



1  
00:00:04,150 --> 00:00:02,070  
welcome back to the mission control

2  
00:00:06,070 --> 00:00:04,160  
center here in houston where we uh now

3  
00:00:07,110 --> 00:00:06,080  
have to talk with us astronaut mario

4  
00:00:09,270 --> 00:00:07,120  
runko who's going to tell us a little

5  
00:00:10,390 --> 00:00:09,280  
bit more about what don pettit is going

6  
00:00:11,749 --> 00:00:10,400  
to be seeing

7  
00:00:14,150 --> 00:00:11,759  
on the space station and what we might

8  
00:00:15,749 --> 00:00:14,160  
be able to see here on earth as venus

9  
00:00:17,029 --> 00:00:15,759  
makes its transit across the sun later

10  
00:00:18,550 --> 00:00:17,039  
today thanks so much for joining us

11  
00:00:20,310 --> 00:00:18,560  
mario thank you brandi

12  
00:00:22,230 --> 00:00:20,320  
thank you brandi thanks for having me

13  
00:00:24,310 --> 00:00:22,240

well okay so we heard a little bit there

14

00:00:25,910 --> 00:00:24,320

about kind of what the transit is but

15

00:00:27,509 --> 00:00:25,920

maybe you can tell us a little bit about

16

00:00:29,830 --> 00:00:27,519

your background why you're interested in

17

00:00:32,150 --> 00:00:29,840

it and why we should pay attention okay

18

00:00:34,069 --> 00:00:32,160

uh well first of all i was infected

19

00:00:36,229 --> 00:00:34,079

somewhat by don pettit and his

20

00:00:39,030 --> 00:00:36,239

enthusiasm for astronomy

21

00:00:41,750 --> 00:00:39,040

my background is earth science remote

22

00:00:44,389 --> 00:00:41,760

sensing meteorology and oceanography and

23

00:00:47,190 --> 00:00:44,399

the connection between my background and

24

00:00:48,069 --> 00:00:47,200

my previous experience and now

25

00:00:50,310 --> 00:00:48,079

is

26  
00:00:51,189 --> 00:00:50,320  
since i was flying in space on the space

27  
00:00:53,029 --> 00:00:51,199  
shuttle

28  
00:00:56,150 --> 00:00:53,039  
i have with the international space

29  
00:00:59,830 --> 00:00:56,160  
station been uh very instrumental with

30  
00:01:03,029 --> 00:00:59,840  
another team in the windows on board the

31  
00:01:04,710 --> 00:01:03,039  
iss particularly one the lab window and

32  
00:01:06,710 --> 00:01:04,720  
the destiny module

33  
00:01:08,550 --> 00:01:06,720  
that is a science window for earth

34  
00:01:11,109 --> 00:01:08,560  
science remote sensing exactly we had

35  
00:01:13,910 --> 00:01:11,119  
proposed to have that on board

36  
00:01:15,109 --> 00:01:13,920  
in in the early 90s and and it is now on

37  
00:01:17,510 --> 00:01:15,119  
board and

38  
00:01:19,910 --> 00:01:17,520

i was with the team that produced the

39

00:01:23,350 --> 00:01:19,920

window observational research facility

40

00:01:25,190 --> 00:01:23,360

dovetailing off of that with uh that the

41

00:01:27,429 --> 00:01:25,200

wharf by the way is the acronym that's

42

00:01:29,910 --> 00:01:27,439

used with the lab window dovetailing off

43

00:01:31,350 --> 00:01:29,920

of that is the cupola window we were

44

00:01:33,990 --> 00:01:31,360

part of the team

45

00:01:36,069 --> 00:01:34,000

that proposed having the cupola on board

46

00:01:37,749 --> 00:01:36,079

and its windows so that we could go

47

00:01:39,910 --> 00:01:37,759

beyond just looking at the earth

48

00:01:42,789 --> 00:01:39,920

straight down underneath the station and

49

00:01:45,030 --> 00:01:42,799

be able to not only use it for operating

50

00:01:47,910 --> 00:01:45,040

the remote

51  
00:01:48,710 --> 00:01:47,920  
arm the canada arm on board the iss and

52  
00:01:50,710 --> 00:01:48,720  
for

53  
00:01:53,510 --> 00:01:50,720  
monitoring dockings and and the like and

54  
00:01:55,670 --> 00:01:53,520  
birthings but also use it for scientific

55  
00:01:58,389 --> 00:01:55,680  
and astronomical purposes which we are

56  
00:02:00,630 --> 00:01:58,399  
doing for the transit of venus today

57  
00:02:02,389 --> 00:02:00,640  
have we been able to do that uh for any

58  
00:02:05,030 --> 00:02:02,399  
interesting events in the past that you

59  
00:02:06,789 --> 00:02:05,040  
would mention uh actually the cupola has

60  
00:02:09,109 --> 00:02:06,799  
been in use for quite some time since

61  
00:02:12,390 --> 00:02:09,119  
it's been on board uh

62  
00:02:14,150 --> 00:02:12,400  
primarily for uh earth observations and

63  
00:02:16,309 --> 00:02:14,160

the images that you many people have

64

00:02:18,949 --> 00:02:16,319  
seen probably of the earth quite

65

00:02:21,350 --> 00:02:18,959  
spectacular however we've not used it in

66

00:02:23,510 --> 00:02:21,360  
the mode we're using it now where there

67

00:02:24,630 --> 00:02:23,520  
are internal

68

00:02:27,750 --> 00:02:24,640  
panes

69

00:02:30,710 --> 00:02:27,760  
kind of like your storm windows you have

70

00:02:32,790 --> 00:02:30,720  
maybe two windows in this case

71

00:02:34,869 --> 00:02:32,800  
there are four panes of glass but the

72

00:02:36,949 --> 00:02:34,879  
innermost one is called a scratch pane

73

00:02:39,430 --> 00:02:36,959  
and that's a protective pain to keep the

74

00:02:41,990 --> 00:02:39,440  
others very pristine and that's not an

75

00:02:44,229 --> 00:02:42,000  
optical quality uh piece of glass due to

76

00:02:46,070 --> 00:02:44,239

the a plastic sheet on it

77

00:02:48,550 --> 00:02:46,080

and so that one is going to be removed

78

00:02:51,670 --> 00:02:48,560

today for the for uh only the third time

79

00:02:53,670 --> 00:02:51,680

prior times were for iss engineering

80

00:02:56,150 --> 00:02:53,680

evaluations this first time for science

81

00:02:58,229 --> 00:02:56,160

so it's kind of a big event for us in

82

00:03:00,229 --> 00:02:58,239

the in the scientific community to be

83

00:03:01,750 --> 00:03:00,239

able to use the optical quality windows

84

00:03:03,589 --> 00:03:01,760

to the efficacy

85

00:03:05,830 --> 00:03:03,599

that's needed to bring out a really

86

00:03:08,390 --> 00:03:05,840

sharp crisp detailed pictures

87

00:03:10,390 --> 00:03:08,400

of items in in in in this case don is

88

00:03:11,270 --> 00:03:10,400

using an 800 millimeter lens which is

89

00:03:13,430 --> 00:03:11,280

about

90

00:03:14,869 --> 00:03:13,440

six inches in diameter

91

00:03:15,990 --> 00:03:14,879

uh the aperture

92

00:03:18,710 --> 00:03:16,000

and

93

00:03:20,869 --> 00:03:18,720

for folks in real simple terms is the

94

00:03:23,030 --> 00:03:20,879

the larger the aperture

95

00:03:25,190 --> 00:03:23,040

on the lens or the telescope that you're

96

00:03:27,589 --> 00:03:25,200

using or a pair of binoculars the more

97

00:03:30,630 --> 00:03:27,599

it is affected by the window so as that

98

00:03:32,390 --> 00:03:30,640

size grows the worse the image becomes

99

00:03:34,070 --> 00:03:32,400

so on a smaller camera

100

00:03:36,550 --> 00:03:34,080

uh a smaller

101  
00:03:38,550 --> 00:03:36,560  
diameter lens you don't see too much of

102  
00:03:41,270 --> 00:03:38,560  
an effect on the imagery that you might

103  
00:03:43,670 --> 00:03:41,280  
uh take but on on a bigger lens the

104  
00:03:45,910 --> 00:03:43,680  
imagery really degrades quite rapidly so

105  
00:03:48,229 --> 00:03:45,920  
we're hoping to get some really sharp uh

106  
00:03:51,110 --> 00:03:48,239  
images of the sun and and fortunately

107  
00:03:54,229 --> 00:03:51,120  
don for this event uh he knew about it

108  
00:03:56,070 --> 00:03:54,239  
and i think dawn in many aspects knows

109  
00:03:59,350 --> 00:03:56,080  
the goings-on of the entire universe in

110  
00:04:01,110 --> 00:03:59,360  
his head and uh and and he he planned

111  
00:04:02,869 --> 00:04:01,120  
ahead to bring the solar filter on board

112  
00:04:04,710 --> 00:04:02,879  
to be able to do this

113  
00:04:08,470 --> 00:04:04,720

good choice we're excited to see what he

114

00:04:11,270 --> 00:04:08,480

gets um now i know this isn't not the

115

00:04:12,949 --> 00:04:11,280

um first time that the people that we

116

00:04:15,190 --> 00:04:12,959

have been around for a few years have uh

117

00:04:16,789 --> 00:04:15,200

have been able to see this but

118

00:04:18,469 --> 00:04:16,799

it's the second time

119

00:04:19,830 --> 00:04:18,479

and before that it's been a long time

120

00:04:22,790 --> 00:04:19,840

and it'll be a long time again until the

121

00:04:27,030 --> 00:04:22,800

next chance right uh correct uh the last

122

00:04:29,030 --> 00:04:27,040

time was in 1760 specifically 1761 and

123

00:04:31,430 --> 00:04:29,040

1769

124

00:04:35,110 --> 00:04:31,440

uh and at that time as don mentioned in

125

00:04:37,110 --> 00:04:35,120

the video there was a of a scientific uh

126

00:04:39,990 --> 00:04:37,120

a quest for this this was

127

00:04:43,909 --> 00:04:40,000

kind of like among the nations back then

128

00:04:44,870 --> 00:04:43,919

a a moon race of the time if you will

129

00:04:48,070 --> 00:04:44,880

because the

130

00:04:50,230 --> 00:04:48,080

to be able to measure the transits at

131

00:04:52,629 --> 00:04:50,240

the contact points that is when

132

00:04:54,550 --> 00:04:52,639

uh venus first enters the sun and then

133

00:04:56,390 --> 00:04:54,560

when it exits the tangency points

134

00:04:59,990 --> 00:04:56,400

between the two edges of the planet

135

00:05:02,230 --> 00:05:00,000

venus and the sun uh and and you could

136

00:05:03,909 --> 00:05:02,240

through geometry figure out by the

137

00:05:06,870 --> 00:05:03,919

distance and the angles

138

00:05:08,950 --> 00:05:06,880

uh the exact distance from the earth to

139

00:05:11,270 --> 00:05:08,960

the to the sun and venus to the earth

140

00:05:12,870 --> 00:05:11,280

etc and by that figure out the distances

141

00:05:13,830 --> 00:05:12,880

for the rest of the planets in the solar

142

00:05:17,430 --> 00:05:13,840

system

143

00:05:18,950 --> 00:05:17,440

uh this was quite a a scientific quest

144

00:05:20,710 --> 00:05:18,960

at the time

145

00:05:23,350 --> 00:05:20,720

and

146

00:05:25,230 --> 00:05:23,360

the english the royal academy sent out

147

00:05:28,390 --> 00:05:25,240

james cook in 19 in

148

00:05:30,469 --> 00:05:28,400

1769 actually he left in 1768 from

149

00:05:32,230 --> 00:05:30,479

england to sail to tahiti and there's

150

00:05:33,110 --> 00:05:32,240

only certain spots on the ground that

151  
00:05:35,670 --> 00:05:33,120  
you could

152  
00:05:37,749 --> 00:05:35,680  
like uh solar eclipses you have to be in

153  
00:05:40,710 --> 00:05:37,759  
opportune places to be able to see the

154  
00:05:43,270 --> 00:05:40,720  
entire transit uh and the french had

155  
00:05:44,950 --> 00:05:43,280  
sent out an explorer legentee which was

156  
00:05:47,110 --> 00:05:44,960  
interesting and don mentioned in this

157  
00:05:49,510 --> 00:05:47,120  
video how he was gone for so long what

158  
00:05:53,350 --> 00:05:49,520  
don didn't mention is that he left for

159  
00:05:56,790 --> 00:05:53,360  
the 1761 transit not the 1769 transit as

160  
00:05:58,870 --> 00:05:56,800  
cook did and the 1761 uh transit he

161  
00:06:00,550 --> 00:05:58,880  
never made it because uh there was a

162  
00:06:01,830 --> 00:06:00,560  
british french war at the time so he

163  
00:06:03,189 --> 00:06:01,840

couldn't get to india where he was

164

00:06:05,909 --> 00:06:03,199

headed to uh

165

00:06:07,749 --> 00:06:05,919

to view it he stayed out which was what

166

00:06:09,590 --> 00:06:07,759

happened to him why he was he was out so

167

00:06:11,189 --> 00:06:09,600

long and why he was declared dead by his

168

00:06:13,510 --> 00:06:11,199

family when he returned

169

00:06:14,790 --> 00:06:13,520

but uh he went he was going to go back

170

00:06:17,909 --> 00:06:14,800

to uh

171

00:06:19,510 --> 00:06:17,919

observe the 1769 transit in india cook

172

00:06:23,350 --> 00:06:19,520

was going to tahiti

173

00:06:25,909 --> 00:06:23,360

and in 1769 he got there but it was

174

00:06:27,270 --> 00:06:25,919

cloudy and he missed the opportunity so

175

00:06:29,270 --> 00:06:27,280

it's going to be disappointing

176

00:06:30,629 --> 00:06:29,280

i'm sure it was for all those years 11

177

00:06:31,430 --> 00:06:30,639

years he was out

178

00:06:32,710 --> 00:06:31,440

uh

179

00:06:34,790 --> 00:06:32,720

what that was the

180

00:06:38,230 --> 00:06:34,800

the previous one last one was in the uh

181

00:06:40,629 --> 00:06:38,240

1800's 1884 i believe was the last one

182

00:06:43,510 --> 00:06:40,639

and then the next one is 2117 and what's

183

00:06:45,189 --> 00:06:43,520

interesting because of the orbits of

184

00:06:47,670 --> 00:06:45,199

venus and the earth

185

00:06:50,469 --> 00:06:47,680

it happens in sequence

186

00:06:52,870 --> 00:06:50,479

semi well it's regular but it's not

187

00:06:55,430 --> 00:06:52,880

at equal intervals for example the next

188

00:06:58,150 --> 00:06:55,440

one's in 105 and a half years

189

00:07:01,110 --> 00:06:58,160

uh the last one was in 125 and a half

190

00:07:03,749 --> 00:07:01,120

years so if you if you go and carry out

191

00:07:06,230 --> 00:07:03,759

the cycle it's 105 and a half and then a

192

00:07:08,309 --> 00:07:06,240

pair of a pair eight years apart and

193

00:07:09,990 --> 00:07:08,319

then 125 and a half and then the cycle

194

00:07:12,230 --> 00:07:10,000

repeats that way okay that's because of

195

00:07:15,430 --> 00:07:12,240

the eccentricities of the orbits that we

196

00:07:18,390 --> 00:07:15,440

have but i guess we also are our last or

197

00:07:20,790 --> 00:07:18,400

the first part of this pair was in 2004

198

00:07:23,830 --> 00:07:20,800

yes yes the the first one for this uh

199

00:07:24,790 --> 00:07:23,840

pair was 2004. the iss photo just a

200

00:07:27,589 --> 00:07:24,800

moment ago

201  
00:07:29,029 --> 00:07:27,599  
there it is again the um the trace uh

202  
00:07:31,350 --> 00:07:29,039  
vehicle getting some photos of that

203  
00:07:34,230 --> 00:07:31,360  
during during its transit in 2004. and

204  
00:07:36,710 --> 00:07:34,240  
and and the 2004 from a manned space

205  
00:07:38,309 --> 00:07:36,720  
exploration perspective uh

206  
00:07:40,070 --> 00:07:38,319  
interesting if i may digress for a

207  
00:07:42,150 --> 00:07:40,080  
moment a piece of trivia is gennady

208  
00:07:45,350 --> 00:07:42,160  
padalka who was on board now at

209  
00:07:47,830 --> 00:07:45,360  
expedition 30 was on board expedition 9

210  
00:07:50,390 --> 00:07:47,840  
in 2004 with mike fink

211  
00:07:52,309 --> 00:07:50,400  
and unfortunately they did not have a

212  
00:07:54,150 --> 00:07:52,319  
solar filter and neither of those

213  
00:07:55,990 --> 00:07:54,160

gentlemen had the entire universe

214

00:07:56,790 --> 00:07:56,000

calculated in their brain as don pettit

215

00:07:59,270 --> 00:07:56,800

does

216

00:08:02,390 --> 00:07:59,280

and uh and but they knew about it and

217

00:08:05,350 --> 00:08:02,400

they tried to observe uh the transit

218

00:08:07,670 --> 00:08:05,360

and by indirect means uh the pinhole

219

00:08:09,510 --> 00:08:07,680

uh box camera on a piece of paper to

220

00:08:11,430 --> 00:08:09,520

project the sun safely

221

00:08:13,670 --> 00:08:11,440

uh they were

222

00:08:16,230 --> 00:08:13,680

barely able to do it because the angles

223

00:08:18,710 --> 00:08:16,240

to the sun were just barely visible that

224

00:08:20,790 --> 00:08:18,720

the iss back then was not as was not

225

00:08:23,110 --> 00:08:20,800

completed and it did not have the suite

226

00:08:25,589 --> 00:08:23,120

of windows that it has today

227

00:08:28,070 --> 00:08:25,599

we have much more opportunities for

228

00:08:30,309 --> 00:08:28,080

viewing in different directions

229

00:08:32,149 --> 00:08:30,319

with the windows on board now which is

230

00:08:34,790 --> 00:08:32,159

why we're going to be able to see

231

00:08:35,670 --> 00:08:34,800

hopefully uh all of the contact points

232

00:08:38,310 --> 00:08:35,680

uh

233

00:08:40,149 --> 00:08:38,320

and and even the center point so not it

234

00:08:41,589 --> 00:08:40,159

won't be invisible the entire time

235

00:08:43,909 --> 00:08:41,599

because even though we don't have to

236

00:08:45,509 --> 00:08:43,919

worry about the clouds uh the solar

237

00:08:47,750 --> 00:08:45,519

arrays on the station as the sun

238

00:08:51,350 --> 00:08:47,760

transits the sky and the relative

239

00:08:53,910 --> 00:08:51,360

motions uh the the the solar arrays or

240

00:08:56,070 --> 00:08:53,920

the radiators may block the view to the

241

00:08:57,750 --> 00:08:56,080

windows that that we would need but that

242

00:08:59,190 --> 00:08:57,760

would be very short periods right we've

243

00:09:01,110 --> 00:08:59,200

got a few different windows that that we

244

00:09:03,269 --> 00:09:01,120

can use so we saw the live view of the

245

00:09:05,590 --> 00:09:03,279

cupola which is one of the choices and

246

00:09:06,630 --> 00:09:05,600

uh and hopefully we'll have some good

247

00:09:07,990 --> 00:09:06,640

stuff and you're going to be back with

248

00:09:09,670 --> 00:09:08,000

us later in the week and hopefully we'll

249

00:09:11,110 --> 00:09:09,680

get to take a look at some of it then

250

00:09:13,670 --> 00:09:11,120

right well hopefully we'll see some of

251  
00:09:14,710 --> 00:09:13,680  
the images that dawn takes now his

252  
00:09:16,870 --> 00:09:14,720  
primary

253  
00:09:18,710 --> 00:09:16,880  
goal is to take the images out of the

254  
00:09:21,110 --> 00:09:18,720  
cupola window one which is the window

255  
00:09:22,949 --> 00:09:21,120  
that looks to port

256  
00:09:25,030 --> 00:09:22,959  
and that window will have the scratch

257  
00:09:27,509 --> 00:09:25,040  
pane removed so it's going to be that's

258  
00:09:29,509 --> 00:09:27,519  
an optical quality window

259  
00:09:31,829 --> 00:09:29,519  
uh the other two windows he's primarily

260  
00:09:35,030 --> 00:09:31,839  
going to use for when the view to the

261  
00:09:37,990 --> 00:09:35,040  
sun is in a different orientation is the

262  
00:09:38,710 --> 00:09:38,000  
mini research module two uh that has a

263  
00:09:44,389 --> 00:09:38,720

uh

264

00:09:45,990 --> 00:09:44,399

the docking compartment one which has a

265

00:09:48,790 --> 00:09:46,000

port forward looking window so that

266

00:09:51,269 --> 00:09:48,800

gives him the sweet of view across the

267

00:09:54,230 --> 00:09:51,279

horizon for when the sun transits the

268

00:09:55,829 --> 00:09:54,240

sky relative to the to the iss well i

269

00:09:57,350 --> 00:09:55,839

know he's really excited about the

270

00:09:58,949 --> 00:09:57,360

chance to see that in space but

271

00:10:01,350 --> 00:09:58,959

hopefully maybe a few of us can see it

272

00:10:02,790 --> 00:10:01,360

here on the ground as well right

273

00:10:04,949 --> 00:10:02,800

if you're

274

00:10:07,670 --> 00:10:04,959

fortunate and and the

275

00:10:10,710 --> 00:10:07,680

the part of the planet that will not see

276

00:10:12,310 --> 00:10:10,720

uh the transit at all is

277

00:10:13,190 --> 00:10:12,320

basically centered over the atlantic

278

00:10:15,430 --> 00:10:13,200

ocean

279

00:10:17,269 --> 00:10:15,440

uh we are fortunate in north america and

280

00:10:20,470 --> 00:10:17,279

south america to be able to see a good

281

00:10:24,150 --> 00:10:20,480

portion of it we will see it later today

282

00:10:26,069 --> 00:10:24,160

starting at 1709 or 509 pm uh central

283

00:10:28,550 --> 00:10:26,079

time in houston

284

00:10:30,389 --> 00:10:28,560

and it will progress

285

00:10:32,389 --> 00:10:30,399

weather permitting of course and and it

286

00:10:34,389 --> 00:10:32,399

looks like uh we will have good weather

287

00:10:37,990 --> 00:10:34,399

at least here locally in houston

288

00:10:38,870 --> 00:10:38,000

uh it progressed till sunset and uh if

289

00:10:40,230 --> 00:10:38,880

you're

290

00:10:41,350 --> 00:10:40,240

uh the uh

291

00:10:48,069 --> 00:10:41,360

in the

292

00:10:49,269 --> 00:10:48,079

european area and east uh toward the

293

00:10:51,990 --> 00:10:49,279

indian ocean

294

00:10:53,829 --> 00:10:52,000

uh you will see it at sunrise so they

295

00:10:54,710 --> 00:10:53,839

will they will have seen it uh they will

296

00:10:56,870 --> 00:10:54,720

see it

297

00:10:58,870 --> 00:10:56,880

for their time zones in the morning and

298

00:11:01,030 --> 00:10:58,880

then over the indian ocean for example

299

00:11:01,750 --> 00:11:01,040

it's invis the entire transit is visit

300

00:11:03,269 --> 00:11:01,760

so

301  
00:11:05,990 --> 00:11:03,279  
if for example

302  
00:11:07,509 --> 00:11:06,000  
uh we were going to send out explorers

303  
00:11:09,670 --> 00:11:07,519  
and we were limited to ground

304  
00:11:12,790 --> 00:11:09,680  
observations uh we would send sailing

305  
00:11:16,470 --> 00:11:12,800  
ships to the indian ocean as they did at

306  
00:11:18,470 --> 00:11:16,480  
the time in when cook and gentile went

307  
00:11:20,949 --> 00:11:18,480  
but we have a a little bit better

308  
00:11:23,670 --> 00:11:20,959  
resources now if i know we've got

309  
00:11:25,350 --> 00:11:23,680  
the nasa edge crew i think in uh hawaii

310  
00:11:26,870 --> 00:11:25,360  
on montaka

311  
00:11:28,710 --> 00:11:26,880  
and they're going to be watching it live

312  
00:11:31,030 --> 00:11:28,720  
and you can actually uh tune in to some

313  
00:11:34,310 --> 00:11:31,040

of that coverage on nasa tv starting at

314

00:11:36,630 --> 00:11:34,320

4 30 p.m central time today again the

315

00:11:37,430 --> 00:11:36,640

transit itself starts at 509 pm central

316

00:11:39,110 --> 00:11:37,440

time

317

00:11:41,190 --> 00:11:39,120

right so if you were going to try and

318

00:11:42,550 --> 00:11:41,200

see it what what are some of your

319

00:11:44,870 --> 00:11:42,560

some of your tips

320

00:11:46,949 --> 00:11:44,880

well uh first of all i don't look at the

321

00:11:48,870 --> 00:11:46,959

sun do the standard safety briefing here

322

00:11:50,790 --> 00:11:48,880

uh let's see i did have a set of glasses

323

00:11:51,990 --> 00:11:50,800

here uh

324

00:11:55,190 --> 00:11:52,000

the

325

00:11:56,870 --> 00:11:55,200

ways that

326

00:12:00,150 --> 00:11:56,880

most people are more familiar with with

327

00:12:02,069 --> 00:12:00,160

watching eclipses solar eclipses uh the

328

00:12:03,509 --> 00:12:02,079

indirect methods as the box camera the

329

00:12:05,430 --> 00:12:03,519

pinhole cameras that i've said but if

330

00:12:07,509 --> 00:12:05,440

you're fortunate enough you can get a

331

00:12:09,350 --> 00:12:07,519

pair of these glasses they're very cheap

332

00:12:11,590 --> 00:12:09,360

and there are solar filter glasses you

333

00:12:14,629 --> 00:12:11,600

can look directly at the sun with these

334

00:12:16,389 --> 00:12:14,639

um they cost about a dollar if that

335

00:12:17,910 --> 00:12:16,399

unfortunately there's not many places

336

00:12:20,470 --> 00:12:17,920

that sell them

337

00:12:23,509 --> 00:12:20,480

uh in most local areas so these are not

338

00:12:25,110 --> 00:12:23,519

3d movie glasses no no actually it's the

339

00:12:26,629 --> 00:12:25,120

same companies make these they just put

340

00:12:28,230 --> 00:12:26,639

in the different inserts for the solar

341

00:12:29,910 --> 00:12:28,240

filter as opposed to the red blue or the

342

00:12:31,110 --> 00:12:29,920

polarizing filters that you might use

343

00:12:34,310 --> 00:12:31,120

for 3d

344

00:12:36,069 --> 00:12:34,320

uh these for example uh you can order

345

00:12:38,710 --> 00:12:36,079

online but you would have had a thought

346

00:12:39,990 --> 00:12:38,720

ahead of time to get that even even next

347

00:12:41,990 --> 00:12:40,000

day delivery is not going to help you in

348

00:12:43,910 --> 00:12:42,000

that case uh

349

00:12:46,790 --> 00:12:43,920

if you haven't had the good fortune to

350

00:12:49,190 --> 00:12:46,800

do that then uh another option

351

00:12:51,990 --> 00:12:49,200

uh might be uh welder's glasses now

352

00:12:53,670 --> 00:12:52,000

welder's glasses come in a variety of

353

00:12:55,670 --> 00:12:53,680

colors if you will

354

00:12:57,829 --> 00:12:55,680

not literally but

355

00:12:59,990 --> 00:12:57,839

you would want number 14 welder's

356

00:13:03,030 --> 00:13:00,000

glasses and those will protect you for

357

00:13:04,710 --> 00:13:03,040

looking directly at the sun now in air

358

00:13:06,870 --> 00:13:04,720

in most areas

359

00:13:08,870 --> 00:13:06,880

where there might be an interest

360

00:13:11,269 --> 00:13:08,880

trying to buy those glasses now in a

361

00:13:12,389 --> 00:13:11,279

home depot or or a lowe's or a hardware

362

00:13:14,470 --> 00:13:12,399

store

363

00:13:17,350 --> 00:13:14,480

they might be sold out on them

364

00:13:19,190 --> 00:13:17,360

for example in houston when uh there's a

365

00:13:21,750 --> 00:13:19,200

storm approaching or florida and a

366

00:13:23,430 --> 00:13:21,760

hurricane approaches uh the stores sell

367

00:13:25,350 --> 00:13:23,440

out of plywood very quickly you know

368

00:13:27,509 --> 00:13:25,360

there's a run on those emergency type

369

00:13:29,430 --> 00:13:27,519

supplies in this case there might be a

370

00:13:30,870 --> 00:13:29,440

run on the goggles for people who didn't

371

00:13:32,470 --> 00:13:30,880

plan ahead

372

00:13:33,990 --> 00:13:32,480

well i hope so i hope that that many

373

00:13:36,389 --> 00:13:34,000

people are interested i'm going to going

374

00:13:38,310 --> 00:13:36,399

to be tuning in or watching yes uh that

375

00:13:40,870 --> 00:13:38,320

that would i it's

376

00:13:43,590 --> 00:13:40,880

the the transit of venus is as dawn said

377

00:13:45,590 --> 00:13:43,600

in this video is not a scientifically

378

00:13:47,430 --> 00:13:45,600

significant nowadays it's historically

379

00:13:49,670 --> 00:13:47,440

significant we might be able because of

380

00:13:51,670 --> 00:13:49,680

better technology and our observation

381

00:13:54,150 --> 00:13:51,680

methods discern some

382

00:13:57,750 --> 00:13:54,160

new nuances of information of scientific

383

00:14:00,310 --> 00:13:57,760

information uh about it but it is it is

384

00:14:03,110 --> 00:14:00,320

a tool to generate interest in in

385

00:14:06,230 --> 00:14:03,120

science astronomy specifically uh

386

00:14:07,910 --> 00:14:06,240

technology space and and i i look at it

387

00:14:10,790 --> 00:14:07,920

in a historical perspective these

388

00:14:12,310 --> 00:14:10,800

transits as i mentioned come every 100

389

00:14:15,910 --> 00:14:12,320

plus years or so

390

00:14:18,629 --> 00:14:15,920

and and they're they're points in time

391

00:14:19,670 --> 00:14:18,639

that that highlight the technology of

392

00:14:20,629 --> 00:14:19,680

the time

393

00:14:22,710 --> 00:14:20,639

and

394

00:14:24,790 --> 00:14:22,720

the next time it comes who knows what

395

00:14:27,670 --> 00:14:24,800

what we will be capable of hopefully a

396

00:14:30,150 --> 00:14:27,680

lot more than we are now uh and and

397

00:14:32,310 --> 00:14:30,160

certainly uh i don't believe the iss

398

00:14:33,829 --> 00:14:32,320

will still be orbiting uh the earth

399

00:14:37,750 --> 00:14:33,839

none of us will be here for the next

400

00:14:40,870 --> 00:14:37,760

observation and folks then in 2117 and

401  
00:14:42,150 --> 00:14:40,880  
in the eight years after that 2125 will

402  
00:14:45,269 --> 00:14:42,160  
talk about

403  
00:14:47,829 --> 00:14:45,279  
as we are today the the history of

404  
00:14:50,230 --> 00:14:47,839  
observing the transits and

405  
00:14:52,550 --> 00:14:50,240  
what is what what gets me is being in

406  
00:14:56,870 --> 00:14:52,560  
this control center and talking with you

407  
00:15:00,550 --> 00:14:56,880  
is is uh the poignant fact that uh the

408  
00:15:03,670 --> 00:15:00,560  
iss now is part of that history with don

409  
00:15:06,310 --> 00:15:03,680  
and the crew making this observation it

410  
00:15:09,430 --> 00:15:06,320  
it goes along with cook and legend teal

411  
00:15:12,949 --> 00:15:09,440  
and all of that that history so it it it

412  
00:15:15,590 --> 00:15:12,959  
it's a demarcation of time every 100

413  
00:15:18,150 --> 00:15:15,600

plus years apart and that to me uh in in

414

00:15:19,910 --> 00:15:18,160

the continuity i mean if you look at uh

415

00:15:22,710 --> 00:15:19,920

online you can dig up there's a catalog

416

00:15:25,590 --> 00:15:22,720

of transit that goes back to november

417

00:15:28,790 --> 00:15:25,600

uh 1998 bc

418

00:15:31,030 --> 00:15:28,800

okay and then it's projected out to 36

419

00:15:34,629 --> 00:15:31,040

hundred eight you know something like

420

00:15:37,030 --> 00:15:34,639

that a.d uh and and so

421

00:15:38,790 --> 00:15:37,040

it it and here we're in at least on the

422

00:15:40,550 --> 00:15:38,800

on the piece of paper that i had it's it

423

00:15:41,910 --> 00:15:40,560

we're in the middle of that that that

424

00:15:44,629 --> 00:15:41,920

timeline so

425

00:15:46,069 --> 00:15:44,639

it connects us with history it connects

426

00:15:49,269 --> 00:15:46,079

us with the future

427

00:15:51,030 --> 00:15:49,279

great well i hope that uh in 100 or so

428

00:15:53,430 --> 00:15:51,040

years they'll be using the photos that

429

00:15:55,829 --> 00:15:53,440

get taken today and talking about what

430

00:15:57,910 --> 00:15:55,839

how we observe the transit then

431

00:15:59,670 --> 00:15:57,920

well great yeah

432

00:16:03,110 --> 00:15:59,680

go ahead i was just going to say that

433

00:16:03,910 --> 00:16:03,120

that uh if folks go online and and uh

434

00:16:06,150 --> 00:16:03,920

um

435

00:16:08,550 --> 00:16:06,160

search on transit of venus venus transit

436

00:16:11,189 --> 00:16:08,560

uh one of the particular uh websites is

437

00:16:13,509 --> 00:16:11,199

venus transit one word.nasa.gov and you

438

00:16:16,710 --> 00:16:13,519

can hunt around there on that website

439

00:16:18,230 --> 00:16:16,720

will be some of the images that dawn

440

00:16:20,230 --> 00:16:18,240

hopefully will have taken by then

441

00:16:21,509 --> 00:16:20,240

starting this uh this evening

442

00:16:23,269 --> 00:16:21,519

and uh

443

00:16:25,509 --> 00:16:23,279

the the team is ready to bring those

444

00:16:27,749 --> 00:16:25,519

images down as rapidly as as we can and

445

00:16:29,749 --> 00:16:27,759

get them posted online for for everyone

446

00:16:31,670 --> 00:16:29,759

to take a look at beyond that

447

00:16:34,069 --> 00:16:31,680

uh there's a whole host of information

448

00:16:36,790 --> 00:16:34,079

out there as i mentioned and there's uh

449

00:16:39,110 --> 00:16:36,800

of course the the website uh

450

00:16:41,189 --> 00:16:39,120

also is with uh the observations and the

451  
00:16:43,749 --> 00:16:41,199  
live webcasts that are going on on uh

452  
00:16:46,470 --> 00:16:43,759  
from the uh mauna kea in hawaii with

453  
00:16:49,030 --> 00:16:46,480  
nasa edge right so uh to recap all of

454  
00:16:50,470 --> 00:16:49,040  
that um the uh

455  
00:16:52,829 --> 00:16:50,480  
an easy

456  
00:16:55,030 --> 00:16:52,839  
website to go to is just straight to the

457  
00:16:56,949 --> 00:16:55,040  
www.nasa.gov site it's linked from the

458  
00:16:59,430 --> 00:16:56,959  
front page there and you can find all

459  
00:17:00,790 --> 00:16:59,440  
the various coverage areas and

460  
00:17:03,189 --> 00:17:00,800  
information

461  
00:17:06,470 --> 00:17:03,199  
sites available through nasa straight

462  
00:17:08,470 --> 00:17:06,480  
from nasa.gov and then as we mentioned

463  
00:17:10,949 --> 00:17:08,480

we're going to be covering it on nasa tv

464

00:17:12,870 --> 00:17:10,959

tonight starting at 4 30 pm central time

465

00:17:15,429 --> 00:17:12,880

we'll have regular studio updates and

466

00:17:18,150 --> 00:17:15,439

also the live coverage by the nasa edge

467

00:17:19,909 --> 00:17:18,160

team from mauna kea in hawaii so all

468

00:17:22,630 --> 00:17:19,919

that to look forward to again coverage

469

00:17:24,549 --> 00:17:22,640

starts at 4 30 p.m central time this

470

00:17:26,309 --> 00:17:24,559

afternoon and uh hopefully we'll be able

471

00:17:28,470 --> 00:17:26,319

to talk with you again later in the week

472

00:17:30,390 --> 00:17:28,480

and get a recap of what actually took

473

00:17:31,750 --> 00:17:30,400

place tonight i look forward to that

474

00:17:33,510 --> 00:17:31,760

thank you thanks so much for coming out

475

00:17:34,310 --> 00:17:33,520

again this is mario ronko an astronaut

476

00:17:37,190 --> 00:17:34,320

here

477

00:17:39,190 --> 00:17:37,200

at nasa and obviously a lot of good