually know where the object is but it

538
00:21:24,890 --> 00:21:23,100

gives us the exact same lines of sight

539
00:21:26,510 --> 00:21:24,900
to the object as in the original video

540
00:21:28,610 --> 00:21:26,520
and when we have that lines of right

541
00:21:30,950 --> 00:21:28,620
then we can start to look at our various

542
00:21:33,890 --> 00:21:30,960
hypotheses and see whether they are

543
00:21:36,110 --> 00:21:33,900
actually plausible or not so hypothesis

544
00:21:40,310 --> 00:21:36,120
one this is what I came up with was the

545
00:21:43,430 --> 00:21:40,320
the anomaly uh the green line here is a

546
00:21:45,830 --> 00:21:43,440
track that matches the hypothesis one an

547
00:21:47,690 --> 00:21:45,840
object at battery drop height moving in

548
00:21:49,430 --> 00:21:47,700
a circle off the cliff at the end down

549
00:21:51,529 --> 00:21:49,440
to the water and out to the Sea the

550
00:21:53,029 --> 00:21:51,539
graph at the top shows the velocity it's

551
00:21:54,470 --> 00:21:53,039
a bit noisy but it's not not too

552
00:21:57,590 --> 00:21:54,480
important that's just an artifacts of

553
00:21:58,970 --> 00:21:57,600
the the spline uh joining together and

554
00:22:02,510 --> 00:21:58,980
really you know the first two thirds of

555
00:22:04,730 --> 00:22:02,520
it are very accurate because that's the

556
00:22:06,710 --> 00:22:04,740
only place where we see features we can

557
00:22:09,130 --> 00:22:06,720
identify and geolocate and line things

558
00:22:13,610 --> 00:22:09,140
up properly the rest is over the water

559
00:22:15,110 --> 00:22:13,620
and hypothesis 2 is this green line in

560
00:22:16,430 --> 00:22:15,120
the middle here which is a more or less

561
00:22:19,970 --> 00:22:16,440
straight line it's moving from this

562
00:22:23,149 --> 00:22:19,980
point here down to over here and we see

563
00:22:25,789 --> 00:22:23,159

on the top we have a velocity which

564
00:22:27,649 --> 00:22:25,799
starts uh I believe it's around 18 miles

565
00:22:30,110 --> 00:22:27,659
per hour and then it moves down to

566
00:22:32,510 --> 00:22:30,120
something lower and the line itself is

567
00:22:34,789 --> 00:22:32,520
actually descending and this of course

568
00:22:38,270 --> 00:22:34,799
so the the reduction in speed

569
00:22:40,370 --> 00:22:38,280
corresponds to reduction in altitude and

570
00:22:42,890 --> 00:22:40,380
perhaps not coincidentally it also is an

571
00:22:46,130 --> 00:22:42,900
exact match for the weather that day and

572
00:22:50,090 --> 00:22:46,140
I can do a quick demonstration of what

573
00:22:53,149 --> 00:22:50,100
we have there for aguadier

574
00:22:57,110 --> 00:22:53,159
we had their full Recreation here and we

575
00:22:59,390 --> 00:22:57,120
can see that the uh the green line here

576
00:23:01,850 --> 00:22:59,400
is more or less straight especially at

577
00:23:04,789 --> 00:23:01,860
the start when we have good data and it

578
00:23:06,649 --> 00:23:04,799
gradually descends towards the end and

579
00:23:10,070 --> 00:23:06,659
we can see that everything kind of

580
00:23:12,049 --> 00:23:10,080
matches with the the video in the

581
00:23:14,570 --> 00:23:12,059
background you see it crosses the runway

582
00:23:16,310 --> 00:23:14,580
there and later on we see it crossing

583
00:23:20,390 --> 00:23:16,320
the street at exactly the same time it's

584
00:23:21,590 --> 00:23:20,400
an exact match uh and I won't get into

585
00:23:23,630 --> 00:23:21,600
the tools because I don't really have

586
00:23:25,250 --> 00:23:23,640
much time here but there's a very

587
00:23:27,649 --> 00:23:25,260
sophisticated set of things that we can

588
00:23:30,590 --> 00:23:27,659

use for kind of editing paths and things

589
00:23:33,710 --> 00:23:30,600
like that to move things around

590
00:23:39,590 --> 00:23:37,850
let me go back to here and uh so we've

591
00:23:41,570 --> 00:23:39,600
got two competing hypotheses that we've

592
00:23:43,070 --> 00:23:41,580
been able to explore with the with with

593
00:23:46,070 --> 00:23:43,080
this tool

594
00:23:47,930 --> 00:23:46,080
uh can we pick one over the other

595
00:23:50,330 --> 00:23:47,940
now it would seem like the lantern

596
00:23:51,649 --> 00:23:50,340
hypothesis better satisfies Occam's

597
00:23:54,770 --> 00:23:51,659
razor it's something that's known to

598
00:23:56,450 --> 00:23:54,780
happen this photo here on the right is

599
00:23:59,330 --> 00:23:56,460
of lanterns being released tonight and

600
00:24:01,789 --> 00:23:59,340
it was actually taken from a hotel that

601
00:24:03,950 --> 00:24:01,799
was just upwind of the airport basically

602
00:24:06,230 --> 00:24:03,960
if you trace this path backwards in this

603
00:24:08,390 --> 00:24:06,240
direction you come to this location on

604
00:24:09,590 --> 00:24:08,400
the beach and the wind is blowing in

605
00:24:11,510 --> 00:24:09,600
this direction

606
00:24:14,810 --> 00:24:11,520
we also have video of a similar event

607
00:24:17,390 --> 00:24:14,820
this is a video taken in Aguadilla on

608
00:24:20,029 --> 00:24:17,400
the same year a few months later and it

609
00:24:22,250 --> 00:24:20,039
shows a couple of what look like wedding

610
00:24:25,549 --> 00:24:22,260
lanterns sky lanterns Chinese lanterns

611
00:24:27,770 --> 00:24:25,559
drifting across the island from

612
00:24:30,350 --> 00:24:27,780
excuse me east to west in exactly the

613
00:24:32,330 --> 00:24:30,360

same way as was being hypothesized for

614
00:24:34,370 --> 00:24:32,340
hypothesis two so there's a bit of

615
00:24:36,770 --> 00:24:34,380
supporting evidence there kind of

616
00:24:37,430 --> 00:24:36,780
circumstantial

617
00:24:39,770 --> 00:24:37,440
um

618
00:24:41,210 --> 00:24:39,780
it's a complicated event I don't have

619
00:24:43,310 --> 00:24:41,220
much time here but very quickly going

620
00:24:45,770 --> 00:24:43,320
over the objections yeah the one

621
00:24:47,510 --> 00:24:45,780
objection is that there is a SL there's

622
00:24:50,149 --> 00:24:47,520
always a slow solution to line of sight

623
00:24:53,210 --> 00:24:50,159
reversal that's not really true uh there

624
00:24:55,549 --> 00:24:53,220
isn't always a slow solution with

625
00:24:57,409 --> 00:24:55,559
constant speed in a straight line

626
00:24:59,930 --> 00:24:57,419
uh our objection is that it goes behind

627
00:25:01,310 --> 00:24:59,940
trees and underwater and that's you know

628
00:25:03,470 --> 00:25:01,320
that's kind of up in the air it's not

629
00:25:06,350 --> 00:25:03,480
really necessarily true we also see

630
00:25:08,690 --> 00:25:06,360
areas in the video where

631
00:25:11,029 --> 00:25:08,700
the object appears to vanish when it's

632
00:25:12,770 --> 00:25:11,039
demonstrably in mid-air especially when

633
00:25:14,750 --> 00:25:12,780
it goes off the cliff towards the end

634
00:25:16,970 --> 00:25:14,760
before it gets down to the water there's

635
00:25:19,310 --> 00:25:16,980
a there's a position where it's not

636
00:25:21,649 --> 00:25:19,320
behind any trees and it disappears

637
00:25:23,930 --> 00:25:21,659
similar to when it's over the water

638
00:25:25,490 --> 00:25:23,940

uh 80 miles per hour is too windy well

639
00:25:27,350 --> 00:25:25,500
it's not 18 miles per hour where it's

640
00:25:29,510 --> 00:25:27,360
released it's 18 miles an hour at the

641
00:25:31,430 --> 00:25:29,520
upper altitude and also you can see it

642
00:25:33,590 --> 00:25:31,440
wobbling around as if it is fairly windy

643
00:25:35,570 --> 00:25:33,600
why does it split into well yeah the

644
00:25:37,250 --> 00:25:35,580
hypothesis that there's two lanterns you

645
00:25:38,810 --> 00:25:37,260
know these are these are valid and

646
00:25:41,510 --> 00:25:38,820
interesting objections but they don't

647
00:25:42,669 --> 00:25:41,520
necessarily disqualify it I did a quick

648
00:25:46,010 --> 00:25:42,679
experiment

649
00:25:47,990 --> 00:25:46,020
uh which is kind of fun I created a

650
00:25:49,789 --> 00:25:48,000
pseudo Lantern in my garage out of paper

651
00:25:52,909 --> 00:25:49,799
and a candle and you can see that the

652
00:25:55,850 --> 00:25:52,919
paper of the uh the lantern would

653
00:25:57,830 --> 00:25:55,860
obscure a heat Source you'll see when I

654
00:26:00,230 --> 00:25:57,840
move up this little black dot here

655
00:26:01,909 --> 00:26:00,240
disappears behind the paper which is

656
00:26:05,269 --> 00:26:01,919
what I'm hypothesizing as the

657
00:26:08,570 --> 00:26:05,279
invisibility scenario SCU did a bunch of

658
00:26:11,570 --> 00:26:08,580
analysis of this uh of this case needed

659
00:26:13,909 --> 00:26:11,580
a very detailed document and they have a

660
00:26:16,490 --> 00:26:13,919
an appendix L where they do line of site

661
00:26:18,409 --> 00:26:16,500
analysis and they concluded that this

662
00:26:21,230 --> 00:26:18,419
line of sight analysis eliminates a

663
00:26:23,090 --> 00:26:21,240

Lambton or balloon hypothesis and in

664
00:26:24,890 --> 00:26:23,100
their analysis they assume the same wind

665
00:26:27,350 --> 00:26:24,900
they find a couple of frames with no

666
00:26:29,630 --> 00:26:27,360
background motion and then they claim

667
00:26:31,190 --> 00:26:29,640
that this means that only the object is

668
00:26:32,690 --> 00:26:31,200
moving so the users to calculated

669
00:26:35,510 --> 00:26:32,700
distance to the object and then

670
00:26:37,750 --> 00:26:35,520
subsequent calculations show that a wind

671
00:26:40,669 --> 00:26:37,760
speed object is actually impossible

672
00:26:42,289 --> 00:26:40,679
unfortunately their assumption Falls

673
00:26:44,930 --> 00:26:42,299
over because planes don't stop in

674
00:26:46,870 --> 00:26:44,940
mid-air so the camera is still moving so

675
00:26:49,909 --> 00:26:46,880
there's still a significant contribution

676
00:26:51,890 --> 00:26:49,919
of Parallax to this these two frames

677
00:26:53,750 --> 00:26:51,900
which means that all of the subsequent

678
00:26:56,930 --> 00:26:53,760
calculations that they make in appendix

679
00:26:59,690 --> 00:26:56,940
L are wrong and uh you know really that

680
00:27:02,450 --> 00:26:59,700
appendix should be removed or revised

681
00:27:04,370 --> 00:27:02,460
uh they do another line of site analysis

682
00:27:06,769 --> 00:27:04,380
which they they say claims that it

683
00:27:08,570 --> 00:27:06,779
couldn't be uh accurate but you know

684
00:27:11,450 --> 00:27:08,580
it's they're using three lines of sight

685
00:27:13,370 --> 00:27:11,460
here where it's very easy to make

686
00:27:16,970 --> 00:27:13,380
mistakes with a limited number of lines

687
00:27:19,190 --> 00:27:16,980
of sight yeah for example uh they also

688
00:27:21,049 --> 00:27:19,200

did a line of sight to this this tanker

689
00:27:23,090 --> 00:27:21,059
here but they they picked the wrong

690
00:27:25,250 --> 00:27:23,100
tanker they picked one that was 500 feet

691
00:27:27,710 --> 00:27:25,260
away from where it actually was which is

692
00:27:30,110 --> 00:27:27,720
which is quite a significant uh error if

693
00:27:31,970 --> 00:27:30,120
you're using that for a line of sight

694
00:27:34,190 --> 00:27:31,980
uh mistake like like this are very easy

695
00:27:36,890 --> 00:27:34,200
to make

696
00:27:38,149 --> 00:27:36,900
um this isn't Midwest versus the SCU

697
00:27:40,010 --> 00:27:38,159
though I'm not trying to be like you

698
00:27:41,510 --> 00:27:40,020
know me versus them lots of people have

699
00:27:43,610 --> 00:27:41,520
actually looked at this case and have

700
00:27:46,190 --> 00:27:43,620
done line of site analysis here's a few

701
00:27:47,870 --> 00:27:46,200
of them uh there's the Puerto Rito

702
00:27:50,750 --> 00:27:47,880
research Group which is a Facebook group

703
00:27:53,090 --> 00:27:50,760
group Lance Moody and Florence uh

704
00:27:56,690 --> 00:27:53,100
Michaud did this this very nice 3D

705
00:27:57,710 --> 00:27:56,700
simulation similar to mine shows um the

706
00:28:00,110 --> 00:27:57,720
same type of thing you know something

707
00:28:02,750 --> 00:28:00,120
moving slowly over the airport

708
00:28:05,269 --> 00:28:02,760
blocky a an engineer from the UK did a

709
00:28:07,430 --> 00:28:05,279
very detailed analysis he also sided it

710
00:28:09,470 --> 00:28:07,440
with the the lantern hypothesis you can

711
00:28:13,010 --> 00:28:09,480
see down in his presentation here

712
00:28:14,930 --> 00:28:13,020
John Nagel SCU contributor says he felt

713
00:28:18,710 --> 00:28:14,940

confident that the object was a Lansing

714
00:28:20,149 --> 00:28:18,720
balloon he did a simple analysis uh

715
00:28:23,630 --> 00:28:20,159
similar type of thing

716
00:28:24,669 --> 00:28:23,640
Bob bexler was asked by SCU to do an

717
00:28:31,269 --> 00:28:24,679
analysis

718
00:28:35,930 --> 00:28:33,890
the French Aeronautics and astronomy

719
00:28:38,090 --> 00:28:35,940
Association did a very detailed analysis

720
00:28:39,529 --> 00:28:38,100
this is very impressive uh very similar

721
00:28:41,029 --> 00:28:39,539
simulations they they didn't really

722
00:28:44,149 --> 00:28:41,039
smooth out the data so the the end

723
00:28:45,649 --> 00:28:44,159
result was rather noisy but they uh they

724
00:28:48,110 --> 00:28:45,659
thought that the Chinese lantern which

725
00:28:51,470 --> 00:28:48,120
they call the Thai Lantern was possible

726
00:28:53,149 --> 00:28:51,480
and Bob lexler uh was asked to look into

727
00:28:55,010 --> 00:28:53,159
this and he published a report in

728
00:28:56,810 --> 00:28:55,020
sunlight magazine saying that the

729
00:28:58,549 --> 00:28:56,820
balloon hypothesis similar to the

730
00:29:01,190 --> 00:28:58,559
lantern hypothesis was also likely

731
00:29:03,409 --> 00:29:01,200
Reuben lianza the head of the

732
00:29:05,510 --> 00:29:03,419
Argentinian Air Force as Aerospace

733
00:29:07,909 --> 00:29:05,520
phenomena research committee was one of

734
00:29:09,909 --> 00:29:07,919
the first people to uh conclude it was a

735
00:29:12,830 --> 00:29:09,919
pair of wedding lanterns

736
00:29:16,190 --> 00:29:12,840
so uh in summary

737
00:29:17,990 --> 00:29:16,200
with more data points the better with

738
00:29:19,669 --> 00:29:18,000

lines of sight you want to use as many

739
00:29:22,250 --> 00:29:19,679
data points as possible if you just use

740
00:29:24,950 --> 00:29:22,260
a handful of data points it's kind of

741
00:29:27,409 --> 00:29:24,960
prone to error if you use lots of data

742
00:29:29,090 --> 00:29:27,419
points then things will leap out to you

743
00:29:31,850 --> 00:29:29,100
if things are wrong your things will

744
00:29:33,769 --> 00:29:31,860
jump from one position to another and

745
00:29:37,130 --> 00:29:33,779
you can get do a much more sophisticated

746
00:29:38,810 --> 00:29:37,140
analysis and reconstruction and often

747
00:29:40,669 --> 00:29:38,820
the data is noisy you need to smooth it

748
00:29:42,590 --> 00:29:40,679
out you don't want to use the raw data

749
00:29:44,810 --> 00:29:42,600
you need to you need to convert it to

750
00:29:46,850 --> 00:29:44,820
something that is both accurate and

751
00:29:48,289 --> 00:29:46,860
physically plausible like a plane is not

752
00:29:50,450 --> 00:29:48,299
going to fly around in a zigzag pattern

753
00:29:52,669 --> 00:29:50,460
it's going to fly in a smooth curve he

754
00:29:54,590 --> 00:29:52,679
to understand the errors in the noisy

755
00:29:56,450 --> 00:29:54,600
data the ground track can be off by

756
00:29:58,010 --> 00:29:56,460
several hundred feet so you don't want

757
00:30:00,590 --> 00:29:58,020
to use that even when it's smooth you

758
00:30:02,570 --> 00:30:00,600
need to geolocate if you just sample a

759
00:30:04,250 --> 00:30:02,580
few points uh that can give very

760
00:30:06,950 --> 00:30:04,260
misleading results because you're just

761
00:30:08,210 --> 00:30:06,960
picking points from noisy data and it

762
00:30:09,470 --> 00:30:08,220
could be somewhere up here it could be

763
00:30:11,149 --> 00:30:09,480

someone down there when really what's

764
00:30:14,750 --> 00:30:11,159
happening is in the middle

765
00:30:17,570 --> 00:30:14,760
recreating a video is uh uh a key

766
00:30:19,970 --> 00:30:17,580
validation of the simulation of or even

767
00:30:21,769 --> 00:30:19,980
of analysis in general if you do an

768
00:30:24,169 --> 00:30:21,779
analysis of something using lines of

769
00:30:25,549 --> 00:30:24,179
sight and then you recreate a video and

770
00:30:27,830 --> 00:30:25,559
it doesn't look like the original video

771
00:30:29,570 --> 00:30:27,840
then obviously it's wrong if you

772
00:30:31,669 --> 00:30:29,580
recreate the video and it looks like the

773
00:30:34,930 --> 00:30:31,679
original video then it's a plausible

774
00:30:40,549 --> 00:30:38,210
we can't prove it's not a fast trans

775
00:30:42,529 --> 00:30:40,559
medium anomaly but that's a pretty

776
00:30:44,269 --> 00:30:42,539
extraordinary claim that it is going

777
00:30:46,130 --> 00:30:44,279
underwater and it's doing these other

778
00:30:47,690 --> 00:30:46,140
things and I feel the supporting

779
00:30:50,090 --> 00:30:47,700
evidence really isn't there I'm sure

780
00:30:52,789 --> 00:30:50,100
we'll hear more about that later but

781
00:30:54,710 --> 00:30:52,799
from from my analysis awaiting Lantern

782
00:30:56,889 --> 00:30:54,720
and from other people's analyzes a

783
00:30:59,690 --> 00:30:56,899
wedding Lantern seems like the best fit

784
00:31:02,690 --> 00:30:59,700
and uh I think you know this type of

785
00:31:06,409 --> 00:31:02,700
analysis uh and the analysis done by uh

786
00:31:08,870 --> 00:31:06,419
three three a and other people uh 3fa is

787
00:31:12,350 --> 00:31:08,880
shows that software is very useful and

788
00:31:14,810 --> 00:31:12,360

can save a very large amount of time and

789
00:31:16,430 --> 00:31:14,820
the problem is that UAP research is kind

790
00:31:18,409 --> 00:31:16,440
of a unique use case you can't use

791
00:31:20,630 --> 00:31:18,419
existing tools we have to create our own

792
00:31:22,850 --> 00:31:20,640
tools so we really want to encourage

793
00:31:24,649 --> 00:31:22,860
more coders people with coding

794
00:31:26,990 --> 00:31:24,659
experience and especially with 3D

795
00:31:30,230 --> 00:31:27,000
Graphics experience and 3D analysis

796
00:31:33,830 --> 00:31:30,240
experience to participate in this

797
00:31:36,710 --> 00:31:33,840
if you want to look at this there is uh

798
00:31:38,230 --> 00:31:36,720
this these tools are actually web-based

799
00:31:41,029 --> 00:31:38,240
you can just go to this link

800
00:31:42,950 --> 00:31:41,039
metabung.org sitrec and you'll be able

801
00:31:44,510 --> 00:31:42,960
to play with it yourself I also have a

802
00:31:46,850 --> 00:31:44,520
video viewer that you can use to look at

803
00:31:48,889 --> 00:31:46,860
the videos in more depth and these are

804
00:31:50,330 --> 00:31:48,899
the links there and I'd like to thank

805
00:31:52,190 --> 00:31:50,340
you very much for giving me this

806
00:31:54,710 --> 00:31:52,200
opportunity to talk and I'm open to

807
00:31:59,810 --> 00:31:56,510
um thank you Mr West

808
00:32:02,690 --> 00:31:59,820
very fascinating thank you thank you

809
00:32:05,810 --> 00:32:02,700
very much very detailed we really really

810
00:32:07,850 --> 00:32:05,820
appreciate the level of detail here so

811
00:32:10,510 --> 00:32:07,860
uh we had a sudden change in your

812
00:32:13,190 --> 00:32:10,520
assigned discussion

813
00:32:16,730 --> 00:32:13,200

cannot establish a stable internet

814
00:32:20,750 --> 00:32:16,740
connection from from Italy so I have

815
00:32:23,510 --> 00:32:20,760
asked Professor Kevin knuth uh to be

816
00:32:26,630 --> 00:32:23,520
your discussion so I will turn it over

817
00:32:28,789 --> 00:32:26,640
to Kevin who will make some uh some

818
00:32:30,409 --> 00:32:28,799
comments or or ask you some questions

819
00:32:34,669 --> 00:32:30,419
and then we'll turn it over to the to

820
00:32:36,409 --> 00:32:34,679
the rest so Kevin Professor canoes

821
00:32:38,630 --> 00:32:36,419
all right thank you thank you very much

822
00:32:40,130 --> 00:32:38,640
I'm Mick for this very interesting

823
00:32:41,210 --> 00:32:40,140
presentation

824
00:32:43,549 --> 00:32:41,220
um

825
00:32:46,970 --> 00:32:43,559
let's see I'll start with a question I

826
00:32:50,990 --> 00:32:46,980
I'm curious I I've

827
00:32:54,110 --> 00:32:52,190
um

828
00:32:55,789 --> 00:32:54,120
question as to whether these objects are

829
00:32:57,350 --> 00:32:55,799
going underwater or not or this object

830
00:33:00,289 --> 00:32:57,360
goes underwater

831
00:33:02,630 --> 00:33:00,299
um I I use that as an example in my

832
00:33:04,190 --> 00:33:02,640
upcoming talk and so I'm of course very

833
00:33:05,810 --> 00:33:04,200
interested in this

834
00:33:08,870 --> 00:33:05,820
and

835
00:33:10,549 --> 00:33:08,880
um you make a good point that these the

836
00:33:11,810 --> 00:33:10,559
object also disappears in mid-air and

837
00:33:13,330 --> 00:33:11,820
certainly it does

838
00:33:19,130 --> 00:33:13,340

so

839
00:33:20,930 --> 00:33:19,140
however why why is do we know why the

840
00:33:22,970 --> 00:33:20,940
objects disappearing in midair and do we

841
00:33:25,009 --> 00:33:22,980
know why the object is would be

842
00:33:26,930 --> 00:33:25,019
disappearing over water the water

843
00:33:28,730 --> 00:33:26,940
presumably is going to be cooler than

844
00:33:31,370 --> 00:33:28,740
the land surface

845
00:33:33,649 --> 00:33:31,380
and so I would imagine that there'd be

846
00:33:37,070 --> 00:33:33,659
actually more contrast between the Heat

847
00:33:38,830 --> 00:33:37,080
of the Lantern and the background of the

848
00:33:41,630 --> 00:33:38,840
water surface

849
00:33:44,330 --> 00:33:41,640
so to me it doesn't quite make sense

850
00:33:45,889 --> 00:33:44,340
that it would necessarily disappear as

851
00:33:47,509 --> 00:33:45,899
it's over water

852
00:33:50,149 --> 00:33:47,519
um can you comment on that

853
00:33:53,690 --> 00:33:50,159
yeah I think if you look at the the

854
00:33:56,330 --> 00:33:53,700
video in the earlier parts of it you see

855
00:33:58,549 --> 00:33:56,340
that the the object is made of two two

856
00:34:00,529 --> 00:33:58,559
regions a hot region and a cold region

857
00:34:04,070 --> 00:34:00,539
and I think the heart region is is

858
00:34:06,049 --> 00:34:04,080
fairly hot like a flame uh or you know

859
00:34:07,310 --> 00:34:06,059
you know something like a it's obviously

860
00:34:09,169 --> 00:34:07,320
not a jet exhaust but something that's

861
00:34:11,210 --> 00:34:09,179
hot and then the rest of it is fairly

862
00:34:13,190 --> 00:34:11,220
like ambient temperature and I think one

863
00:34:15,530 --> 00:34:13,200

of the best places to look at in this

864
00:34:17,510 --> 00:34:15,540
video is where it crosses over the road

865
00:34:19,669 --> 00:34:17,520
and we see where it crosses over the

866
00:34:22,369 --> 00:34:19,679
road there's a number of cars and other

867
00:34:24,669 --> 00:34:22,379
vehicles and you see the object itself

868
00:34:29,329 --> 00:34:24,679
and you see they look remarkably similar

869
00:34:32,329 --> 00:34:29,339
we see a gray kind of warmish Ambience

870
00:34:35,690 --> 00:34:32,339
temperature object and then we see the

871
00:34:39,470 --> 00:34:35,700
black of there's a heat source and it's

872
00:34:41,810 --> 00:34:39,480
it's not too different from

873
00:34:43,849 --> 00:34:41,820
um other objects in the scene

874
00:34:46,369 --> 00:34:43,859
so I think the kind of the ambient

875
00:34:48,530 --> 00:34:46,379
temperature of the the hypothetical

876
00:34:51,050 --> 00:34:48,540
Lantern is similar to the ambient

877
00:34:54,230 --> 00:34:51,060
temperature of these these cars and it's

878
00:34:56,030 --> 00:34:54,240
very easy for it to blend in uh with the

879
00:34:58,250 --> 00:34:56,040
background and I don't know what the

880
00:35:00,050 --> 00:34:58,260
temperature of the the ocean was but

881
00:35:02,390 --> 00:35:00,060
this was filmed at night so presumably

882
00:35:04,970 --> 00:35:02,400
the the air would be fairly cool which

883
00:35:07,370 --> 00:35:04,980
would cool down the the temperature of

884
00:35:08,750 --> 00:35:07,380
the surface of the lantern so the the

885
00:35:11,750 --> 00:35:08,760
temperature of the surface of the

886
00:35:14,329 --> 00:35:11,760
lantern will be you know perhaps closer

887
00:35:15,589 --> 00:35:14,339
to the air temperature of the air than

888
00:35:18,530 --> 00:35:15,599

the water so I think the temperature

889
00:35:20,329 --> 00:35:18,540
differential will be fairly small uh you

890
00:35:21,790 --> 00:35:20,339
see when it's flying over the water you

891
00:35:25,730 --> 00:35:21,800
can really only see

892
00:35:28,370 --> 00:35:25,740
the uh the heat source which means that

893
00:35:30,410 --> 00:35:28,380
the the canopy has already disappeared

894
00:35:32,329 --> 00:35:30,420
when it's when when it's just flying

895
00:35:34,790 --> 00:35:32,339
over all we're seeing is black when it's

896
00:35:36,770 --> 00:35:34,800
flying over the water until it goes you

897
00:35:38,810 --> 00:35:36,780
know underwater theoretically and then

898
00:35:40,910 --> 00:35:38,820
we just we can just make out this this

899
00:35:43,730 --> 00:35:40,920
grayness which I would say would be the

900
00:35:46,970 --> 00:35:43,740
the canopy of this this hot air balloon

901
00:35:48,349 --> 00:35:46,980
so I think uh what's happening is that

902
00:35:50,630 --> 00:35:48,359
the heat source is just simply being

903
00:35:52,910 --> 00:35:50,640
occluded by the balloon turning away so

904
00:35:55,190 --> 00:35:52,920
the heat sources is is hidden by the

905
00:35:57,829 --> 00:35:55,200
mass of the the balloon and so we just

906
00:36:00,050 --> 00:35:57,839
see this kind of ambient thing uh like

907
00:36:02,510 --> 00:36:00,060
we would see uh one of these cars on the

908
00:36:05,650 --> 00:36:02,520
road if someone had covered up the the

909
00:36:07,970 --> 00:36:05,660
heat source of the exhaust or the engine

910
00:36:10,069 --> 00:36:07,980
all right interesting all right thank

911
00:36:12,589 --> 00:36:10,079
you yes a lot to think about and of

912
00:36:14,930 --> 00:36:12,599
course we'll have to see Robert Powell's

913
00:36:15,829 --> 00:36:14,940

upcoming talk as well and see what their

914
00:36:21,589 --> 00:36:15,839
um

915
00:36:23,990 --> 00:36:21,599
this really points out an important well

916
00:36:26,390 --> 00:36:24,000
this makes an important point that these

917
00:36:28,069 --> 00:36:26,400
analysis of data especially from Just

918
00:36:30,710 --> 00:36:28,079
One sensor is extremely difficult

919
00:36:32,210 --> 00:36:30,720
there's a lot of complexity there's a

920
00:36:36,230 --> 00:36:32,220
lot of inference that needs to be made

921
00:36:38,690 --> 00:36:36,240
and um and this is another

922
00:36:42,349 --> 00:36:38,700
reason for having multiple instruments

923
00:36:44,270 --> 00:36:42,359
which is why you know we at uapx and the

924
00:36:45,890 --> 00:36:44,280
Galileo project and others are are

925
00:36:48,349 --> 00:36:45,900
trying to do that

926
00:36:52,250 --> 00:36:48,359
so so Robert asked the question

927
00:36:53,930 --> 00:36:52,260
um in the chat where he he asks

928
00:36:55,790 --> 00:36:53,940
um and you may you may have had this in

929
00:36:58,430 --> 00:36:55,800
your plot I thought that you had put up

930
00:37:00,290 --> 00:36:58,440
a graph that showed speeds but he asked

931
00:37:02,690 --> 00:37:00,300
what um speed did your model show the

932
00:37:04,609 --> 00:37:02,700
object was moving as it traveled east to

933
00:37:07,010 --> 00:37:04,619
west and do you have any evidence that a

934
00:37:10,130 --> 00:37:07,020
lantern can survive wins at those speeds

935
00:37:12,890 --> 00:37:10,140
it starts out at about 18 miles per hour

936
00:37:14,390 --> 00:37:12,900
and I have it on the graph uh the graph

937
00:37:16,130 --> 00:37:14,400
was a little small but it's going to

938
00:37:18,050 --> 00:37:16,140

make it big so I could see the the

939
00:37:20,450 --> 00:37:18,060
anomalous version

940
00:37:21,849 --> 00:37:20,460
um and it decreases as the object

941
00:37:24,890 --> 00:37:21,859
decreases

942
00:37:28,849 --> 00:37:24,900
and yeah I I don't think 80 miles per

943
00:37:31,310 --> 00:37:28,859
hour at altitude is an unreasonable uh

944
00:37:33,410 --> 00:37:31,320
speed we we know that the As It Gets

945
00:37:35,329 --> 00:37:33,420
lower the speed decreases quite a bit

946
00:37:38,210 --> 00:37:35,339
now you know obviously if it was 18

947
00:37:41,390 --> 00:37:38,220
miles per hour on the ground that would

948
00:37:42,770 --> 00:37:41,400
be a a silly uh windy day for you to

949
00:37:44,390 --> 00:37:42,780
release a landowner you're not going to

950
00:37:45,950 --> 00:37:44,400
be flying lanterns when it's 18 miles

951
00:37:48,530 --> 00:37:45,960
per hour on the ground but it wasn't it

952
00:37:51,109 --> 00:37:48,540
was it was a more reasonable uh like I

953
00:37:52,670 --> 00:37:51,119
think less than 10 miles per hour so the

954
00:37:56,510 --> 00:37:52,680
lantern would have been released on the

955
00:37:59,150 --> 00:37:56,520
beach uh some some miles away in a lower

956
00:38:02,390 --> 00:37:59,160
uh wind speed and then ascended to

957
00:38:06,470 --> 00:38:02,400
altitude where it's faster and yeah the

958
00:38:08,450 --> 00:38:06,480
the effect of wind is is relative so

959
00:38:10,670 --> 00:38:08,460
it's if you release if you're holding

960
00:38:12,589 --> 00:38:10,680
something in in Fast Wind then that's an

961
00:38:15,170 --> 00:38:12,599
issue but if something is moving in Fast

962
00:38:17,270 --> 00:38:15,180
Wind then you know it's less of an issue

963
00:38:20,569 --> 00:38:17,280

and especially at altitude where there

964
00:38:23,990 --> 00:38:20,579
were the air mass flows in a more more

965
00:38:25,250 --> 00:38:24,000
lemon away more a smoother way than it

966
00:38:27,770 --> 00:38:25,260
does at the ground where it's a lot more

967
00:38:29,329 --> 00:38:27,780
turbulent so you know this is something

968
00:38:33,290 --> 00:38:29,339
that's I think like with the first

969
00:38:34,849 --> 00:38:33,300
question is you the ultimate Arbiter of

970
00:38:36,470 --> 00:38:34,859
that would be a physical reconstruction

971
00:38:39,650 --> 00:38:36,480
and that's something I would certainly

972
00:38:42,230 --> 00:38:39,660
like to see uh done uh physical

973
00:38:45,410 --> 00:38:42,240
reconstruction of experimenting with

974
00:38:47,089 --> 00:38:45,420
wind speed and various altitudes but I I

975
00:38:49,310 --> 00:38:47,099
don't personally think that it's

976
00:38:54,730 --> 00:38:49,320
implausible especially as we start out

977
00:38:59,990 --> 00:38:57,670
real quick there

978
00:39:03,530 --> 00:39:00,000
can I just make one more point there the

979
00:39:05,630 --> 00:39:03,540
the really interesting thing about that

980
00:39:08,270 --> 00:39:05,640
particular speed and direction is that

981
00:39:11,630 --> 00:39:08,280
that is the wind speed and direction on

982
00:39:14,270 --> 00:39:11,640
that day we knew that the the upper the

983
00:39:16,609 --> 00:39:14,280
the wind above 400 feet was around I

984
00:39:18,170 --> 00:39:16,619
think 12 to 18 miles per hour and at

985
00:39:20,150 --> 00:39:18,180
lower level it was around 10 miles per

986
00:39:22,370 --> 00:39:20,160
hour and in that direction which is the

987
00:39:23,870 --> 00:39:22,380
the path that emerged from the analysis

988
00:39:25,970 --> 00:39:23,880

it wasn't me trying to force that path

989
00:39:28,670 --> 00:39:25,980
that was really the the only plausible

990
00:39:30,890 --> 00:39:28,680
path was one that actually matched the

991
00:39:32,270 --> 00:39:30,900
wind speed

992
00:39:35,210 --> 00:39:32,280
yeah

993
00:39:37,430 --> 00:39:35,220
right and um uh let's see I just

994
00:39:39,890 --> 00:39:37,440
happened to notice uh Rich Hoffman had

995
00:39:41,690 --> 00:39:39,900
something related to that where actually

996
00:39:45,349 --> 00:39:41,700
there's a hand up from Professor uh

997
00:39:47,510 --> 00:39:45,359
sedagas maybe he could throw in yeah I'm

998
00:39:48,589 --> 00:39:47,520
having trouble seeing the hands up so if

999
00:39:52,250 --> 00:39:48,599
you can help me with that that'd be

1000
00:39:54,050 --> 00:39:52,260
great yeah um Matthew can you you can go

1001
00:39:57,410 --> 00:39:54,060
uh thank you

1002
00:39:59,510 --> 00:39:57,420
um Kevin Mick that was a a very uh good

1003
00:40:03,530 --> 00:39:59,520
presentation I'm curious obviously what

1004
00:40:05,270 --> 00:40:03,540
Robert will will have in his but on on

1005
00:40:07,670 --> 00:40:05,280
the face of it definitely find what you

1006
00:40:08,930 --> 00:40:07,680
have is very compelling there but my

1007
00:40:12,109 --> 00:40:08,940
question is more of a big picture

1008
00:40:14,150 --> 00:40:12,119
General one since you mentioned of

1009
00:40:16,609 --> 00:40:14,160
course Occam's razor several times and I

1010
00:40:18,349 --> 00:40:16,619
wanted to ask what is your opinion

1011
00:40:20,930 --> 00:40:18,359
though of the perspective that at least

1012
00:40:23,630 --> 00:40:20,940
in in science from The History of

1013
00:40:25,730 --> 00:40:23,640

Science and speaking from myself as a

1014
00:40:27,290 --> 00:40:25,740
particle physicist one possible

1015
00:40:29,810 --> 00:40:27,300
perspective is actually the history of

1016
00:40:32,270 --> 00:40:29,820
science is from one point of view at

1017
00:40:35,630 --> 00:40:32,280
least a scathing indictment of Occam's

1018
00:40:38,030 --> 00:40:35,640
razor since for example earth air fire

1019
00:40:41,210 --> 00:40:38,040
and water and ether the Greek five

1020
00:40:43,010 --> 00:40:41,220
elements that's way simpler than the

1021
00:40:44,990 --> 00:40:43,020
periodic table the elements or the

1022
00:40:46,490 --> 00:40:45,000
standard model particle physics which is

1023
00:40:49,730 --> 00:40:46,500
really really hard and really

1024
00:40:51,589 --> 00:40:49,740
complicated and similarly

1025
00:40:54,710 --> 00:40:51,599
um uh Daniel crew mentioned earlier

1026
00:40:56,630 --> 00:40:54,720
Newton and sign general relativity is

1027
00:40:59,510 --> 00:40:56,640
extremely hard it's a graduate level

1028
00:41:01,430 --> 00:40:59,520
course Einstein Newton can be talked to

1029
00:41:03,650 --> 00:41:01,440
first year first year undergraduate

1030
00:41:06,530 --> 00:41:03,660
students so the history of physics seems

1031
00:41:08,990 --> 00:41:06,540
to show that Occam's razor is a cute

1032
00:41:11,150 --> 00:41:09,000
idea that it works a lot of the time but

1033
00:41:13,010 --> 00:41:11,160
doesn't really seem to work and and when

1034
00:41:15,230 --> 00:41:13,020
you actually put that principle under

1035
00:41:17,089 --> 00:41:15,240
the microscope in the hard Sciences so

1036
00:41:19,190 --> 00:41:17,099
I'd like to hear your thoughts on that

1037
00:41:21,230 --> 00:41:19,200
sure well welcome to razor is kind of a

1038
00:41:23,349 --> 00:41:21,240

rule of thumb it's something that's very

1039
00:41:25,790 --> 00:41:23,359
useful for kind of making initial

1040
00:41:27,589 --> 00:41:25,800
determinations of hypotheses and if you

1041
00:41:29,329 --> 00:41:27,599
don't have anything else to go by it's a

1042
00:41:31,250 --> 00:41:29,339
very good thing and it isn't really like

1043
00:41:32,750 --> 00:41:31,260
which is the simplest explanation

1044
00:41:34,670 --> 00:41:32,760
because if you look at these two

1045
00:41:37,069 --> 00:41:34,680
explanations in some ways the simplest

1046
00:41:39,230 --> 00:41:37,079
explanation uh is that it's a an

1047
00:41:40,730 --> 00:41:39,240
anomalous craft we can just say oh it's

1048
00:41:42,710 --> 00:41:40,740
just some kind of advanced technology

1049
00:41:45,109 --> 00:41:42,720
craft perhaps a non-human intelligence

1050
00:41:49,010 --> 00:41:45,119
power to craft and we don't have to

1051
00:41:51,290 --> 00:41:49,020
explain beyond that but Occam's razor uh

1052
00:41:52,910 --> 00:41:51,300
in its actual original form isn't the

1053
00:41:56,210 --> 00:41:52,920
the simplest explanation is the best

1054
00:41:59,150 --> 00:41:56,220
it's the Do Not net do not multiply

1055
00:42:02,990 --> 00:41:59,160
entities unnecessarily do not add things

1056
00:42:04,730 --> 00:42:03,000
to the explanation that are new and here

1057
00:42:06,849 --> 00:42:04,740
we've got two explanations one of which

1058
00:42:11,390 --> 00:42:06,859
is just wedding lanterns which we know

1059
00:42:13,670 --> 00:42:11,400
exist in that location and match all the

1060
00:42:17,030 --> 00:42:13,680
available data and the other one is some

1061
00:42:19,849 --> 00:42:17,040
some mysterious anomalous

1062
00:42:21,950 --> 00:42:19,859
craft so we're introducing something new

1063
00:42:25,250 --> 00:42:21,960

and not just something you know trivial

1064
00:42:26,810 --> 00:42:25,260
and you like a new type of drone or

1065
00:42:29,510 --> 00:42:26,820
something like that where introducing

1066
00:42:31,010 --> 00:42:29,520
something that seems to defy the laws of

1067
00:42:34,069 --> 00:42:31,020
physics in the way it Dives underwater

1068
00:42:35,990 --> 00:42:34,079
so there's there's a very significant

1069
00:42:38,750 --> 00:42:36,000
difference which I think really occamus

1070
00:42:40,310 --> 00:42:38,760
racist does speak to in that the the

1071
00:42:43,069 --> 00:42:40,320
Lansing hypothesis doesn't bring

1072
00:42:45,050 --> 00:42:43,079
anything new the anomaly hypothesis

1073
00:42:46,490 --> 00:42:45,060
brings something incredible and amazing

1074
00:42:48,650 --> 00:42:46,500
and new and there's a very big

1075
00:42:50,450 --> 00:42:48,660
distinction and since that's you know

1076
00:42:53,510 --> 00:42:50,460
our pivoting point I think we have to go

1077
00:42:56,270 --> 00:42:53,520
towards the uh the the simpler

1078
00:42:58,490 --> 00:42:56,280
explanation in an outcome Style

1079
00:43:00,950 --> 00:42:58,500
Kevin can we we have an intervention

1080
00:43:05,210 --> 00:43:00,960
here from my colleague

1081
00:43:09,109 --> 00:43:07,970
because Nick Gray shock I thought it was

1082
00:43:12,710 --> 00:43:09,119
really interesting

1083
00:43:14,089 --> 00:43:12,720
um I and I have nothing to say I have no

1084
00:43:16,790 --> 00:43:14,099
um nothing to say about this particular

1085
00:43:19,550 --> 00:43:16,800
case and um I have no idea how to

1086
00:43:21,170 --> 00:43:19,560
adjudicate it um but the sort of

1087
00:43:23,210 --> 00:43:21,180
conversations you guys are having about

1088
00:43:24,410 --> 00:43:23,220

this I think is very important and it's

1089
00:43:25,670 --> 00:43:24,420
the sort of thing that we ought to be

1090
00:43:27,650 --> 00:43:25,680
doing

1091
00:43:28,730 --> 00:43:27,660
um so I do want to do a little big

1092
00:43:31,010 --> 00:43:28,740
picture

1093
00:43:33,170 --> 00:43:31,020
scientific explanation I'm not going to

1094
00:43:35,329 --> 00:43:33,180
talk about Occam's razor because yeah

1095
00:43:36,890 --> 00:43:35,339
it's a value judgment whatever

1096
00:43:38,690 --> 00:43:36,900
um I think it's not always the simplest

1097
00:43:41,809 --> 00:43:38,700
thing how do you define simple but but

1098
00:43:43,550 --> 00:43:41,819
let's just make it more Bare Bones so I

1099
00:43:44,990 --> 00:43:43,560
think I I hope everyone at least

1100
00:43:47,210 --> 00:43:45,000
everyone who wants to play the game of

1101
00:43:48,890 --> 00:43:47,220
Science degree is that you know we want

1102
00:43:50,990 --> 00:43:48,900
to figure out whether or not the Black

1103
00:43:53,690 --> 00:43:51,000
Swan is more probable than not than what

1104
00:43:55,730 --> 00:43:53,700
you call the mundane scenario and and

1105
00:43:58,190 --> 00:43:55,740
that's fine but we just want to make

1106
00:44:00,349 --> 00:43:58,200
sure that we're all all our Bayesian

1107
00:44:02,150 --> 00:44:00,359
priors are the same we want to make sure

1108
00:44:03,950 --> 00:44:02,160
we're all agreeing on how you know we're

1109
00:44:07,250 --> 00:44:03,960
going to adjudicate you know when we

1110
00:44:08,930 --> 00:44:07,260
place these bets we we nobody need we

1111
00:44:12,109 --> 00:44:08,940
can't be using different epistemic

1112
00:44:15,170 --> 00:44:12,119
criteria or what have you right so

1113
00:44:17,390 --> 00:44:15,180

um you know in the case at hand which of

1114
00:44:19,010 --> 00:44:17,400
these is more probable well it's going

1115
00:44:21,650 --> 00:44:19,020
to come down to an awful lot of

1116
00:44:24,710 --> 00:44:21,660
questions right about the physics of

1117
00:44:26,990 --> 00:44:24,720
those and the thermodynamics and all

1118
00:44:28,550 --> 00:44:27,000
kinds of things uh which would take you

1119
00:44:30,589 --> 00:44:28,560
know again getting out of the details

1120
00:44:33,470 --> 00:44:30,599
and but one of the things I do want to

1121
00:44:35,569 --> 00:44:33,480
say is in a lot of these cases there are

1122
00:44:37,250 --> 00:44:35,579
multiple this is Daniel's point there

1123
00:44:41,210 --> 00:44:37,260
are multiple streams of convergent

1124
00:44:42,710 --> 00:44:41,220
evidence right and I don't think we can

1125
00:44:45,530 --> 00:44:42,720
go through each case and do what you're

1126
00:44:47,569 --> 00:44:45,540
doing and we should but I think we have

1127
00:44:49,130 --> 00:44:47,579
to take all those different streams of

1128
00:44:52,010 --> 00:44:49,140
convergent evidence and all the

1129
00:44:54,950 --> 00:44:52,020
different cases together when we decide

1130
00:44:58,069 --> 00:44:54,960
you know which hypothesis is is more

1131
00:44:59,809 --> 00:44:58,079
probable than not so I guess my really

1132
00:45:02,390 --> 00:44:59,819
my question to you is

1133
00:45:05,329 --> 00:45:02,400
do you think that when you look at the

1134
00:45:07,609 --> 00:45:05,339
the preponderance of evidence that these

1135
00:45:11,089 --> 00:45:07,619
people who were speaking yesterday it's

1136
00:45:13,609 --> 00:45:11,099
absolutely reasonable them for us and to

1137
00:45:16,190 --> 00:45:13,619
receive funding to try to acquire more

1138
00:45:18,650 --> 00:45:16,200

data would you support that

1139
00:45:20,270 --> 00:45:18,660
uh sure and I think you know you talk

1140
00:45:22,250 --> 00:45:20,280
about getting a common epistemic

1141
00:45:23,750 --> 00:45:22,260
framework uh I but I think that we're

1142
00:45:25,670 --> 00:45:23,760
kind of hobbled here by the fact that

1143
00:45:27,950 --> 00:45:25,680
we're all individual people and we're

1144
00:45:29,329 --> 00:45:27,960
all working independently and you know

1145
00:45:30,950 --> 00:45:29,339
we're not just all in the same room

1146
00:45:32,569 --> 00:45:30,960
together working on the same thing so

1147
00:45:35,750 --> 00:45:32,579
we're naturally going to have lots of

1148
00:45:37,910 --> 00:45:35,760
Divergence within that but yeah I I

1149
00:45:40,130 --> 00:45:37,920
don't see uh any issue with people

1150
00:45:43,069 --> 00:45:40,140
asking for funding to study things like

1151
00:45:45,410 --> 00:45:43,079
if there are unidentified objects in the

1152
00:45:48,349 --> 00:45:45,420
sky then it would be good to identify

1153
00:45:50,150 --> 00:45:48,359
them and uh if they're a Mysteries

1154
00:45:51,829 --> 00:45:50,160
flight floating around in the sky it

1155
00:45:53,809 --> 00:45:51,839
would be good to try to to solve those

1156
00:45:57,170 --> 00:45:53,819
Mysteries and to figure out what we can

1157
00:46:01,010 --> 00:45:57,180
we can learn from them uh but you know

1158
00:46:02,809 --> 00:46:01,020
if if uh you want to do that based on

1159
00:46:05,930 --> 00:46:02,819
good evidence and you want to do it

1160
00:46:08,390 --> 00:46:05,940
based on cases that do actually stand up

1161
00:46:10,250 --> 00:46:08,400
to analysis

1162
00:46:13,130 --> 00:46:10,260
um and you know as you could have

1163
00:46:15,470 --> 00:46:13,140

pointed out we do have a a wide variety

1164
00:46:18,349 --> 00:46:15,480
there and I think you do at some point

1165
00:46:20,809 --> 00:46:18,359
have to look at individual cases and see

1166
00:46:23,089 --> 00:46:20,819
whether they they they hold up but I

1167
00:46:25,490 --> 00:46:23,099
have no objection to uh you know a

1168
00:46:27,109 --> 00:46:25,500
broader study of this topic I think we

1169
00:46:29,809 --> 00:46:27,119
should look at every individual case and

1170
00:46:32,210 --> 00:46:29,819
see if it holds up I I agree with you we

1171
00:46:33,890 --> 00:46:32,220
have to consider all the streams of of

1172
00:46:37,250 --> 00:46:33,900
evidence in each of those individual

1173
00:46:40,069 --> 00:46:37,260
cases and to your point about a common I

1174
00:46:41,329 --> 00:46:40,079
mean a common epistemic framework is an

1175
00:46:44,089 --> 00:46:41,339
idealization

1176
00:46:46,670 --> 00:46:44,099
to achieve but it is what drives science

1177
00:46:49,309 --> 00:46:46,680
right so the whole idea is to have so

1178
00:46:52,490 --> 00:46:49,319
when we assign sig figs and we place

1179
00:46:54,589 --> 00:46:52,500
bets about you know uh the nature of

1180
00:46:56,809 --> 00:46:54,599
black holes or whether or not Psy exists

1181
00:47:00,530 --> 00:46:56,819
or what have you we at least presuppose

1182
00:47:02,569 --> 00:47:00,540
right that we've agreed on what you know

1183
00:47:03,770 --> 00:47:02,579
is going to count as who's going to win

1184
00:47:06,170 --> 00:47:03,780
who's going to lose under what

1185
00:47:08,329 --> 00:47:06,180
conditions based on what procedures so

1186
00:47:10,910 --> 00:47:08,339
that's all I'm trying to do is you know

1187
00:47:13,130 --> 00:47:10,920
in effect get everybody in the same room

1188
00:47:14,809 --> 00:47:13,140

and agree on that so that nobody's

1189
00:47:15,770 --> 00:47:14,819
cheating

1190
00:47:18,950 --> 00:47:15,780
Etc

1191
00:47:21,050 --> 00:47:18,960
does that sounds reasonable yes but I I

1192
00:47:22,550 --> 00:47:21,060
think it is perhaps a bit uh over

1193
00:47:25,490 --> 00:47:22,560
ambitious because the rest of science

1194
00:47:27,109 --> 00:47:25,500
really hasn't got there yet uh and you

1195
00:47:29,089 --> 00:47:27,119
know we can use the rest of science as

1196
00:47:31,730 --> 00:47:29,099
you know a basic framework you know what

1197
00:47:34,130 --> 00:47:31,740
are the the the the levels of evidence

1198
00:47:36,530 --> 00:47:34,140
that we need but you know even in other

1199
00:47:38,690 --> 00:47:36,540
disciplines that are older and more well

1200
00:47:42,250 --> 00:47:38,700
established there's still a variety of

1201
00:47:44,329 --> 00:47:42,260
uh of approaches and a variety of people

1202
00:47:46,010 --> 00:47:44,339
uh so I think you know we're probably

1203
00:47:47,510 --> 00:47:46,020
going to be stuck with that for for some

1204
00:47:49,370 --> 00:47:47,520
time but it's certainly something we can

1205
00:47:51,770 --> 00:47:49,380
work towards improving

1206
00:47:52,970 --> 00:47:51,780
thank you man thanks I I think

1207
00:47:55,069 --> 00:47:52,980
unfortunately we're going to have to

1208
00:47:57,470 --> 00:47:55,079
transition over to that song Kevin if

1209
00:47:58,910 --> 00:47:57,480
you could uh also be in the discuss it

1210
00:48:01,670 --> 00:47:58,920
for Robert

1211
00:48:04,490 --> 00:48:01,680
um yeah that would be fun I I think I

1212
00:48:06,829 --> 00:48:04,500
would just like to finish by adding that

1213
00:48:11,870 --> 00:48:09,589

yeah your your trajectory is a straight

1214
00:48:14,089 --> 00:48:11,880
line over the airport which I think is

1215
00:48:16,010 --> 00:48:14,099
is you know in some ways if we're going

1216
00:48:17,690 --> 00:48:16,020
to talk about Simplicity and and Occam's

1217
00:48:19,430 --> 00:48:17,700
razor is a very simple solution right

1218
00:48:21,589 --> 00:48:19,440
and the fact that this straight line

1219
00:48:24,890 --> 00:48:21,599
motion is something you would expect

1220
00:48:26,750 --> 00:48:24,900
from something like a a lantern is is

1221
00:48:29,390 --> 00:48:26,760
compelling

1222
00:48:32,569 --> 00:48:29,400
um but then I also have to ask why why

1223
00:48:35,270 --> 00:48:32,579
is it if there's a hotel downwind

1224
00:48:37,010 --> 00:48:35,280
um that regularly releases

1225
00:48:39,589 --> 00:48:37,020
um Chinese lanterns

1226
00:48:40,670 --> 00:48:39,599
then why are the Personnel at the

1227
00:48:43,250 --> 00:48:40,680
airport

1228
00:48:44,990 --> 00:48:43,260
um interested and surprised and bothered

1229
00:48:45,890 --> 00:48:45,000
by Chinese lanterns flying over the

1230
00:48:48,530 --> 00:48:45,900
airport

1231
00:48:50,630 --> 00:48:48,540
um why is this a mystery to them and so

1232
00:48:53,690 --> 00:48:50,640
I there's a lot there's a lot to think

1233
00:48:56,089 --> 00:48:53,700
about here and um yeah again these

1234
00:48:57,530 --> 00:48:56,099
problems with people yeah I don't know

1235
00:49:00,410 --> 00:48:57,540
but we do know that the something that

1236
00:49:02,690 --> 00:49:00,420
does happen and uh it was perhaps uh not

1237
00:49:04,370 --> 00:49:02,700
that familiar to the people who were on

1238
00:49:06,230 --> 00:49:04,380

duty that night and they saw something

1239
00:49:07,609 --> 00:49:06,240
that they didn't immediately recognize

1240
00:49:11,230 --> 00:49:07,619
it might not be something that happens

1241
00:49:13,609 --> 00:49:11,240
every single day notifications

1242
00:49:16,670 --> 00:49:13,619
yeah it's it's you know it's another

1243
00:49:18,589 --> 00:49:16,680
thing that kind of like modifies the

1244
00:49:19,550 --> 00:49:18,599
hypothesis in terms of plausibility but

1245
00:49:22,010 --> 00:49:19,560
I don't think it's something that

1246
00:49:24,290 --> 00:49:22,020
eliminates it especially as we're

1247
00:49:27,170 --> 00:49:24,300
considering far more

1248
00:49:28,430 --> 00:49:27,180
um exotic explanations as well so the

1249
00:49:30,650 --> 00:49:28,440
the fact that someone might not

1250
00:49:32,750 --> 00:49:30,660
immediately recognize a wedding Lantern

1251
00:49:37,450 --> 00:49:32,760
isn't really as exotic as something that

1252
00:49:41,870 --> 00:49:39,950
thank you so much for your talk I really

1253
00:49:44,089 --> 00:49:41,880
appreciate it and um thank you everyone