

DISCLOSURE
TEAM

AVI LOEB

#67

1
00:01:06,789 --> 00:00:06,840

[Music]

2
00:01:11,350 --> 00:01:09,830

hey guys how's it going welcome back to

3
00:01:14,070 --> 00:01:11,360

the youtube channel

4
00:01:14,870 --> 00:01:14,080

um i'm just waiting for for avi to join

5
00:01:16,870 --> 00:01:14,880

me

6
00:01:18,950 --> 00:01:16,880

um i actually made it a slight mistake

7
00:01:20,870 --> 00:01:18,960

and i'll hold my hands up to it i didn't

8
00:01:22,789 --> 00:01:20,880

realize that daylight savings had

9
00:01:25,030 --> 00:01:22,799

changed two days ago

10
00:01:26,710 --> 00:01:25,040

in in new york and so

11
00:01:28,469 --> 00:01:26,720

i got a message from avi an hour ago

12
00:01:30,630 --> 00:01:28,479

saying i'm i'm waiting on stream yards

13
00:01:33,270 --> 00:01:30,640

so i ran up to my office

14

00:01:35,429 --> 00:01:33,280

spoke to him and he graciously said no

15

00:01:38,390 --> 00:01:35,439

problem i'll come back in an hour so

16

00:01:39,910 --> 00:01:38,400

he's due due any moment so um

17

00:01:40,710 --> 00:01:39,920

yeah before we start though i'll just

18

00:01:42,630 --> 00:01:40,720

say

19

00:01:44,950 --> 00:01:42,640

um thank you to everybody watching live

20

00:01:47,109 --> 00:01:44,960

on youtube anybody watching this later

21

00:01:48,950 --> 00:01:47,119

date on youtube thank you so much

22

00:01:51,749 --> 00:01:48,960

and thank you to anybody listening to

23

00:01:54,310 --> 00:01:51,759

this on the anomalous podcast network um

24

00:01:55,910 --> 00:01:54,320

i really appreciate it um for anybody

25

00:01:58,870 --> 00:01:55,920

that is here live if we could just keep

26

00:02:00,469 --> 00:01:58,880

the the chat room mature and uh let's

27

00:02:02,789 --> 00:02:00,479

not get into any arguments or anything

28

00:02:04,149 --> 00:02:02,799

which i'm sure sure won't happen

29

00:02:06,069 --> 00:02:04,159

if you do have a question that you'd

30

00:02:08,229 --> 00:02:06,079

like me to possibly ask at the end of

31

00:02:10,309 --> 00:02:08,239

the interview for avi if you could leave

32

00:02:12,470 --> 00:02:10,319

that in capital letters and that should

33

00:02:13,910 --> 00:02:12,480

help me see it i've got so much going on

34

00:02:17,350 --> 00:02:13,920

in front of me

35

00:02:20,150 --> 00:02:17,360

um that would be great so yeah um

36

00:02:21,110 --> 00:02:20,160

i see some questions already coming in

37

00:02:22,869 --> 00:02:21,120

and

38

00:02:24,550 --> 00:02:22,879

yeah i'll i'll make a note of them but

39

00:02:26,070 --> 00:02:24,560

they may actually conflict with some of

40

00:02:28,470 --> 00:02:26,080

the ones that i've already got so so

41

00:02:31,910 --> 00:02:28,480

that's cool um let's see who we got here

42

00:02:33,190 --> 00:02:31,920

hey guys lara joss arno aaron r

43

00:02:35,750 --> 00:02:33,200

andre

44

00:02:37,430 --> 00:02:35,760

k alexander benji

45

00:02:39,430 --> 00:02:37,440

my brother

46

00:02:40,309 --> 00:02:39,440

thank you thank you guys for all being

47

00:02:43,990 --> 00:02:40,319

here

48

00:02:45,910 --> 00:02:44,000

anonymous rex uap experiences steph

49

00:02:47,670 --> 00:02:45,920

thank you so much guys

50

00:02:49,509 --> 00:02:47,680

um

51
00:02:51,990 --> 00:02:49,519
what else can we talk about until uh

52
00:02:54,470 --> 00:02:52,000
professor gets here journey how's it

53
00:02:56,390 --> 00:02:54,480
going and for anybody that's not aware i

54
00:02:57,830 --> 00:02:56,400
recently made a trip to colombia to film

55
00:03:00,149 --> 00:02:57,840
a documentary series called

56
00:03:02,390 --> 00:03:00,159
phenomenology you can now go and

57
00:03:04,390 --> 00:03:02,400
subscribe to the youtube channel we have

58
00:03:05,990 --> 00:03:04,400
a trailer up we have a rough cuts video

59
00:03:08,470 --> 00:03:06,000
up already as well

60
00:03:09,509 --> 00:03:08,480
the uh the season starts on may the

61
00:03:11,830 --> 00:03:09,519
first

62
00:03:13,190 --> 00:03:11,840
so uh that'll be episode one

63
00:03:15,910 --> 00:03:13,200

um so yeah i'm really excited for

64

00:03:18,309 --> 00:03:15,920

everybody to see what we did out there

65

00:03:21,430 --> 00:03:18,319

um it's gonna be great i really hope you

66

00:03:24,070 --> 00:03:21,440

enjoy it um

67

00:03:26,710 --> 00:03:24,080

benji thank you so much thank you so

68

00:03:29,030 --> 00:03:26,720

much ann i really appreciate that

69

00:03:32,070 --> 00:03:29,040

and

70

00:03:34,229 --> 00:03:32,080

that's very very kind well guys my guest

71

00:03:36,149 --> 00:03:34,239

is here so i'm just going to give him a

72

00:03:38,789 --> 00:03:36,159

uh an introduction and then we'll bring

73

00:03:39,589 --> 00:03:38,799

him on and get this show on the road

74

00:03:41,110 --> 00:03:39,599

so

75

00:03:43,509 --> 00:03:41,120

avilo

76

00:03:45,110 --> 00:03:43,519

is the frank b baird jr professor of

77

00:03:47,430 --> 00:03:45,120

science at harvard university and

78

00:03:49,110 --> 00:03:47,440

best-selling author

79

00:03:51,270 --> 00:03:49,120

he received a phd in physics from the

80

00:03:53,589 --> 00:03:51,280

hebrew university of jerusalem in israel

81

00:03:55,270 --> 00:03:53,599

at age 24. he led the first

82

00:03:57,429 --> 00:03:55,280

international project supported by the

83

00:03:59,270 --> 00:03:57,439

strategic defense initiative and was

84

00:04:00,630 --> 00:03:59,280

subsequently a long-term member of the

85

00:04:02,869 --> 00:04:00,640

institute for advanced study at

86

00:04:04,710 --> 00:04:02,879

princeton he's written eight books on a

87

00:04:06,630 --> 00:04:04,720

wide range of topics including black

88

00:04:08,949 --> 00:04:06,640

holes the first stars the search for

89

00:04:10,070 --> 00:04:08,959

extraterrestrial life and the future of

90

00:04:11,910 --> 00:04:10,080

the universe

91

00:04:13,750 --> 00:04:11,920

he is the director of the institute for

92

00:04:15,429 --> 00:04:13,760

theory and computation within the

93

00:04:18,469 --> 00:04:15,439

harvard smithsonian center for

94

00:04:20,390 --> 00:04:18,479

astrophysics and also serves as the head

95

00:04:22,150 --> 00:04:20,400

of the galileo project

96

00:04:24,070 --> 00:04:22,160

he had been the longest serving chair of

97

00:04:25,830 --> 00:04:24,080

harvard's department of astronomy and

98

00:04:27,430 --> 00:04:25,840

the founding director of harvard's black

99

00:04:29,350 --> 00:04:27,440

hole initiative

100

00:04:31,590 --> 00:04:29,360

he is an elected fellow of the american

101
00:04:33,430 --> 00:04:31,600
academy of arts and sciences the

102
00:04:36,150 --> 00:04:33,440
american physical society and the

103
00:04:37,830 --> 00:04:36,160
international academy of astronautics he

104
00:04:39,590 --> 00:04:37,840
is a former member of the president's

105
00:04:41,510 --> 00:04:39,600
council of advisers on science and

106
00:04:43,749 --> 00:04:41,520
technology at the white house

107
00:04:46,230 --> 00:04:43,759
former chair of the board on physics and

108
00:04:48,469 --> 00:04:46,240
astronomy of the national academics

109
00:04:49,830 --> 00:04:48,479
sorry national academies and a current

110
00:04:52,390 --> 00:04:49,840
member of the advisory board for

111
00:04:54,950 --> 00:04:52,400
einstein visualized the impossible of

112
00:04:56,629 --> 00:04:54,960
the hebrew university he also chairs the

113
00:04:58,870 --> 00:04:56,639

advisory committee for the breakthrough

114

00:05:00,550 --> 00:04:58,880

star shot initiative and serves as the

115

00:05:02,150 --> 00:05:00,560

science theory director for all

116

00:05:03,430 --> 00:05:02,160

initiatives of the breakthrough prize

117

00:05:05,909 --> 00:05:03,440

foundation

118

00:05:08,710 --> 00:05:05,919

in 2012 time magazine selected loeb as

119

00:05:11,590 --> 00:05:08,720

one of the 25 most influential people in

120

00:05:14,390 --> 00:05:11,600

space and in 2020 he was selected among

121

00:05:15,990 --> 00:05:14,400

the 14 most inspiring israelis of the

122

00:05:18,550 --> 00:05:16,000

last decade

123

00:05:20,629 --> 00:05:18,560

please uh welcome

124

00:05:23,029 --> 00:05:20,639

avila avi how are you

125

00:05:25,189 --> 00:05:23,039

i'm doing great nice to see you vinnie

126
00:05:26,710 --> 00:05:25,199
um i have to apologize for the mistake i

127
00:05:29,110 --> 00:05:26,720
made earlier with regards to the time

128
00:05:31,909 --> 00:05:29,120
zone difference oh no time is relative

129
00:05:33,430 --> 00:05:31,919
according to einstein

130
00:05:36,390 --> 00:05:33,440
thank you so much

131
00:05:37,990 --> 00:05:36,400
um so i i appreciate you being here it

132
00:05:40,070 --> 00:05:38,000
really means a lot to me it's good to

133
00:05:42,629 --> 00:05:40,080
see you um so i'll try not to keep you

134
00:05:44,870 --> 00:05:42,639
too long so we'll jump straight into it

135
00:05:47,510 --> 00:05:44,880
um so basically we're mainly to talk

136
00:05:48,870 --> 00:05:47,520
about the galileo project um it's been

137
00:05:51,110 --> 00:05:48,880
probably getting on for around a year

138
00:05:52,950 --> 00:05:51,120

now since you you announced it and

139

00:05:55,350 --> 00:05:52,960

you've built this strong research team

140

00:05:57,430 --> 00:05:55,360

advisory board and a large affiliate

141

00:05:58,710 --> 00:05:57,440

group featuring many professionals and

142

00:06:01,110 --> 00:05:58,720

scientists

143

00:06:03,670 --> 00:06:01,120

but during this first almost year have

144

00:06:05,510 --> 00:06:03,680

you have the conversations in the halls

145

00:06:07,990 --> 00:06:05,520

of harvard and elsewhere have you felt

146

00:06:10,390 --> 00:06:08,000

the stigma and taboo lift at all

147

00:06:13,430 --> 00:06:10,400

surrounding this topic

148

00:06:15,189 --> 00:06:13,440

um well a bit i should say

149

00:06:17,350 --> 00:06:15,199

first of all

150

00:06:19,430 --> 00:06:17,360

by now we have more than 100 scientists

151
00:06:21,270 --> 00:06:19,440
engaged in the galileo project it was

152
00:06:24,309 --> 00:06:21,280
announced only

153
00:06:27,350 --> 00:06:24,319
um eight months ago or so

154
00:06:29,749 --> 00:06:27,360
uh seven months ago and uh actually we

155
00:06:33,510 --> 00:06:29,759
are planning uh in the summer it was

156
00:06:35,670 --> 00:06:33,520
announced in at the end of july 2021 so

157
00:06:39,029 --> 00:06:35,680
um exactly a year

158
00:06:41,430 --> 00:06:39,039
uh later we are planning to have the

159
00:06:42,550 --> 00:06:41,440
first in-person meeting of the galileo

160
00:06:43,430 --> 00:06:42,560
project

161
00:06:45,029 --> 00:06:43,440
and

162
00:06:46,710 --> 00:06:45,039
actually

163
00:06:48,230 --> 00:06:46,720

by then we hope to have the first

164

00:06:50,390 --> 00:06:48,240

telescope system on the roof of the

165

00:06:53,110 --> 00:06:50,400

harvard college observatory and have

166

00:06:55,830 --> 00:06:53,120

some data and some analysis of our

167

00:06:57,670 --> 00:06:55,840

artificial intelligence algorithms

168

00:06:59,990 --> 00:06:57,680

just to demonstrate that

169

00:07:02,150 --> 00:07:00,000

we can take a video of the sky in

170

00:07:05,350 --> 00:07:02,160

different wavelengths infrared visible

171

00:07:07,670 --> 00:07:05,360

light radio and also audio

172

00:07:09,270 --> 00:07:07,680

so basically make a movie of the sky and

173

00:07:10,309 --> 00:07:09,280

analyze it

174

00:07:12,070 --> 00:07:10,319

so that

175

00:07:13,909 --> 00:07:12,080

once we're happy with this telescope

176

00:07:16,550 --> 00:07:13,919

system we can make copies of it and make

177

00:07:18,629 --> 00:07:16,560

it put it in different locations and

178

00:07:20,469 --> 00:07:18,639

i really hope that this first in-person

179

00:07:22,629 --> 00:07:20,479

meeting where we will demonstrate the

180

00:07:25,189 --> 00:07:22,639

the fact that the telescope works

181

00:07:26,950 --> 00:07:25,199

um that that would

182

00:07:29,430 --> 00:07:26,960

provide a

183

00:07:30,950 --> 00:07:29,440

brainstorming session where all my

184

00:07:33,270 --> 00:07:30,960

members of the gallery project will

185

00:07:34,950 --> 00:07:33,280

think ahead about the next phase and

186

00:07:37,270 --> 00:07:34,960

starting to collect data because it's

187

00:07:38,950 --> 00:07:37,280

all about getting evidence you see the

188

00:07:42,710 --> 00:07:38,960

the thing that defines the galileo

189

00:07:44,869 --> 00:07:42,720

project is that we're not giving up on

190

00:07:47,189 --> 00:07:44,879

exotic explanations the scientific

191

00:07:49,110 --> 00:07:47,199

community basically

192

00:07:51,510 --> 00:07:49,120

attempts to interpret anything seen on

193

00:07:54,230 --> 00:07:51,520

the sky as being natural without

194

00:07:56,070 --> 00:07:54,240

considering other options and we are

195

00:07:58,550 --> 00:07:56,080

allowing other options

196

00:08:00,550 --> 00:07:58,560

to be possible it's not as if we have a

197

00:08:01,510 --> 00:08:00,560

prejudice or

198

00:08:03,189 --> 00:08:01,520

um

199

00:08:05,670 --> 00:08:03,199

you know a a

200

00:08:08,070 --> 00:08:05,680

wishful thinking or anything it's just

201

00:08:10,869 --> 00:08:08,080

that we are willing to follow the data

202

00:08:12,550 --> 00:08:10,879

let the telescopes guide us because

203

00:08:15,189 --> 00:08:12,560

that's the lesson that we learned from

204

00:08:17,270 --> 00:08:15,199

galileo galilei four centuries ago he

205

00:08:19,029 --> 00:08:17,280

was telling the philosophers look

206

00:08:20,230 --> 00:08:19,039

through my telescope and they said no we

207

00:08:21,830 --> 00:08:20,240

know that

208

00:08:24,309 --> 00:08:21,840

the sun moves around the earth there is

209

00:08:26,309 --> 00:08:24,319

no point in doing that and not only that

210

00:08:27,510 --> 00:08:26,319

they didn't want others to listen to

211

00:08:30,869 --> 00:08:27,520

this

212

00:08:33,110 --> 00:08:30,879

first scientist of modern science and

213

00:08:34,630 --> 00:08:33,120

they put him in house arrest and today

214

00:08:38,149 --> 00:08:34,640

they would have cancelled him on social

215

00:08:41,430 --> 00:08:38,159

media so we learned an important lesson

216

00:08:42,310 --> 00:08:41,440

that you know nowadays when we launch a

217

00:09:09,030 --> 00:08:42,320

a

218

00:09:11,269 --> 00:09:09,040

something else

219

00:09:13,670 --> 00:09:11,279

but the actual reality that we all share

220

00:09:15,350 --> 00:09:13,680

to learn about it with all its pimples

221

00:09:17,670 --> 00:09:15,360

you know it's just like you know people

222

00:09:18,870 --> 00:09:17,680

prefer to put makeup on reality so that

223

00:09:20,710 --> 00:09:18,880

we don't see

224

00:09:22,310 --> 00:09:20,720

uh the things that are not so pleasant

225

00:09:23,750 --> 00:09:22,320

for us that like we are not at the

226

00:09:25,590 --> 00:09:23,760

center of the universe you know that's

227

00:09:28,470 --> 00:09:25,600

not so pleasant we would rather be at

228

00:09:30,550 --> 00:09:28,480

the center uh we would rather be the

229

00:09:32,710 --> 00:09:30,560

only intelligent species that ever

230

00:09:34,630 --> 00:09:32,720

existed since the big bang but let's

231

00:09:37,670 --> 00:09:34,640

give up on that uh

232

00:09:39,190 --> 00:09:37,680

presumption let's say just look at

233

00:09:41,670 --> 00:09:39,200

the universe the way it is without

234

00:09:43,750 --> 00:09:41,680

makeup just using our telescopes that's

235

00:09:46,150 --> 00:09:43,760

the lesson we learned from galileo

236

00:09:48,389 --> 00:09:46,160

because sometimes you know the evidence

237

00:09:50,630 --> 00:09:48,399

is not flattering to us and we better

238

00:09:53,110 --> 00:09:50,640

know it so that we can accommodate

239

00:09:55,269 --> 00:09:53,120

uh to whatever the reality is and you

240

00:09:57,350 --> 00:09:55,279

know i love reality

241

00:09:59,750 --> 00:09:57,360

the way it is i don't need it to have

242

00:10:02,310 --> 00:09:59,760

makeup i don't need it to please my

243

00:10:04,310 --> 00:10:02,320

wishes i just want to see the way it is

244

00:10:06,550 --> 00:10:04,320

i'm in love with it the way it is and

245

00:10:08,550 --> 00:10:06,560

you know when you are in love with

246

00:10:10,470 --> 00:10:08,560

something or someone

247

00:10:12,870 --> 00:10:10,480

you want to learn everything about it

248

00:10:13,990 --> 00:10:12,880

you know so if there is a smarter kid on

249

00:10:17,670 --> 00:10:14,000

our blog

250

00:10:19,110 --> 00:10:17,680

so be it let's learn about him he or her

251

00:10:23,030 --> 00:10:19,120

or it

252

00:10:24,949 --> 00:10:23,040

yeah absolutely absolutely now um

253

00:10:26,550 --> 00:10:24,959

the early plans and the processes that

254

00:10:28,470 --> 00:10:26,560

you were going to implement were looking

255

00:10:30,710 --> 00:10:28,480

at objects out in sort of interstellar

256

00:10:31,590 --> 00:10:30,720

space and also things a lot closer to

257

00:10:33,350 --> 00:10:31,600

home

258

00:10:35,509 --> 00:10:33,360

and so so let's just talk about the

259

00:10:36,949 --> 00:10:35,519

things that are a bit further afield

260

00:10:39,670 --> 00:10:36,959

with the equipment that you plan on

261

00:10:41,190 --> 00:10:39,680

using to look out outwards is this new

262

00:10:43,350 --> 00:10:41,200

equipment that is being created

263

00:10:44,310 --> 00:10:43,360

specifically for the project

264

00:10:46,949 --> 00:10:44,320

yes

265

00:10:49,430 --> 00:10:46,959

so astronomers look at the sky all the

266

00:10:50,550 --> 00:10:49,440

time right but they're focusing on

267

00:10:53,269 --> 00:10:50,560

distant

268

00:10:55,110 --> 00:10:53,279

sources of light and if a bird flies

269

00:10:56,389 --> 00:10:55,120

above above the telescope they simply

270

00:11:00,710 --> 00:10:56,399

ignore it

271

00:11:03,509 --> 00:11:00,720

anything moving close to the telescope

272

00:11:05,590 --> 00:11:03,519

is being ignored also you know only

273

00:11:08,949 --> 00:11:05,600

recently over the past decade we built

274

00:11:11,350 --> 00:11:08,959

that a telescope that can survey the sky

275

00:11:14,870 --> 00:11:11,360

and detect an object the size

276

00:11:20,550 --> 00:11:18,150

the pan stars survey telescope and

277

00:11:22,470 --> 00:11:20,560

it indeed discovered an object the size

278

00:11:24,949 --> 00:11:22,480

of a football field that came from

279

00:11:27,590 --> 00:11:24,959

outside the solar system but that object

280

00:11:29,430 --> 00:11:27,600

didn't look like the typical rock that

281

00:11:31,829 --> 00:11:29,440

we see within the solar system it didn't

282

00:11:33,350 --> 00:11:31,839

look like a comet it did not evaporate

283

00:11:35,509 --> 00:11:33,360

did not produce a cometary tail and it

284

00:11:37,190 --> 00:11:35,519

didn't look like a an asteroid in the

285

00:11:38,470 --> 00:11:37,200

sense that it was pushed away from the

286

00:11:39,670 --> 00:11:38,480

sun without

287

00:11:42,470 --> 00:11:39,680

any

288

00:11:45,590 --> 00:11:42,480

rocket effect without evaporation so so

289

00:11:46,550 --> 00:11:45,600

it looked strange and by the way nasa

290

00:11:48,630 --> 00:11:46,560

never

291

00:11:50,790 --> 00:11:48,640

launched a football

292

00:11:52,310 --> 00:11:50,800

a football field size

293

00:11:54,870 --> 00:11:52,320

spacecraft

294

00:11:57,190 --> 00:11:54,880

so there might be many more

295

00:12:00,310 --> 00:11:57,200

smaller objects that might some of which

296

00:12:01,990 --> 00:12:00,320

might be artificial may not be rocks and

297

00:12:04,550 --> 00:12:02,000

so the point is only over the past

298

00:12:05,750 --> 00:12:04,560

decade there was a survey telescope that

299

00:12:08,230 --> 00:12:05,760

could see

300

00:12:10,150 --> 00:12:08,240

based on the reflected sunlight objects

301
00:12:11,829 --> 00:12:10,160
of the size of a football field so we

302
00:12:14,069 --> 00:12:11,839
might be missing a lot of them and they

303
00:12:14,870 --> 00:12:14,079
might be passing fast so

304
00:12:15,829 --> 00:12:14,880
um

305
00:12:23,030 --> 00:12:15,839
so

306
00:12:24,870 --> 00:12:23,040
unidentified objects

307
00:12:26,550 --> 00:12:24,880
and they were not really equipped with

308
00:12:28,949 --> 00:12:26,560
scientific instrumentation and

309
00:12:30,389 --> 00:12:28,959
astronomers were not looking close to us

310
00:12:32,310 --> 00:12:30,399
you know of course people were

311
00:12:34,069 --> 00:12:32,320
monitoring meteors these are rocks

312
00:12:36,150 --> 00:12:34,079
falling from the sky and burning up in

313
00:12:38,710 --> 00:12:36,160

the atmosphere but they are extremely

314

00:12:40,629 --> 00:12:38,720

rare and much rarer than

315

00:12:42,389 --> 00:12:40,639

the frequency of those unidentified

316

00:12:43,430 --> 00:12:42,399

objects that the military was reporting

317

00:12:46,150 --> 00:12:43,440

about so

318

00:12:49,269 --> 00:12:46,160

so there is a need to build uh new

319

00:12:52,629 --> 00:12:49,279

observing systems and what we are

320

00:12:55,269 --> 00:12:52,639

constructing is new in the sense that

321

00:12:57,910 --> 00:12:55,279

you know we we will have

322

00:12:59,670 --> 00:12:57,920

cameras that monitor the entire sky

323

00:13:01,590 --> 00:12:59,680

not just a small portion of the sky the

324

00:13:03,350 --> 00:13:01,600

way usually astronomy is done

325

00:13:04,710 --> 00:13:03,360

but the entire sky

326
00:13:06,629 --> 00:13:04,720
all the time

327
00:13:08,310 --> 00:13:06,639
in both infrared

328
00:13:10,069 --> 00:13:08,320
and visible light

329
00:13:12,069 --> 00:13:10,079
the infrared is important because if you

330
00:13:14,310 --> 00:13:12,079
have a warm object at night you can

331
00:13:16,230 --> 00:13:14,320
still see it from the emission

332
00:13:19,350 --> 00:13:16,240
but during day time you can see the

333
00:13:23,350 --> 00:13:19,360
reflection of sunlight from anything and

334
00:13:24,069 --> 00:13:23,360
so we have both and also radio waves and

335
00:13:26,310 --> 00:13:24,079
uh

336
00:13:28,629 --> 00:13:26,320
we also have we'll have a magnetometer

337
00:13:29,670 --> 00:13:28,639
and the audio system

338
00:13:31,590 --> 00:13:29,680

and

339

00:13:33,269 --> 00:13:31,600

all together it's a new system even

340

00:13:35,269 --> 00:13:33,279

though the components

341

00:13:37,430 --> 00:13:35,279

can be bought off the shelf you know

342

00:13:40,069 --> 00:13:37,440

it's just putting it together and also

343

00:13:41,030 --> 00:13:40,079

equipping it with the computing system

344

00:13:43,269 --> 00:13:41,040

that can

345

00:13:45,269 --> 00:13:43,279

uh do the

346

00:13:47,110 --> 00:13:45,279

identification of what we see in the sky

347

00:13:50,629 --> 00:13:47,120

in terms of you know is it an object

348

00:13:53,110 --> 00:13:50,639

that we recognize like a drone or a bird

349

00:13:54,790 --> 00:13:53,120

in those cases even though it sounds you

350

00:13:57,110 --> 00:13:54,800

know interesting to some people you know

351
00:13:58,949 --> 00:13:57,120
zoologists are interested in birds

352
00:14:01,750 --> 00:13:58,959
i will be glad to transfer any

353
00:14:03,990 --> 00:14:01,760
high-resolution image of a bird to

354
00:14:05,590 --> 00:14:04,000
zoologists you know for us it's not so

355
00:14:06,870 --> 00:14:05,600
interesting just we just want to

356
00:14:08,310 --> 00:14:06,880
identify

357
00:14:10,870 --> 00:14:08,320
whether what we're seeing is is

358
00:14:11,910 --> 00:14:10,880
something known and if we see a drone

359
00:14:14,069 --> 00:14:11,920
that says

360
00:14:16,230 --> 00:14:14,079
made in china made in russia you know

361
00:14:18,069 --> 00:14:16,240
then of course there are people in

362
00:14:19,910 --> 00:14:18,079
washington dc that are very interesting

363
00:14:23,189 --> 00:14:19,920

we'll be glad to transfer that data to

364

00:14:24,790 --> 00:14:23,199

them for us it's as boring i should say

365

00:14:25,750 --> 00:14:24,800

now it's possible that everything we

366

00:14:27,750 --> 00:14:25,760

would see

367

00:14:31,509 --> 00:14:27,760

will end up in these categories are they

368

00:14:35,269 --> 00:14:31,519

either natural you know bird lightning

369

00:14:38,470 --> 00:14:35,279

meteor all kinds of natural phenomena or

370

00:14:39,590 --> 00:14:38,480

human-made objects including satellites

371

00:14:41,350 --> 00:14:39,600

including

372

00:14:44,389 --> 00:14:41,360

you know

373

00:14:46,949 --> 00:14:44,399

airplanes drones anything that

374

00:14:48,870 --> 00:14:46,959

or a balloon weather balloon or whatever

375

00:14:50,389 --> 00:14:48,880

if it ends up being

376

00:14:53,110 --> 00:14:50,399

just these two

377

00:14:55,269 --> 00:14:53,120

categories um you know so be it it's

378

00:14:56,310 --> 00:14:55,279

also an important service uh that the

379

00:14:57,590 --> 00:14:56,320

galileo

380

00:14:59,430 --> 00:14:57,600

project

381

00:15:01,750 --> 00:14:59,440

is making because at least the

382

00:15:04,150 --> 00:15:01,760

government is puzzled by some of the

383

00:15:06,310 --> 00:15:04,160

things that the military personnel saw

384

00:15:07,670 --> 00:15:06,320

and you know the government has i would

385

00:15:09,189 --> 00:15:07,680

assume

386

00:15:11,670 --> 00:15:09,199

excellent data

387

00:15:13,430 --> 00:15:11,680

because they have to monitor the sky so

388

00:15:15,910 --> 00:15:13,440

if the government is puzzled and we just

389

00:15:17,509 --> 00:15:15,920

explain it in terms of known things i

390

00:15:19,509 --> 00:15:17,519

think it's an important service that the

391

00:15:21,670 --> 00:15:19,519

scientific community

392

00:15:24,230 --> 00:15:21,680

needs to make rather than ridicule and

393

00:15:27,030 --> 00:15:24,240

say everything is natural and if there

394

00:15:29,590 --> 00:15:27,040

is something else that is not from this

395

00:15:31,350 --> 00:15:29,600

earth that is not a meteor not a rock

396

00:15:33,670 --> 00:15:31,360

not a natural thing

397

00:15:36,470 --> 00:15:33,680

then let's see what it is i mean we

398

00:15:38,550 --> 00:15:36,480

shouldn't make any assumptions uh if it

399

00:15:40,870 --> 00:15:38,560

behaves in ways that

400

00:15:42,790 --> 00:15:40,880

cannot be replicated by our technologies

401
00:15:44,550 --> 00:15:42,800
if it looks very different

402
00:15:46,629 --> 00:15:44,560
uh the natural objects because it has

403
00:15:48,710 --> 00:15:46,639
screws and bolts on it and some buttons

404
00:15:50,230 --> 00:15:48,720
that you can in principle press let's

405
00:15:53,110 --> 00:15:50,240
figure out what it is you know i'm just

406
00:15:55,189 --> 00:15:53,120
like at that point i would be like a kid

407
00:15:56,870 --> 00:15:55,199
in a candy store

408
00:15:58,710 --> 00:15:56,880
i would like to press any button that

409
00:16:00,150 --> 00:15:58,720
they see

410
00:16:01,670 --> 00:16:00,160
that's great and would any of these

411
00:16:03,430 --> 00:16:01,680
objects that you mentioned if it did

412
00:16:04,550 --> 00:16:03,440
come down to genuinely being something

413
00:16:06,550 --> 00:16:04,560

anomalous

414

00:16:08,550 --> 00:16:06,560

has that been have you got systems in

415

00:16:10,790 --> 00:16:08,560

place that are utilizing artificial

416

00:16:12,389 --> 00:16:10,800

intelligence to you know to brush away

417

00:16:14,870 --> 00:16:12,399

all the all the things that we know and

418

00:16:17,350 --> 00:16:14,880

then what is the actual analysis process

419

00:16:19,110 --> 00:16:17,360

like before you can finally confirm that

420

00:16:20,790 --> 00:16:19,120

it's a genuine anomaly

421

00:16:22,550 --> 00:16:20,800

yes exactly that is

422

00:16:24,629 --> 00:16:22,560

our approach would be

423

00:16:25,590 --> 00:16:24,639

the approaches sherlock holmes adapted

424

00:16:27,829 --> 00:16:25,600

you know

425

00:16:28,790 --> 00:16:27,839

the fictional detective

426

00:16:30,150 --> 00:16:28,800

um

427

00:16:30,949 --> 00:16:30,160

he basically

428

00:16:32,629 --> 00:16:30,959

said

429

00:16:33,670 --> 00:16:32,639

that you put all possibilities on the

430

00:16:35,509 --> 00:16:33,680

table

431

00:16:38,550 --> 00:16:35,519

and then you rule them out by the

432

00:16:41,590 --> 00:16:38,560

evidence okay and whatever remains

433

00:16:43,350 --> 00:16:41,600

however improbable must be the truth

434

00:16:45,829 --> 00:16:43,360

now it's possible that

435

00:16:47,430 --> 00:16:45,839

what will remain would be something that

436

00:16:49,590 --> 00:16:47,440

we are familiar with okay that's

437

00:16:51,509 --> 00:16:49,600

possible everything we look at will

438

00:16:53,990 --> 00:16:51,519

appear to be either natural or

439

00:16:55,749 --> 00:16:54,000

human-made it's a possibility

440

00:16:57,269 --> 00:16:55,759

but what i'm saying is at least the

441

00:16:59,350 --> 00:16:57,279

government

442

00:17:02,230 --> 00:16:59,360

currently is puzzled so we will help

443

00:17:05,590 --> 00:17:02,240

them figure it out and the head of nasa

444

00:17:07,350 --> 00:17:05,600

bill nelson was saying back when the

445

00:17:09,990 --> 00:17:07,360

director of national intelligence avery

446

00:17:11,350 --> 00:17:10,000

haynes delivered the report to congress

447

00:17:14,789 --> 00:17:11,360

about

448

00:17:16,549 --> 00:17:14,799

seven eight months ago he was saying

449

00:17:19,110 --> 00:17:16,559

that scientists should engage and figure

450

00:17:20,710 --> 00:17:19,120

out what these things are and that's

451
00:17:22,549 --> 00:17:20,720
exactly what we are doing we are using

452
00:17:25,590 --> 00:17:22,559
the scientific method which was

453
00:17:26,710 --> 00:17:25,600
pioneered by galileo so if he were alive

454
00:17:28,950 --> 00:17:26,720
today

455
00:17:30,789 --> 00:17:28,960
i would have made him a honorary member

456
00:17:32,230 --> 00:17:30,799
of the galileo project

457
00:17:34,230 --> 00:17:32,240
and are you having conversations with

458
00:17:36,470 --> 00:17:34,240
people like bill nelson or other members

459
00:17:39,029 --> 00:17:36,480
of nasa you know are you engaging with

460
00:17:41,190 --> 00:17:39,039
them and liaising with them with regards

461
00:17:42,710 --> 00:17:41,200
to helping with the project at all

462
00:17:45,110 --> 00:17:42,720
well at the moment

463
00:17:46,789 --> 00:17:45,120

uh we are not engaged with any

464

00:17:48,470 --> 00:17:46,799

government

465

00:17:51,430 --> 00:17:48,480

organization

466

00:17:53,110 --> 00:17:51,440

part of this is because we don't want to

467

00:17:55,190 --> 00:17:53,120

analyze

468

00:17:58,150 --> 00:17:55,200

classified data because that would limit

469

00:18:02,789 --> 00:18:00,549

share freely what we know

470

00:18:03,909 --> 00:18:02,799

uh with other scientists

471

00:18:05,669 --> 00:18:03,919

um

472

00:18:07,590 --> 00:18:05,679

so at the moment there are no

473

00:18:10,150 --> 00:18:07,600

collaborations

474

00:18:12,150 --> 00:18:10,160

but you know we shall see if anything

475

00:18:13,830 --> 00:18:12,160

else comes along

476

00:18:15,750 --> 00:18:13,840

for example there would be this new

477

00:18:19,190 --> 00:18:15,760

office in government

478

00:18:21,669 --> 00:18:19,200

that will start operations in june 2022

479

00:18:22,870 --> 00:18:21,679

uh signed into law by president biden

480

00:18:25,190 --> 00:18:22,880

and then

481

00:18:27,990 --> 00:18:25,200

it's possible they would declassify some

482

00:18:29,990 --> 00:18:28,000

data and we will be really interested in

483

00:18:32,310 --> 00:18:30,000

looking at that

484

00:18:34,310 --> 00:18:32,320

the other thing i should say is

485

00:18:36,310 --> 00:18:34,320

i was told by

486

00:18:38,710 --> 00:18:36,320

a number of members of the galileo

487

00:18:40,950 --> 00:18:38,720

project that they're really thrilled to

488

00:18:43,029 --> 00:18:40,960

be engaged in collecting new data

489

00:18:45,510 --> 00:18:43,039

because you know for many years they

490

00:18:47,590 --> 00:18:45,520

were interested in the subject

491

00:18:49,830 --> 00:18:47,600

but they didn't have

492

00:18:53,110 --> 00:18:49,840

this

493

00:18:54,630 --> 00:18:53,120

community of people that are like-minded

494

00:18:56,390 --> 00:18:54,640

and by

495

00:18:58,070 --> 00:18:56,400

announcing the galileo project i

496

00:19:00,950 --> 00:18:58,080

basically allowed

497

00:19:02,150 --> 00:19:00,960

this group of people to speak freely and

498

00:19:05,510 --> 00:19:02,160

if you think about it that's an

499

00:19:07,990 --> 00:19:05,520

elementary right an elementary

500

00:19:10,070 --> 00:19:08,000

ingredient of the scientific process

501
00:19:11,669 --> 00:19:10,080
so by ridiculing the subject and

502
00:19:14,310 --> 00:19:11,679
stigmatizing it

503
00:19:15,510 --> 00:19:14,320
you know uh the scientific unity is

504
00:19:18,789 --> 00:19:15,520
basically

505
00:19:21,510 --> 00:19:18,799
taking it out of the scientific process

506
00:19:22,789 --> 00:19:21,520
now think about the dark matter we don't

507
00:19:25,990 --> 00:19:22,799
know what most of the matter in the

508
00:19:29,270 --> 00:19:26,000
universe is and people suggested over

509
00:19:31,190 --> 00:19:29,280
the past 40 50 years that maybe this

510
00:19:33,270 --> 00:19:31,200
type of particle maybe another type of

511
00:19:35,270 --> 00:19:33,280
particle is the dark matter we don't

512
00:19:37,350 --> 00:19:35,280
know what it is and they were sort of

513
00:19:38,950 --> 00:19:37,360

suggesting various possibilities and i

514

00:19:40,150 --> 00:19:38,960

came from that community you know i

515

00:19:44,150 --> 00:19:40,160

worked

516

00:19:47,029 --> 00:19:44,160

on cosmology throughout the first

517

00:19:49,350 --> 00:19:47,039

couple of a few decades of my career and

518

00:19:51,430 --> 00:19:49,360

that was pretty much the mentality you

519

00:19:54,310 --> 00:19:51,440

it was completely legitimate to

520

00:19:55,669 --> 00:19:54,320

speculate or suggest the possibilities

521

00:19:57,190 --> 00:19:55,679

for the dark matter since we don't know

522

00:19:59,750 --> 00:19:57,200

what it is and it can motivate

523

00:20:01,909 --> 00:19:59,760

experiments and over the past four years

524

00:20:03,750 --> 00:20:01,919

there were experiments funded

525

00:20:06,710 --> 00:20:03,760

billions of dollars altogether the

526

00:20:09,029 --> 00:20:06,720

latest is the large hadron collider that

527

00:20:11,350 --> 00:20:09,039

cost 10 billion dollars and was looking

528

00:20:13,350 --> 00:20:11,360

for super symmetric particles

529

00:20:15,190 --> 00:20:13,360

that could potentially make the dark the

530

00:20:17,430 --> 00:20:15,200

lightest among them could make the dark

531

00:20:19,350 --> 00:20:17,440

matter we haven't found it

532

00:20:20,390 --> 00:20:19,360

so think about

533

00:20:21,909 --> 00:20:20,400

uh if

534

00:20:23,430 --> 00:20:21,919

some people within the scientific

535

00:20:26,390 --> 00:20:23,440

community would say

536

00:20:29,029 --> 00:20:26,400

well supersymmetry was not found yet and

537

00:20:30,549 --> 00:20:29,039

therefore they would ridicule that idea

538

00:20:32,630 --> 00:20:30,559

they would say

539

00:20:34,149 --> 00:20:32,640

not only that it doesn't make much sense

540

00:20:37,029 --> 00:20:34,159

since we haven't seen any sign of

541

00:20:38,390 --> 00:20:37,039

supersymmetry but anyone that engages

542

00:20:40,789 --> 00:20:38,400

with that

543

00:20:42,549 --> 00:20:40,799

uh is a crackpot or should be

544

00:20:45,270 --> 00:20:42,559

stigmatized this should not be even

545

00:20:47,830 --> 00:20:45,280

studied because we have no extraordinary

546

00:20:49,669 --> 00:20:47,840

evidence for supersymmetry therefore

547

00:20:51,190 --> 00:20:49,679

supersymmetric particles cannot make the

548

00:20:53,029 --> 00:20:51,200

dark matter therefore we should not

549

00:20:54,950 --> 00:20:53,039

invest any funds in the search for

550

00:20:57,669 --> 00:20:54,960

supersymmetric particles

551
00:21:00,070 --> 00:20:57,679
what would we then do we would not build

552
00:21:02,549 --> 00:21:00,080
the large hadron collider we would not

553
00:21:04,789 --> 00:21:02,559
search for the most popular super

554
00:21:06,710 --> 00:21:04,799
symmetric you know

555
00:21:07,830 --> 00:21:06,720
model for the dark matter

556
00:21:11,029 --> 00:21:07,840
and

557
00:21:13,270 --> 00:21:11,039
as a result we would not know if it is

558
00:21:15,990 --> 00:21:13,280
that particle or maybe something else

559
00:21:18,789 --> 00:21:16,000
but instead we engaged in the search we

560
00:21:21,110 --> 00:21:18,799
didn't find it so we learned something

561
00:21:22,950 --> 00:21:21,120
now in retrospect was it a waste of

562
00:21:24,230 --> 00:21:22,960
money should they

563
00:21:26,149 --> 00:21:24,240

you know should we

564

00:21:28,070 --> 00:21:26,159

have avoided it because there was no

565

00:21:29,909 --> 00:21:28,080

extraordinary evidence for super saiyan

566

00:21:31,430 --> 00:21:29,919

the answer is no that's the scientific

567

00:21:32,950 --> 00:21:31,440

process that's the way things should be

568

00:21:35,110 --> 00:21:32,960

done so

569

00:21:37,270 --> 00:21:35,120

you know in the case of unidentified

570

00:21:39,590 --> 00:21:37,280

objects or objects like

571

00:21:41,909 --> 00:21:39,600

that did not look like the rocks we are

572

00:21:44,470 --> 00:21:41,919

used to what's the problem in allowing

573

00:21:46,310 --> 00:21:44,480

for the possibility that we might find a

574

00:21:48,630 --> 00:21:46,320

plastic bottle one day from another

575

00:21:51,430 --> 00:21:48,640

civilization i mean after all we sent

576
00:21:53,270 --> 00:21:51,440
spacecraft to space and it's not such a

577
00:21:55,430 --> 00:21:53,280
speculation to imagine someone else

578
00:21:57,350 --> 00:21:55,440
doing it a billion years ago because a

579
00:21:58,950 --> 00:21:57,360
lot of stars formed billions of years

580
00:22:01,350 --> 00:21:58,960
before the sun and they have planets

581
00:22:04,310 --> 00:22:01,360
like the earth around them so

582
00:22:06,470 --> 00:22:04,320
just imagine us elsewhere a billion

583
00:22:08,789 --> 00:22:06,480
years ago that's all and sending

584
00:22:10,789 --> 00:22:08,799
spacecraft and so that's not a great

585
00:22:13,270 --> 00:22:10,799
speculation i i would argue that it's

586
00:22:13,990 --> 00:22:13,280
more down to earth so to speak compared

587
00:22:14,950 --> 00:22:14,000
to

588
00:22:17,190 --> 00:22:14,960

the the

589

00:22:19,830 --> 00:22:17,200

suggestion that dark matter is super a

590

00:22:22,470 --> 00:22:19,840

super symmetric particle nevertheless

591

00:22:24,950 --> 00:22:22,480

it's stigmatized ridiculed and people

592

00:22:26,390 --> 00:22:24,960

claim it's extraordinary of us to even

593

00:22:28,110 --> 00:22:26,400

consider that

594

00:22:30,549 --> 00:22:28,120

and i say

595

00:22:33,990 --> 00:22:30,559

extraordinary evidence requires

596

00:22:35,190 --> 00:22:34,000

extraordinary funding if we had billions

597

00:22:37,190 --> 00:22:35,200

of dollars

598

00:22:39,909 --> 00:22:37,200

dedicated to the search for equipment

599

00:22:43,270 --> 00:22:39,919

from other civilizations in space over

600

00:22:45,110 --> 00:22:43,280

40 years and we would not find anything

601
00:22:47,909 --> 00:22:45,120
then we would be exactly at the same

602
00:22:50,630 --> 00:22:47,919
point as the search for

603
00:22:52,470 --> 00:22:50,640
supersymmetric particles the dark matter

604
00:22:54,710 --> 00:22:52,480
okay we would be at the same point where

605
00:22:57,190 --> 00:22:54,720
we are now in the context of the dark

606
00:22:58,789 --> 00:22:57,200
matter search so why should

607
00:23:01,909 --> 00:22:58,799
the search for equipment from other

608
00:23:04,549 --> 00:23:01,919
civilizations be ridiculed in advance

609
00:23:06,070 --> 00:23:04,559
this is not the scientific method

610
00:23:08,070 --> 00:23:06,080
no not at all

611
00:23:09,830 --> 00:23:08,080
and now you're mentioning that muammar

612
00:23:12,870 --> 00:23:09,840
um one thing that i was really wanting

613
00:23:14,630 --> 00:23:12,880

to ask was in the time that um was

614

00:23:15,669 --> 00:23:14,640

visible through the telescopes did you

615

00:23:19,830 --> 00:23:15,679

do

616

00:23:21,830 --> 00:23:19,840

in the time it was there or did it

617

00:23:24,149 --> 00:23:21,840

disappear before you know you had the

618

00:23:25,990 --> 00:23:24,159

chance to do all the studies

619

00:23:27,830 --> 00:23:26,000

definitely disappeared before we had the

620

00:23:30,230 --> 00:23:27,840

chance because right

621

00:23:33,029 --> 00:23:30,240

you know there were unusual

622

00:23:35,110 --> 00:23:33,039

anomalies about the omo things that did

623

00:23:38,549 --> 00:23:35,120

not conform with objects we've seen

624

00:23:41,830 --> 00:23:38,559

before i mean the first was that it

625

00:23:43,510 --> 00:23:41,840

changed its brightness by a factor of 10

626
00:23:45,750 --> 00:23:43,520
as it was tumbling

627
00:23:47,830 --> 00:23:45,760
and then that's unusual it meant that it

628
00:23:50,070 --> 00:23:47,840
has an extreme shape usually we see

629
00:23:50,950 --> 00:23:50,080
variations but up to a factor of three

630
00:23:52,549 --> 00:23:50,960
from

631
00:23:54,870 --> 00:23:52,559
asteroids

632
00:23:56,470 --> 00:23:54,880
and also that it was pushed away from

633
00:23:58,549 --> 00:23:56,480
the sun

634
00:24:00,870 --> 00:23:58,559
by some mysterious force even though it

635
00:24:03,510 --> 00:24:00,880
didn't have a cometary tail

636
00:24:04,870 --> 00:24:03,520
now this last bit of

637
00:24:07,669 --> 00:24:04,880
anomaly

638
00:24:08,789 --> 00:24:07,679

was reported about eight months after

639

00:24:11,830 --> 00:24:08,799

the

640

00:24:15,029 --> 00:24:11,840

object was discovered and

641

00:24:18,710 --> 00:24:15,039

so it was reported in june 2018

642

00:24:19,750 --> 00:24:18,720

and by january 2018 about five months

643

00:24:22,549 --> 00:24:19,760

earlier

644

00:24:25,110 --> 00:24:22,559

the object was already too faint for us

645

00:24:27,909 --> 00:24:25,120

to see with our telescopes so by the

646

00:24:29,830 --> 00:24:27,919

time we realized that it's so unusual it

647

00:24:30,870 --> 00:24:29,840

was too late it's sort of like going on

648

00:24:32,789 --> 00:24:30,880

a date

649

00:24:33,909 --> 00:24:32,799

and realizing the person you went out

650

00:24:35,990 --> 00:24:33,919

with

651
00:24:38,230 --> 00:24:36,000
is really remarkable and interesting

652
00:24:40,070 --> 00:24:38,240
only after that person left

653
00:24:43,350 --> 00:24:40,080
and then you have to

654
00:24:45,350 --> 00:24:43,360
find another person like that one uh and

655
00:24:48,230 --> 00:24:45,360
so you know the problem with

656
00:24:50,549 --> 00:24:48,240
by now it's millions of times fainter

657
00:24:51,510 --> 00:24:50,559
than it was close to us and it's simply

658
00:24:54,549 --> 00:24:51,520
because

659
00:24:59,029 --> 00:24:54,559
an object gets a fainter inversely

660
00:25:03,750 --> 00:25:00,789
relative to the sun and

661
00:25:06,390 --> 00:25:03,760
so it get these objects get really faint

662
00:25:07,990 --> 00:25:06,400
quickly as they move away and then we

663
00:25:09,029 --> 00:25:08,000

need to catch them when they are passing

664

00:25:10,950 --> 00:25:09,039

near us

665

00:25:12,870 --> 00:25:10,960

and in fact we want to rendezvous with

666

00:25:16,870 --> 00:25:12,880

the next tomorrow it's sort of like

667

00:25:20,070 --> 00:25:16,880

planning on it dating the next

668

00:25:23,110 --> 00:25:20,080

and it's a very expensive date i i i

669

00:25:24,950 --> 00:25:23,120

should tell you because if we we i mean

670

00:25:27,029 --> 00:25:24,960

the best way to figure out its nature

671

00:25:28,710 --> 00:25:27,039

would be to send a camera very close to

672

00:25:31,190 --> 00:25:28,720

it so we can get

673

00:25:33,029 --> 00:25:31,200

a high resolution image of it i mean we

674

00:25:34,870 --> 00:25:33,039

could also learn more about it with the

675

00:25:35,990 --> 00:25:34,880

james webb space telescope from a

676
00:25:36,950 --> 00:25:36,000
distance

677
00:25:38,789 --> 00:25:36,960
yeah

678
00:25:40,630 --> 00:25:38,799
and and by the way the james webb space

679
00:25:42,390 --> 00:25:40,640
telescope is much better than the hubble

680
00:25:43,750 --> 00:25:42,400
space telescope that we had when we

681
00:25:45,269 --> 00:25:43,760
looked at um

682
00:25:49,590 --> 00:25:45,279
because

683
00:25:53,029 --> 00:25:49,600
the jwst is at the lagrange point to you

684
00:25:56,789 --> 00:25:53,039
know l2 which is quite far from earth

685
00:25:59,590 --> 00:25:56,799
okay and if we look at the next one

686
00:26:01,750 --> 00:25:59,600
from earth and from jwst we are looking

687
00:26:03,669 --> 00:26:01,760
at it from two different directions

688
00:26:05,269 --> 00:26:03,679

significantly different directions

689

00:26:07,510 --> 00:26:05,279

the hubble space telescope was very

690

00:26:09,510 --> 00:26:07,520

close to earth so it was almost the same

691

00:26:11,190 --> 00:26:09,520

viewing angle but if you look at an

692

00:26:12,070 --> 00:26:11,200

object from different directions you can

693

00:26:14,630 --> 00:26:12,080

track

694

00:26:17,029 --> 00:26:14,640

its motion in three dimensions extremely

695

00:26:19,190 --> 00:26:17,039

well because you are seeing it from two

696

00:26:21,350 --> 00:26:19,200

directions so you can cross the

697

00:26:23,269 --> 00:26:21,360

cross reference the observations and

698

00:26:25,590 --> 00:26:23,279

figure out the trajectory in three

699

00:26:26,789 --> 00:26:25,600

dimensions to a high precision that

700

00:26:28,710 --> 00:26:26,799

would give us

701
00:26:30,070 --> 00:26:28,720
a very good sense about whether it's

702
00:26:32,549 --> 00:26:30,080
being pushed

703
00:26:35,510 --> 00:26:32,559
by something other than evaporation okay

704
00:26:38,390 --> 00:26:35,520
and moreover you can observe it with a

705
00:26:40,230 --> 00:26:38,400
much bigger telescope because the jwst

706
00:26:42,230 --> 00:26:40,240
is three times bigger than

707
00:26:44,070 --> 00:26:42,240
the hubble space telescope so

708
00:26:46,070 --> 00:26:44,080
10 times the collecting area also

709
00:26:47,750 --> 00:26:46,080
looking at the infrared so it can

710
00:26:50,870 --> 00:26:47,760
potentially see the emission from the

711
00:26:53,110 --> 00:26:50,880
object can figure out its temperature

712
00:26:54,870 --> 00:26:53,120
and then maybe the reflectance take a

713
00:26:57,190 --> 00:26:54,880

spectrum of it so figure out the

714

00:26:59,430 --> 00:26:57,200

composition of the surface a lot of

715

00:27:01,750 --> 00:26:59,440

things that even without coming close to

716

00:27:04,470 --> 00:27:01,760

the object you can figure out so that's

717

00:27:06,789 --> 00:27:04,480

the advantage of having jwst

718

00:27:07,830 --> 00:27:06,799

and the other advantage we have is that

719

00:27:11,110 --> 00:27:07,840

instead of

720

00:27:13,350 --> 00:27:11,120

pan stars the telescope that discovered

721

00:27:15,110 --> 00:27:13,360

there will be another um survey

722

00:27:17,190 --> 00:27:15,120

telescope called the vera rubin

723

00:27:18,789 --> 00:27:17,200

observatory that

724

00:27:21,029 --> 00:27:18,799

will be much more sensitive bigger

725

00:27:22,870 --> 00:27:21,039

telescope and therefore much more

726

00:27:24,389 --> 00:27:22,880

sensitive that will start operations in

727

00:27:25,269 --> 00:27:24,399

about a year and a half

728

00:27:27,590 --> 00:27:25,279

and

729

00:27:30,149 --> 00:27:27,600

we'll be able to find many more objects

730

00:27:31,990 --> 00:27:30,159

like more at larger distances so if we

731

00:27:35,029 --> 00:27:32,000

see them an object like that coming

732

00:27:37,510 --> 00:27:35,039

towards us we can send a spacecraft

733

00:27:39,750 --> 00:27:37,520

equipped with a camera that will run the

734

00:27:42,310 --> 00:27:39,760

void along its path

735

00:27:44,549 --> 00:27:42,320

and you need to come as close as a

736

00:27:46,870 --> 00:27:44,559

thousand kilometers to such an object in

737

00:27:50,149 --> 00:27:46,880

order to get a high resolution image

738

00:27:51,909 --> 00:27:50,159

and that's possible now that is part of

739

00:27:54,230 --> 00:27:51,919

the galileo project so aside from

740

00:27:55,269 --> 00:27:54,240

looking at unidentified objects close to

741

00:27:57,350 --> 00:27:55,279

earth

742

00:27:59,430 --> 00:27:57,360

we are also engaged in designing a

743

00:28:02,149 --> 00:27:59,440

mission that will

744

00:28:04,710 --> 00:28:02,159

rendezvous with the next one and such a

745

00:28:05,510 --> 00:28:04,720

mission is quite expensive you know it's

746

00:28:07,669 --> 00:28:05,520

half

747

00:28:10,549 --> 00:28:07,679

a billion dollars at least

748

00:28:12,230 --> 00:28:10,559

and so it's a very expensive date

749

00:28:14,230 --> 00:28:12,240

just think about it

750

00:28:17,190 --> 00:28:14,240

going on a date this is an expensive

751
00:28:19,110 --> 00:28:17,200
date so you have to make sure

752
00:28:21,510 --> 00:28:19,120
that the object you are run the viewing

753
00:28:23,110 --> 00:28:21,520
with is worth the money

754
00:28:24,710 --> 00:28:23,120
because you don't want to

755
00:28:26,230 --> 00:28:24,720
go there and see

756
00:28:28,149 --> 00:28:26,240
you know a rock

757
00:28:30,310 --> 00:28:28,159
that would be disappoint i mean

758
00:28:32,149 --> 00:28:30,320
it would be interesting to examine the

759
00:28:33,669 --> 00:28:32,159
rock but we've seen a lot of rocks

760
00:28:36,870 --> 00:28:33,679
before so

761
00:28:38,149 --> 00:28:36,880
um you know for example osiris-rex this

762
00:28:39,350 --> 00:28:38,159
mission from

763
00:28:41,990 --> 00:28:39,360

um

764

00:28:43,990 --> 00:28:42,000

that landed on on the asteroid bennu

765

00:28:46,470 --> 00:28:44,000

took a high resolution image off the

766

00:28:48,630 --> 00:28:46,480

surface it looked like a rock with you

767

00:28:50,310 --> 00:28:48,640

know pebbles and stuff on it

768

00:28:51,990 --> 00:28:50,320

it's sort of like dirt you know and it

769

00:28:54,230 --> 00:28:52,000

collected some of this dirt it will

770

00:28:56,549 --> 00:28:54,240

bring it back to earth within a year

771

00:28:58,870 --> 00:28:56,559

but that's not as thrilling as landing

772

00:29:00,549 --> 00:28:58,880

on a spacecraft you know like figuring

773

00:29:03,029 --> 00:29:00,559

out this spacecraft

774

00:29:06,310 --> 00:29:03,039

has a label the label says made on

775

00:29:08,710 --> 00:29:06,320

exoplanet y and there are some buttons

776

00:29:10,470 --> 00:29:08,720

on it maybe we can navigate it

777

00:29:13,029 --> 00:29:10,480

so anyway um

778

00:29:14,789 --> 00:29:13,039

so we want to meet to be sure that the

779

00:29:16,460 --> 00:29:14,799

object we are rendezvousing with is

780

00:29:17,750 --> 00:29:16,470

unusual at least looking like

781

00:29:19,750 --> 00:29:17,760

[Music]

782

00:29:21,590 --> 00:29:19,760

and then send that mission and

783

00:29:23,750 --> 00:29:21,600

so we are planning that mission but also

784

00:29:26,549 --> 00:29:23,760

we have to prepare for finding such

785

00:29:30,310 --> 00:29:26,559

objects so designing the software that

786

00:29:32,310 --> 00:29:30,320

will identify or more more like objects

787

00:29:34,149 --> 00:29:32,320

from the pipeline of data that comes

788

00:29:36,549 --> 00:29:34,159

from

789

00:29:38,549 --> 00:29:36,559

the vera rubin observatory yeah well

790

00:29:40,549 --> 00:29:38,559

hypothetically speaking if

791

00:29:42,630 --> 00:29:40,559

tomorrow maybe one of the telescopes in

792

00:29:43,830 --> 00:29:42,640

chile or hawaii

793

00:29:45,350 --> 00:29:43,840

suddenly alerted you that they've

794

00:29:47,350 --> 00:29:45,360

spotted an object that's coming in

795

00:29:49,350 --> 00:29:47,360

that's similar and you're not ready or

796

00:29:51,750 --> 00:29:49,360

prepared to you know roll out all the

797

00:29:54,549 --> 00:29:51,760

equipment yet do you have like um things

798

00:29:56,389 --> 00:29:54,559

in place to to to get there would do you

799

00:29:59,190 --> 00:29:56,399

have connections with nasa where you can

800

00:30:00,950 --> 00:29:59,200

say can we utilize the james webb and

801
00:30:03,669 --> 00:30:00,960
turn it and look for this thing like

802
00:30:05,990 --> 00:30:03,679
what would you do if it happens tomorrow

803
00:30:08,389 --> 00:30:06,000
oh definitely use all the telescopes

804
00:30:12,549 --> 00:30:08,399
available and you know given that my

805
00:30:15,029 --> 00:30:12,559
book was published a year ago and um

806
00:30:16,470 --> 00:30:15,039
there was a huge amount of interest and

807
00:30:18,549 --> 00:30:16,480
both in the public but also in the

808
00:30:19,990 --> 00:30:18,559
scientific community a lot of people

809
00:30:22,950 --> 00:30:20,000
trying to push back

810
00:30:25,190 --> 00:30:22,960
i you know i would imagine that every

811
00:30:26,149 --> 00:30:25,200
telescope would look at this object okay

812
00:30:27,990 --> 00:30:26,159
just

813
00:30:29,909 --> 00:30:28,000

because the scientists would like to

814

00:30:31,830 --> 00:30:29,919

prove that it's a hydrogen iceberg or a

815

00:30:33,669 --> 00:30:31,840

nitrogen iceberg or a cloud of dust

816

00:30:36,230 --> 00:30:33,679

particles if it's not

817

00:30:38,549 --> 00:30:36,240

artificial and that's perfectly fine i'm

818

00:30:40,389 --> 00:30:38,559

all for it if we discover that this

819

00:30:42,789 --> 00:30:40,399

object is a rock of a type that we've

820

00:30:45,029 --> 00:30:42,799

never seen before like was suggested

821

00:30:46,710 --> 00:30:45,039

by the mainstream

822

00:30:48,230 --> 00:30:46,720

then we learned something new we learned

823

00:30:50,950 --> 00:30:48,240

that there are nurseries that make

824

00:30:52,389 --> 00:30:50,960

objects that the solar system doesn't or

825

00:30:54,950 --> 00:30:52,399

at least we didn't see in the solar

826

00:30:56,950 --> 00:30:54,960

system okay and so we will learn

827

00:30:58,310 --> 00:30:56,960

something new no matter what and

828

00:31:00,070 --> 00:30:58,320

i hope that

829

00:31:01,830 --> 00:31:00,080

in trying to just prove that it's

830

00:31:02,950 --> 00:31:01,840

natural but of a type that we've never

831

00:31:05,430 --> 00:31:02,960

seen before

832

00:31:07,750 --> 00:31:05,440

the scientists will collect so much data

833

00:31:10,389 --> 00:31:07,760

that we will definitely have a better

834

00:31:12,310 --> 00:31:10,399

clue about the nature of that object as

835

00:31:14,389 --> 00:31:12,320

long as it doesn't look like a comet a

836

00:31:16,470 --> 00:31:14,399

regular comet you know because the

837

00:31:20,549 --> 00:31:16,480

second the interstellar object that was

838

00:31:22,710 --> 00:31:20,559

discovered was borisov and that was

839

00:31:24,230 --> 00:31:22,720

that looked like a comet so scientists

840

00:31:25,909 --> 00:31:24,240

came to me and said

841

00:31:27,990 --> 00:31:25,919

well this second one looks like a

842

00:31:29,590 --> 00:31:28,000

regular comet so doesn't it convince you

843

00:31:30,870 --> 00:31:29,600

that umuamua

844

00:31:33,029 --> 00:31:30,880

was natural

845

00:31:34,710 --> 00:31:33,039

and i said well if you go

846

00:31:36,789 --> 00:31:34,720

on the beach and if you see a plastic

847

00:31:38,230 --> 00:31:36,799

bottle and then you see a rock

848

00:31:40,149 --> 00:31:38,240

you know it doesn't make the plastic

849

00:31:41,430 --> 00:31:40,159

bottle a rock

850

00:31:43,269 --> 00:31:41,440

and

851
00:31:45,990 --> 00:31:43,279
on the contrary the fact that the

852
00:31:47,269 --> 00:31:46,000
borisov looked so close to a regular

853
00:31:49,750 --> 00:31:47,279
comet makes

854
00:31:55,430 --> 00:31:49,760
unusual i should say

855
00:31:59,830 --> 00:31:57,190
about

856
00:32:01,909 --> 00:31:59,840
three years ago

857
00:32:04,230 --> 00:32:01,919
i was interviewed about

858
00:32:08,230 --> 00:32:04,240
a meteor that was found

859
00:32:10,149 --> 00:32:08,240
close to um kamchatka

860
00:32:13,909 --> 00:32:10,159
and

861
00:32:17,750 --> 00:32:13,919
in in trying to learn uh about more more

862
00:32:19,190 --> 00:32:17,760
information about this meteor um i um

863
00:32:21,190 --> 00:32:19,200

opened up you know on the internet

864

00:32:24,070 --> 00:32:21,200

various websites related to meteors and

865

00:32:26,549 --> 00:32:24,080

i realized that there is

866

00:32:28,789 --> 00:32:26,559

there is a catalog of meteors and

867

00:32:30,710 --> 00:32:28,799

uh that has data about the speed by

868

00:32:32,310 --> 00:32:30,720

which they entered the atmosphere okay

869

00:32:34,789 --> 00:32:32,320

so meteors are just

870

00:32:35,590 --> 00:32:34,799

usually the there are a rock you know

871

00:32:38,389 --> 00:32:35,600

that

872

00:32:39,909 --> 00:32:38,399

enters the atmospheres and burns up

873

00:32:41,669 --> 00:32:39,919

and you see the light

874

00:32:43,990 --> 00:32:41,679

so you basically you you're using the

875

00:32:47,029 --> 00:32:44,000

atmosphere as the detector of an object

876

00:32:49,830 --> 00:32:47,039

it's very different from looking

877

00:32:51,990 --> 00:32:49,840

uh at the reflected sunlight so for the

878

00:32:53,669 --> 00:32:52,000

reflected sunlight as i said you can

879

00:32:55,669 --> 00:32:53,679

only see

880

00:32:57,029 --> 00:32:55,679

right now objects as big as a football

881

00:32:58,230 --> 00:32:57,039

field within the orbit of the earth

882

00:33:00,149 --> 00:32:58,240

around the sun unless they come

883

00:33:01,990 --> 00:33:00,159

extremely close but

884

00:33:03,990 --> 00:33:02,000

with an object that burns in the

885

00:33:06,389 --> 00:33:04,000

atmosphere it creates its own light

886

00:33:09,110 --> 00:33:06,399

there is a fireball so you can see

887

00:33:11,830 --> 00:33:09,120

objects the size of a person no problem

888

00:33:14,310 --> 00:33:11,840

okay and that was this um

889

00:33:16,950 --> 00:33:14,320

this meteor and but then there is a

890

00:33:18,789 --> 00:33:16,960

catalog and so i approached as soon as

891

00:33:21,590 --> 00:33:18,799

after the interview was over it was a

892

00:33:24,389 --> 00:33:21,600

radio interview i approached my

893

00:33:26,870 --> 00:33:24,399

student undergraduate student and i said

894

00:33:27,750 --> 00:33:26,880

why don't you check this catalog

895

00:33:28,549 --> 00:33:27,760

and

896

00:33:29,830 --> 00:33:28,559

you know

897

00:33:32,630 --> 00:33:29,840

and figure out

898

00:33:33,909 --> 00:33:32,640

whether the fastest meteors that were

899

00:33:37,509 --> 00:33:33,919

identified

900

00:33:39,509 --> 00:33:37,519

any of them if you go back in time

901
00:33:41,590 --> 00:33:39,519
you can figure out whether they

902
00:33:43,750 --> 00:33:41,600
came from outside the solar system if

903
00:33:45,909 --> 00:33:43,760
they moved fast enough they cannot be

904
00:33:47,750 --> 00:33:45,919
bound to the sun okay

905
00:33:50,630 --> 00:33:47,760
so he went to the first object that was

906
00:33:53,430 --> 00:33:50,640
the fastest turned out that this one

907
00:33:55,909 --> 00:33:53,440
was just a head-on collision with earth

908
00:33:58,710 --> 00:33:55,919
so it wasn't moving really

909
00:34:00,470 --> 00:33:58,720
uh fast relative to the sun it was just

910
00:34:02,630 --> 00:34:00,480
moving opposite to the earth so the

911
00:34:04,149 --> 00:34:02,640
earth collided with it at the high speed

912
00:34:08,629 --> 00:34:04,159
relative speed

913
00:34:10,069 --> 00:34:08,639

he was then he went to the second object

914

00:34:12,710 --> 00:34:10,079

and

915

00:34:14,310 --> 00:34:12,720

for that he found definitely you know it

916

00:34:17,510 --> 00:34:14,320

came from outside the solar system it

917

00:34:20,950 --> 00:34:17,520

was moving at 40 kilometers per second

918

00:34:23,669 --> 00:34:20,960

far away from the sun and

919

00:34:25,190 --> 00:34:23,679

my student amir siraj and myself we

920

00:34:26,869 --> 00:34:25,200

wrote immediately a paper that we

921

00:34:29,510 --> 00:34:26,879

submitted for publication within a few

922

00:34:32,869 --> 00:34:29,520

days saying actually this is a meteor

923

00:34:36,550 --> 00:34:32,879

from 2014 this second on the list from

924

00:34:39,669 --> 00:34:36,560

2014 january 2014 so it's almost four

925

00:34:42,710 --> 00:34:39,679

years before omo was discovered and it

926
00:34:45,030 --> 00:34:42,720
is it seems to be of interstellar origin

927
00:34:47,270 --> 00:34:45,040
so we said here is an object the first

928
00:34:49,990 --> 00:34:47,280
interstellar meteor

929
00:34:52,069 --> 00:34:50,000
and by the way interstellar dust was

930
00:34:54,310 --> 00:34:52,079
detected on earth before i mean tiny

931
00:34:56,230 --> 00:34:54,320
particles this is just a human size

932
00:34:57,910 --> 00:34:56,240
object so it's been

933
00:35:00,630 --> 00:34:57,920
and then you know if you think about

934
00:35:02,470 --> 00:35:00,640
cubesats or there are many more cubesats

935
00:35:04,550 --> 00:35:02,480
that nasa

936
00:35:06,550 --> 00:35:04,560
or or objects the size of a person that

937
00:35:07,510 --> 00:35:06,560
nasa launched to space

938
00:35:10,630 --> 00:35:07,520

than

939

00:35:12,550 --> 00:35:10,640

the big spacecraft right so you expect

940

00:35:14,870 --> 00:35:12,560

objects like that to be much more common

941

00:35:17,109 --> 00:35:14,880

than more more like objects even if they

942

00:35:18,310 --> 00:35:17,119

are artificial you know you expect so at

943

00:35:20,790 --> 00:35:18,320

any event

944

00:35:23,349 --> 00:35:20,800

we don't know the nature of this meteor

945

00:35:25,510 --> 00:35:23,359

so we submitted the paper just saying

946

00:35:28,150 --> 00:35:25,520

the first interstellar meteor

947

00:35:29,990 --> 00:35:28,160

and the referees the reviewers of the

948

00:35:33,270 --> 00:35:30,000

paper said no this paper should be

949

00:35:35,430 --> 00:35:33,280

rejected not published because

950

00:35:36,470 --> 00:35:35,440

the data in that catalog was government

951
00:35:38,150 --> 00:35:36,480
owned

952
00:35:40,870 --> 00:35:38,160
you know it got the it was government

953
00:35:42,630 --> 00:35:40,880
data and the error bars were not

954
00:35:45,430 --> 00:35:42,640
reported because the government doesn't

955
00:35:47,670 --> 00:35:45,440
want to provide information about how

956
00:35:49,109 --> 00:35:47,680
good the sensors that the government is

957
00:35:51,670 --> 00:35:49,119
using are

958
00:35:53,030 --> 00:35:51,680
so we said look you know you don't trust

959
00:35:55,349 --> 00:35:53,040
the government but the government needs

960
00:35:57,589 --> 00:35:55,359
to know whether a ballistic missile gets

961
00:35:59,349 --> 00:35:57,599
to boston or new york city so they

962
00:36:00,790 --> 00:35:59,359
really have very good instrumentation

963
00:36:02,550 --> 00:36:00,800

they won't you know

964

00:36:04,069 --> 00:36:02,560

but the referee said no way i don't

965

00:36:06,150 --> 00:36:04,079

believe the government the government

966

00:36:07,750 --> 00:36:06,160

could be wrong and therefore the paper

967

00:36:10,390 --> 00:36:07,760

should not be published

968

00:36:12,390 --> 00:36:10,400

so then i approached some people that

969

00:36:14,710 --> 00:36:12,400

tried to help us um

970

00:36:16,630 --> 00:36:14,720

uh from behind the f the

971

00:36:20,230 --> 00:36:16,640

defense so to speak

972

00:36:21,109 --> 00:36:20,240

uh and then you know it took many years

973

00:36:25,190 --> 00:36:21,119

uh

974

00:36:26,870 --> 00:36:25,200

but um i just heard recently that um

975

00:36:28,630 --> 00:36:26,880

indeed the

976
00:36:31,270 --> 00:36:28,640
there is um

977
00:36:34,310 --> 00:36:31,280
hopefully a document about to be sent to

978
00:36:35,910 --> 00:36:34,320
us that will and definitely state that

979
00:36:38,630 --> 00:36:35,920
this object

980
00:36:41,190 --> 00:36:38,640
uh was interstellar so

981
00:36:43,349 --> 00:36:41,200
it well there are two things to take

982
00:36:45,109 --> 00:36:43,359
from this story first of all momo is not

983
00:36:47,750 --> 00:36:45,119
the first okay we have interstellar

984
00:36:50,069 --> 00:36:47,760
meteors that we can look for and the

985
00:36:52,230 --> 00:36:50,079
advantage of that is if anything remains

986
00:36:54,150 --> 00:36:52,240
from the meteor that lands on the ground

987
00:36:55,990 --> 00:36:54,160
you know we can put our hands on it so

988
00:36:58,390 --> 00:36:56,000

it's possible most of the interstellar

989

00:37:00,230 --> 00:36:58,400

objects would be rocks

990

00:37:01,109 --> 00:37:00,240

but it's also possible that one every

991

00:37:02,390 --> 00:37:01,119

now and

992

00:37:04,630 --> 00:37:02,400

every once in a while one of the

993

00:37:06,310 --> 00:37:04,640

interstellar objects will not be a rock

994

00:37:08,790 --> 00:37:06,320

and that's great because we don't need

995

00:37:10,710 --> 00:37:08,800

to send anything to space space sends

996

00:37:11,990 --> 00:37:10,720

things to us

997

00:37:14,230 --> 00:37:12,000

okay

998

00:37:17,430 --> 00:37:14,240

and it could be even possible to search

999

00:37:18,470 --> 00:37:17,440

for the whatever debris was left over of

1000

00:37:21,750 --> 00:37:18,480

that

1001
00:37:24,950 --> 00:37:21,760
meteor from 2014 in near papua new

1002
00:37:26,550 --> 00:37:24,960
guinea that's where it entered the ocean

1003
00:37:28,390 --> 00:37:26,560
at any event

1004
00:37:29,829 --> 00:37:28,400
the second lesson to learn is how

1005
00:37:32,230 --> 00:37:29,839
conservative

1006
00:37:33,829 --> 00:37:32,240
the scientific community is because

1007
00:37:35,910 --> 00:37:33,839
the referees

1008
00:37:38,470 --> 00:37:35,920
were not willing to consider this paper

1009
00:37:39,829 --> 00:37:38,480
for publication and you know what would

1010
00:37:41,510 --> 00:37:39,839
be the harm

1011
00:37:44,069 --> 00:37:41,520
from such a

1012
00:37:45,750 --> 00:37:44,079
paper being published like why would

1013
00:37:47,589 --> 00:37:45,760

that be

1014

00:37:50,790 --> 00:37:47,599

so so um

1015

00:37:52,550 --> 00:37:50,800

so much pushed against and uh the only

1016

00:37:55,270 --> 00:37:52,560

way i can think of it you know they're

1017

00:37:56,550 --> 00:37:55,280

for the reviewers were experts in this

1018

00:37:59,030 --> 00:37:56,560

field

1019

00:38:02,550 --> 00:37:59,040

and they were not part of

1020

00:38:04,630 --> 00:38:02,560

the discovery of this of this meteor

1021

00:38:06,710 --> 00:38:04,640

and they would try to block it as much

1022

00:38:08,790 --> 00:38:06,720

as possible because

1023

00:38:10,310 --> 00:38:08,800

you know why would someone else get

1024

00:38:13,109 --> 00:38:10,320

credit

1025

00:38:15,750 --> 00:38:13,119

for that discovery now

1026
00:38:17,589 --> 00:38:15,760
by claiming the government is does not

1027
00:38:20,150 --> 00:38:17,599
know what they're doing you know that

1028
00:38:21,829 --> 00:38:20,160
that's an easy claim to make because

1029
00:38:23,829 --> 00:38:21,839
unfortunately a lot of the information

1030
00:38:24,870 --> 00:38:23,839
is hidden

1031
00:38:27,589 --> 00:38:24,880
but

1032
00:38:30,870 --> 00:38:27,599
in this case i hope that very soon we'll

1033
00:38:33,910 --> 00:38:30,880
be able to show publicly that indeed

1034
00:38:35,510 --> 00:38:33,920
this data was good enough for us to

1035
00:38:38,230 --> 00:38:35,520
claim that this is an interstellar

1036
00:38:40,550 --> 00:38:38,240
meteor so it took a few years in the

1037
00:38:42,550 --> 00:38:40,560
making to get the government out that's

1038
00:38:44,390 --> 00:38:42,560

why i'm not seeking classified data you

1039

00:38:46,310 --> 00:38:44,400

know if the government will release or

1040

00:38:49,109 --> 00:38:46,320

declassify existing data that would be

1041

00:38:52,710 --> 00:38:49,119

fantastic but otherwise the process of

1042

00:38:54,230 --> 00:38:52,720

this classification is so tedious

1043

00:38:56,870 --> 00:38:54,240

it's better to get our

1044

00:38:58,390 --> 00:38:56,880

you know new data from our new telescope

1045

00:39:00,390 --> 00:38:58,400

systems because the sky is not

1046

00:39:02,150 --> 00:39:00,400

classified no absolutely and then you

1047

00:39:05,349 --> 00:39:02,160

don't have anybody else to answer to

1048

00:39:06,150 --> 00:39:05,359

either which which would be be great i

1049

00:39:08,550 --> 00:39:06,160

mean

1050

00:39:10,470 --> 00:39:08,560

this is one aspect of it but another is

1051
00:39:12,230 --> 00:39:10,480
suppose you know something that is

1052
00:39:13,270 --> 00:39:12,240
classified and and you're not speaking

1053
00:39:16,790 --> 00:39:13,280
about it

1054
00:39:19,109 --> 00:39:16,800
but then you discover something similar

1055
00:39:21,109 --> 00:39:19,119
using the telescope systems

1056
00:39:22,150 --> 00:39:21,119
then you have a conflict

1057
00:39:24,710 --> 00:39:22,160
because

1058
00:39:28,230 --> 00:39:24,720
you know someone could argue that the

1059
00:39:30,710 --> 00:39:28,240
reason you interpreted that new thing

1060
00:39:32,470 --> 00:39:30,720
as this or that is based on what you

1061
00:39:35,349 --> 00:39:32,480
already knew

1062
00:39:37,430 --> 00:39:35,359
that looked similar to this and or that

1063
00:39:38,550 --> 00:39:37,440

so there is also that part that you are

1064

00:39:40,390 --> 00:39:38,560

not them

1065

00:39:43,109 --> 00:39:40,400

you know that it's complicated because

1066

00:39:44,950 --> 00:39:43,119

you're you're not entangled in some

1067

00:39:45,670 --> 00:39:44,960

prior knowledge that you're not supposed

1068

00:39:48,390 --> 00:39:45,680

to

1069

00:39:50,790 --> 00:39:48,400

talk about so it's much simpler if you

1070

00:39:53,109 --> 00:39:50,800

act like a kid you know a kid doesn't

1071

00:39:54,950 --> 00:39:53,119

the kid doesn't care you know adults

1072

00:39:57,750 --> 00:39:54,960

always have a baggage

1073

00:39:59,190 --> 00:39:57,760

yeah um i'm trying to keep maintain my

1074

00:40:01,190 --> 00:39:59,200

childhood the

1075

00:40:02,550 --> 00:40:01,200

approach as much as possible not have a

1076

00:40:04,309 --> 00:40:02,560

baggage

1077

00:40:06,390 --> 00:40:04,319

i think a lot of people should should

1078

00:40:09,750 --> 00:40:06,400

follow suit and try to try that out

1079

00:40:11,510 --> 00:40:09,760

themselves me included and now in that

1080

00:40:13,270 --> 00:40:11,520

conversation part there you mentioned

1081

00:40:14,069 --> 00:40:13,280

sensor systems and the government and

1082

00:40:15,270 --> 00:40:14,079

that

1083

00:40:21,910 --> 00:40:15,280

now

1084

00:40:23,670 --> 00:40:21,920

it comes to uap is that they can

1085

00:40:25,030 --> 00:40:23,680

manipulate gravity

1086

00:40:26,069 --> 00:40:25,040

now

1087

00:40:27,670 --> 00:40:26,079

is there any way that you will be

1088

00:40:29,349 --> 00:40:27,680

implementing any systems that will

1089

00:40:31,270 --> 00:40:29,359

monitor sort of gravity waves or

1090

00:40:33,750 --> 00:40:31,280

anything like that to see if there are

1091

00:40:36,069 --> 00:40:33,760

any objects you know

1092

00:40:38,150 --> 00:40:36,079

visible in that respect

1093

00:40:39,829 --> 00:40:38,160

yeah so first i should explain the

1094

00:40:42,390 --> 00:40:39,839

perspective i'm coming from i'm a

1095

00:40:44,790 --> 00:40:42,400

physicist you know and the laws of

1096

00:40:46,950 --> 00:40:44,800

physics that we use um

1097

00:40:49,109 --> 00:40:46,960

routinely in physics

1098

00:40:50,790 --> 00:40:49,119

work exceptionally well okay in the

1099

00:40:54,550 --> 00:40:50,800

sense that

1100

00:40:57,349 --> 00:40:54,560

you know um to find deviations from the

1101

00:40:59,829 --> 00:40:57,359

laws of physics that we routinely use

1102

00:41:02,150 --> 00:40:59,839

you know wins you a nobel prize even if

1103

00:41:04,309 --> 00:41:02,160

the deviation is tiny and a lot of

1104

00:41:06,950 --> 00:41:04,319

people are working really hard to see

1105

00:41:09,190 --> 00:41:06,960

any slight hint of a deviation it's

1106

00:41:11,750 --> 00:41:09,200

called an anomaly relative to the

1107

00:41:14,390 --> 00:41:11,760

established laws of quantum mechanics

1108

00:41:15,750 --> 00:41:14,400

and gravity that we we all know

1109

00:41:19,430 --> 00:41:15,760

so

1110

00:41:21,430 --> 00:41:19,440

if we find any evidence for a deviation

1111

00:41:23,270 --> 00:41:21,440

from the known laws of physics that

1112

00:41:24,470 --> 00:41:23,280

would be of much

1113

00:41:26,150 --> 00:41:24,480

bigger

1114

00:41:28,230 --> 00:41:26,160

impact because it would affect the

1115

00:41:30,150 --> 00:41:28,240

universe at large you know because the

1116

00:41:33,510 --> 00:41:30,160

laws of physics apply everywhere they

1117

00:41:35,750 --> 00:41:33,520

don't just apply to uap so if a uap

1118

00:41:37,190 --> 00:41:35,760

shows a deviation from the laws of

1119

00:41:38,150 --> 00:41:37,200

physics

1120

00:41:40,550 --> 00:41:38,160

it's

1121

00:41:42,390 --> 00:41:40,560

dramatic because it means that anywhere

1122

00:41:44,069 --> 00:41:42,400

in the universe you can deviate in the

1123

00:41:46,790 --> 00:41:44,079

same way okay

1124

00:41:48,710 --> 00:41:46,800

so that i would argue

1125

00:41:50,550 --> 00:41:48,720

is only

1126
00:41:51,510 --> 00:41:50,560
you know if we cannot explain what we

1127
00:41:53,349 --> 00:41:51,520
see

1128
00:41:55,030 --> 00:41:53,359
in terms of the known laws of physics

1129
00:41:57,349 --> 00:41:55,040
and that should be left

1130
00:41:59,829 --> 00:41:57,359
out of the first approach to any

1131
00:42:01,990 --> 00:41:59,839
phenomena we see so if you see something

1132
00:42:04,550 --> 00:42:02,000
really weird you need to understand is

1133
00:42:06,950 --> 00:42:04,560
it malfunction of the instruments okay

1134
00:42:08,230 --> 00:42:06,960
is it an optical illusion

1135
00:42:10,710 --> 00:42:08,240
there there could be lots of

1136
00:42:12,870 --> 00:42:10,720
possibilities uh and only once you rule

1137
00:42:14,390 --> 00:42:12,880
them out you should even consider the

1138
00:42:16,390 --> 00:42:14,400

possibility of

1139

00:42:17,750 --> 00:42:16,400

because that would be of much grander

1140

00:42:19,750 --> 00:42:17,760

scope you know

1141

00:42:21,910 --> 00:42:19,760

uh so we should be careful before we get

1142

00:42:24,309 --> 00:42:21,920

there to make sure that we exhausted all

1143

00:42:26,550 --> 00:42:24,319

other possibilities now with respect to

1144

00:42:29,190 --> 00:42:26,560

gravity waves i should say you know base

1145

00:42:30,390 --> 00:42:29,200

again i'm speaking about what we know

1146

00:42:32,630 --> 00:42:30,400

from

1147

00:42:35,030 --> 00:42:32,640

the rest of experimental physics you

1148

00:42:36,230 --> 00:42:35,040

know to detect gravity waves the ligo

1149

00:42:39,589 --> 00:42:36,240

experiment

1150

00:42:40,390 --> 00:42:39,599

had to to build very sensitive detectors

1151
00:42:41,510 --> 00:42:40,400
uh

1152
00:42:42,390 --> 00:42:41,520
that

1153
00:42:46,150 --> 00:42:42,400
you know

1154
00:42:47,829 --> 00:42:46,160
can detect a tiny tiny deviation

1155
00:42:49,990 --> 00:42:47,839
you know across

1156
00:42:51,910 --> 00:42:50,000
across a distance

1157
00:42:53,829 --> 00:42:51,920
of let's say

1158
00:42:55,430 --> 00:42:53,839
five kilometers or so the deviation is

1159
00:42:58,630 --> 00:42:55,440
smaller than the size of the nucleus of

1160
00:42:59,990 --> 00:42:58,640
an atom you know it's tiny

1161
00:43:04,069 --> 00:43:00,000
and

1162
00:43:05,829 --> 00:43:04,079
you know that kind of a deviation that

1163
00:43:09,030 --> 00:43:05,839

won them the nobel prize because they

1164

00:43:09,829 --> 00:43:09,040

detected it in in 2015

1165

00:43:11,829 --> 00:43:09,839

that

1166

00:43:13,750 --> 00:43:11,839

was produced by the collision of two

1167

00:43:15,910 --> 00:43:13,760

black holes at the edge of the universe

1168

00:43:19,030 --> 00:43:15,920

and black holes represent

1169

00:43:21,349 --> 00:43:19,040

the most extreme structures of space and

1170

00:43:23,750 --> 00:43:21,359

time in the sense that you know when you

1171

00:43:24,630 --> 00:43:23,760

get into a black hole you cannot get out

1172

00:43:27,109 --> 00:43:24,640

of it

1173

00:43:29,510 --> 00:43:27,119

uh it's sort of like the ultimate prison

1174

00:43:31,030 --> 00:43:29,520

uh because space and time confine you and

1175

00:43:32,790 --> 00:43:31,040

you're doomed

1176

00:43:34,550 --> 00:43:32,800

to be torn apart

1177

00:43:37,349 --> 00:43:34,560

when you fall to the center of the black

1178

00:43:39,030 --> 00:43:37,359

world i once described it because i was

1179

00:43:41,030 --> 00:43:39,040

invited to

1180

00:43:42,790 --> 00:43:41,040

the kindergarten where my

1181

00:43:45,109 --> 00:43:42,800

daughters were and they asked me to

1182

00:43:46,710 --> 00:43:45,119

speak about black holes and of course my

1183

00:43:48,550 --> 00:43:46,720

wife said it's your

1184

00:43:50,470 --> 00:43:48,560

duty to your daughters to speak in front

1185

00:43:52,309 --> 00:43:50,480

of the class about it so i started

1186

00:43:54,710 --> 00:43:52,319

speaking about what happens

1187

00:43:56,470 --> 00:43:54,720

to an astronaut when

1188

00:43:57,349 --> 00:43:56,480

the astronaut falls into a black hole

1189

00:44:02,230 --> 00:43:57,359

and

1190

00:44:05,109 --> 00:44:02,240

said please don't describe it in more

1191

00:44:05,990 --> 00:44:05,119

details because the kids have nightmares

1192

00:44:07,910 --> 00:44:06,000

so

1193

00:44:09,750 --> 00:44:07,920

because you know the human body

1194

00:44:12,710 --> 00:44:09,760

basically gets torn apart there there is

1195

00:44:14,069 --> 00:44:12,720

no escape from that so imagine those

1196

00:44:16,150 --> 00:44:14,079

extreme

1197

00:44:19,589 --> 00:44:16,160

structures of space curved space and

1198

00:44:21,990 --> 00:44:19,599

time that collide they create a

1199

00:44:23,990 --> 00:44:22,000

storm of space and time near them like

1200

00:44:27,109 --> 00:44:24,000

every like if you had a clock you would

1201

00:44:30,870 --> 00:44:27,119

see the clock you know changing

1202

00:44:33,270 --> 00:44:30,880

the dial changes by all the unity like

1203

00:44:35,589 --> 00:44:33,280

it shows one time and then

1204

00:44:38,069 --> 00:44:35,599

a completely different time later on and

1205

00:44:40,550 --> 00:44:38,079

so the rate by which time is ticking is

1206

00:44:41,990 --> 00:44:40,560

changing by all the unity relative to an

1207

00:44:44,230 --> 00:44:42,000

observer far away

1208

00:44:47,030 --> 00:44:44,240

close to the collision site

1209

00:44:48,950 --> 00:44:47,040

and that is an extremely powerful

1210

00:44:51,430 --> 00:44:48,960

change in the curvature of space and

1211

00:44:53,510 --> 00:44:51,440

time locally and that

1212

00:44:55,349 --> 00:44:53,520

gets radiated away as gravitational

1213

00:44:56,309 --> 00:44:55,359

waves okay so it's just like dropping a

1214

00:44:59,349 --> 00:44:56,319

stone

1215

00:45:00,550 --> 00:44:59,359

uh on the surface of a pond so close to

1216

00:45:02,870 --> 00:45:00,560

where the stone

1217

00:45:05,030 --> 00:45:02,880

hit the pond you get large amplitude

1218

00:45:08,069 --> 00:45:05,040

waves but then they die out as they move

1219

00:45:10,550 --> 00:45:08,079

away so we detect it far away you know

1220

00:45:12,470 --> 00:45:10,560

it's a tiny deviation now

1221

00:45:15,349 --> 00:45:12,480

you're asking about the uap producing

1222

00:45:16,870 --> 00:45:15,359

gravitational waves well to do that you

1223

00:45:18,950 --> 00:45:16,880

need it to be

1224

00:45:20,870 --> 00:45:18,960

sort of like a black hole for us to be

1225

00:45:23,430 --> 00:45:20,880

able to detect it it needs to be a huge

1226

00:45:25,109 --> 00:45:23,440

amount of mass but we would see actually

1227

00:45:27,430 --> 00:45:25,119

if it was a huge amount of mass

1228

00:45:29,349 --> 00:45:27,440

concentrated in a small region

1229

00:45:31,270 --> 00:45:29,359

it would actually affect us

1230

00:45:33,270 --> 00:45:31,280

through newton's law of gravity forget

1231

00:45:36,309 --> 00:45:33,280

about einstein's theory of generativity

1232

00:45:38,790 --> 00:45:36,319

these waves you would actually sense

1233

00:45:41,430 --> 00:45:38,800

the pull from something very

1234

00:45:43,510 --> 00:45:41,440

concentrated with a lot of energy okay

1235

00:45:45,030 --> 00:45:43,520

the gravitational pull just as a result

1236

00:45:47,270 --> 00:45:45,040

of newtonian

1237

00:45:49,990 --> 00:45:47,280

uh law of gravity you know you would

1238

00:45:51,750 --> 00:45:50,000

feel it and and newton's law of gravity

1239

00:45:54,309 --> 00:45:51,760

is the consequence of einstein's

1240

00:45:56,069 --> 00:45:54,319

equations okay so so they're both

1241

00:45:58,470 --> 00:45:56,079

consistent with each other so my point

1242

00:46:00,309 --> 00:45:58,480

is we would notice it just because we

1243

00:46:01,829 --> 00:46:00,319

would be pulled gravitationally long

1244

00:46:02,790 --> 00:46:01,839

before we would detect the gravitational

1245

00:46:04,870 --> 00:46:02,800

waves

1246

00:46:06,630 --> 00:46:04,880

so according to the standard description

1247

00:46:08,390 --> 00:46:06,640

of gravity that we see

1248

00:46:10,309 --> 00:46:08,400

you know throughout the universe we see

1249

00:46:12,150 --> 00:46:10,319

the universe expanding according to that

1250

00:46:14,309 --> 00:46:12,160

to einstein's equations

1251
00:46:17,510 --> 00:46:14,319
according to that you know there is no

1252
00:46:19,349 --> 00:46:17,520
major deviation uh that we noticed uh

1253
00:46:21,670 --> 00:46:19,359
tests of einstein's theory of gravity

1254
00:46:22,870 --> 00:46:21,680
are all in perfect agreement with his

1255
00:46:25,030 --> 00:46:22,880
equations

1256
00:46:26,950 --> 00:46:25,040
so according to that you would first

1257
00:46:28,710 --> 00:46:26,960
feel the effect of newt you know

1258
00:46:31,109 --> 00:46:28,720
newtonian gravity

1259
00:46:33,430 --> 00:46:31,119
long before you would feel the effects

1260
00:46:34,309 --> 00:46:33,440
of gravitational waves and

1261
00:46:36,230 --> 00:46:34,319
um

1262
00:46:38,150 --> 00:46:36,240
therefore i you know we don't need to

1263
00:46:40,309 --> 00:46:38,160

put ligo

1264

00:46:42,710 --> 00:46:40,319

as part of our

1265

00:46:44,870 --> 00:46:42,720

detector system and also it's a very com

1266

00:46:46,630 --> 00:46:44,880

you know this experiment cost 1.1

1267

00:46:48,630 --> 00:46:46,640

billion dollars to the national science

1268

00:46:50,870 --> 00:46:48,640

foundation we don't you know if we had

1269

00:46:53,270 --> 00:46:50,880

the billion dollars we make we would

1270

00:46:55,510 --> 00:46:53,280

make better use of it to look for

1271

00:46:58,470 --> 00:46:55,520

other kinds of signals

1272

00:47:00,790 --> 00:46:58,480

now people often talk about you know

1273

00:47:02,069 --> 00:47:00,800

modifications of gravity about extra

1274

00:47:04,230 --> 00:47:02,079

dimensions

1275

00:47:07,030 --> 00:47:04,240

once again these are

1276

00:47:10,390 --> 00:47:07,040

uh ideas to which we don't have any

1277

00:47:12,470 --> 00:47:10,400

evidence from existing data okay and

1278

00:47:14,870 --> 00:47:12,480

it's possible i'm saying you know we

1279

00:47:17,990 --> 00:47:14,880

cannot rule it out and perhaps we should

1280

00:47:19,589 --> 00:47:18,000

look for that uh as anomalies but

1281

00:47:21,910 --> 00:47:19,599

the first approach should be to

1282

00:47:23,349 --> 00:47:21,920

interpret whatever we see using the laws

1283

00:47:24,549 --> 00:47:23,359

of physics because that's the way

1284

00:47:26,150 --> 00:47:24,559

science is done

1285

00:47:27,750 --> 00:47:26,160

and only when you're pushed with your

1286

00:47:29,750 --> 00:47:27,760

back to the wall you can't really

1287

00:47:32,390 --> 00:47:29,760

explain what you see then you should go

1288

00:47:34,309 --> 00:47:32,400

in that direction and that you know

1289

00:47:37,030 --> 00:47:34,319

people invest billions of dollars to

1290

00:47:39,030 --> 00:47:37,040

figure out any deviations from what we

1291

00:47:41,990 --> 00:47:39,040

know you know the large hadron collider

1292

00:47:44,790 --> 00:47:42,000

is an example for that um and

1293

00:47:47,349 --> 00:47:44,800

we don't find very often deviations it's

1294

00:47:48,710 --> 00:47:47,359

it's quite rare uh and that's why nobel

1295

00:47:50,470 --> 00:47:48,720

prizes are

1296

00:47:52,790 --> 00:47:50,480

not easy to get by you know you really

1297

00:47:55,109 --> 00:47:52,800

need to discover something new

1298

00:47:56,870 --> 00:47:55,119

uh so i would say

1299

00:47:58,069 --> 00:47:56,880

let's wait and see what the data tells

1300

00:48:00,790 --> 00:47:58,079

us again

1301

00:48:03,030 --> 00:48:00,800

i i'm not excluding that but i'm saying

1302

00:48:05,589 --> 00:48:03,040

it would be of major importance to

1303

00:48:08,309 --> 00:48:05,599

describing the universe if we ever find

1304

00:48:10,390 --> 00:48:08,319

it a new you know and a deviation from

1305

00:48:11,190 --> 00:48:10,400

what we know in physics

1306

00:48:13,030 --> 00:48:11,200

yeah

1307

00:48:14,950 --> 00:48:13,040

and now before before we go is it okay

1308

00:48:18,230 --> 00:48:14,960

if i just um read out some questions

1309

00:48:21,910 --> 00:48:20,309

if you want to ask quick questions here

1310

00:48:23,270 --> 00:48:21,920

yeah sure um

1311

00:48:24,309 --> 00:48:23,280

i suppose the main question i've been

1312

00:48:26,230 --> 00:48:24,319

getting is

1313

00:48:27,910 --> 00:48:26,240

after all of this data is collected and

1314

00:48:29,750 --> 00:48:27,920

you can say that this is a genuine

1315

00:48:31,589 --> 00:48:29,760

photograph of something anomalous when

1316

00:48:33,829 --> 00:48:31,599

does the public get to see the data or

1317

00:48:36,230 --> 00:48:33,839

the image so the only delay would be

1318

00:48:37,750 --> 00:48:36,240

caused by us within the galileo project

1319

00:48:39,109 --> 00:48:37,760

trying to make sure that

1320

00:48:40,630 --> 00:48:39,119

you know there is no artifact in the

1321

00:48:42,470 --> 00:48:40,640

data that it's not

1322

00:48:44,950 --> 00:48:42,480

it's a malfunction of the instrument to

1323

00:48:47,270 --> 00:48:44,960

make sure that we trust the data

1324

00:48:49,670 --> 00:48:47,280

uh and that often takes a few months you

1325

00:48:51,430 --> 00:48:49,680

know it must just to make sure the data

1326

00:48:53,109 --> 00:48:51,440

you know we understand that how the data

1327

00:48:55,109 --> 00:48:53,119

was collected and

1328

00:48:58,230 --> 00:48:55,119

that there is no bug in the way it was

1329

00:49:00,230 --> 00:48:58,240

analyzed then we put out a scientific

1330

00:49:02,630 --> 00:49:00,240

paper about it and we release it to the

1331

00:49:04,710 --> 00:49:02,640

public so it will all be open that the

1332

00:49:06,470 --> 00:49:04,720

analysis will be transparent the only

1333

00:49:08,549 --> 00:49:06,480

delay is because we want to make sure

1334

00:49:10,309 --> 00:49:08,559

that you know we are not

1335

00:49:11,750 --> 00:49:10,319

crying wolf when

1336

00:49:16,870 --> 00:49:11,760

it's

1337

00:49:18,390 --> 00:49:16,880

yeah one final question um will there be

1338

00:49:21,030 --> 00:49:18,400

a capability for

1339

00:49:23,190 --> 00:49:21,040

normal people to to donate their sort of

1340

00:49:25,270 --> 00:49:23,200

cpu processing power to help with

1341

00:49:27,109 --> 00:49:25,280

analyzing data like they used to do with

1342

00:49:30,630 --> 00:49:27,119

seti back in the back in the early days

1343

00:49:33,270 --> 00:49:30,640

well it's a possibility um for now the

1344

00:49:34,230 --> 00:49:33,280

cpu is not an issue for us it's not like

1345

00:49:35,910 --> 00:49:34,240

um

1346

00:49:38,150 --> 00:49:35,920

i mean we can deal with it with the

1347

00:49:39,589 --> 00:49:38,160

computer systems that we can purchase so

1348

00:49:41,030 --> 00:49:39,599

really the

1349

00:49:43,430 --> 00:49:41,040

the main

1350

00:49:46,069 --> 00:49:43,440

challenge is to get enough money that we

1351
00:49:47,510 --> 00:49:46,079
can build many copies of those telescope

1352
00:49:48,790 --> 00:49:47,520
systems you see

1353
00:49:51,349 --> 00:49:48,800
and then

1354
00:49:53,510 --> 00:49:51,359
when we estimate based on the reported

1355
00:49:55,750 --> 00:49:53,520
rate of uap when we estimate how many

1356
00:49:57,910 --> 00:49:55,760
telescope systems we need it's

1357
00:50:00,950 --> 00:49:57,920
you know it would be good to to to have

1358
00:50:03,270 --> 00:50:00,960
tens of millions of dollars just to have

1359
00:50:05,430 --> 00:50:03,280
enough telescope systems so 100 million

1360
00:50:07,670 --> 00:50:05,440
dollar would definitely allow us to to

1361
00:50:09,670 --> 00:50:07,680
get the job done and and by the way 100

1362
00:50:11,750 --> 00:50:09,680
million dollars is not

1363
00:50:13,510 --> 00:50:11,760

a lot of money for a scientific project

1364

00:50:14,390 --> 00:50:13,520

especially dealing with a question that

1365

00:50:16,630 --> 00:50:14,400

is of

1366

00:50:18,549 --> 00:50:16,640

so much interest to the public so my

1367

00:50:19,750 --> 00:50:18,559

hope is that there would be

1368

00:50:22,390 --> 00:50:19,760

a wealthy

1369

00:50:23,990 --> 00:50:22,400

donor that will decide that this is

1370

00:50:26,150 --> 00:50:24,000

indeed a priority

1371

00:50:28,069 --> 00:50:26,160

uh that the public deserves to know the

1372

00:50:30,870 --> 00:50:28,079

answer that you know we will definitely

1373

00:50:33,510 --> 00:50:30,880

do a honest job we will make sure that

1374

00:50:35,910 --> 00:50:33,520

everything is open and transparent and

1375

00:50:38,230 --> 00:50:35,920

according to the scientific method and

1376

00:50:40,069 --> 00:50:38,240

so um if there will be a wealthy donor

1377

00:50:41,589 --> 00:50:40,079

that will be excited and then you know

1378

00:50:42,549 --> 00:50:41,599

i'm working on that

1379

00:50:44,230 --> 00:50:42,559

then

1380

00:50:46,549 --> 00:50:44,240

we will get the job done within a few

1381

00:50:48,309 --> 00:50:46,559

years i mean this will not take long as

1382

00:50:50,630 --> 00:50:48,319

long as we have the funding

1383

00:50:52,069 --> 00:50:50,640

yeah sure i really do hope that that you

1384

00:50:53,750 --> 00:50:52,079

find the funding that you need for

1385

00:50:55,910 --> 00:50:53,760

anybody that happens to be listening or

1386

00:50:56,950 --> 00:50:55,920

watching if you have any millions lying

1387

00:50:58,710 --> 00:50:56,960

around there is a link in the

1388

00:51:00,630 --> 00:50:58,720

description to directly go to the

1389

00:51:03,589 --> 00:51:00,640

donation page on the galileo project

1390

00:51:05,270 --> 00:51:03,599

website on the harvard website but avi

1391

00:51:07,349 --> 00:51:05,280

thank you so much for your time i really

1392

00:51:08,950 --> 00:51:07,359

do appreciate it i won't keep you any

1393

00:51:10,790 --> 00:51:08,960

longer to everybody listening and

1394

00:51:13,589 --> 00:51:10,800

watching thank you so much for joining

1395

00:51:14,549 --> 00:51:13,599

us and i will see you all very soon so