1
00:00:19,750 --> 00:00:17,189
why did you want to be an astronaut

2
00:00:22,390 --> 00:00:19,760
well i i know the day that i was

3
00:00:26,070 --> 00:00:22,400
inspired to be an astronaut and that was

4
00:00:28,390 --> 00:00:26,080
july 20th 1969. i was seven years old

5
00:00:29,910 --> 00:00:28,400
in michigan at my grandparents house

6
00:00:31,830 --> 00:00:29,920
watching a black and white tv with my

7
00:00:35,270 --> 00:00:31,840
brother and sister and parents

8
00:00:38,869 --> 00:00:35,280
and we watched with great interest

9
00:00:40,950 --> 00:00:38,879
on a fuzzy black and white tv as neil

10
00:00:42,950 --> 00:00:40,960
armstrong stepped on the moon and made

11
00:00:44,709 --> 00:00:42,960
his first speech as he as he stepped on

12
00:00:46,630 --> 00:00:44,719
the moon i looked at my brother and

13
00:00:49,510 --> 00:00:46,640

sister i was seven my brother was nine

14
00:00:52,470 --> 00:00:49,520
my sister was eleven and uh

15
00:00:54,790 --> 00:00:52,480
we um were amazed and i said wow that

16
00:00:56,869 --> 00:00:54,800
i'd love to be an astronaut so that was

17
00:00:58,790 --> 00:00:56,879
kind of the bit that was set way back

18
00:01:01,029 --> 00:00:58,800
when i was seven and i remember that

19
00:01:01,910 --> 00:01:01,039
actually when i talked to kids

20
00:01:03,830 --> 00:01:01,920
how

21
00:01:07,310 --> 00:01:03,840
a small

22
00:01:11,190 --> 00:01:07,320
milestone a very short event can have an

23
00:01:12,550 --> 00:01:11,200
incredible impact on somebody's future

24
00:01:14,230 --> 00:01:12,560
that being said i thought it was just a

25
00:01:15,429 --> 00:01:14,240
dream i didn't really believe it that it

26
00:01:17,990 --> 00:01:15,439
could ever happen

27
00:01:20,310 --> 00:01:18,000
um but i worked hard in school loved

28
00:01:22,550 --> 00:01:20,320
math and science became enamored with

29
00:01:24,390 --> 00:01:22,560
airplanes and rocket ships

30
00:01:26,230 --> 00:01:24,400
decided to get an engineering degree

31
00:01:28,469 --> 00:01:26,240
went to the air force academy because i

32
00:01:30,069 --> 00:01:28,479
really wanted to fly but i also wanted

33
00:01:32,149 --> 00:01:30,079
to fly to be a better

34
00:01:33,270 --> 00:01:32,159
engineer better understanding of of the

35
00:01:36,310 --> 00:01:33,280
physics and

36
00:01:37,030 --> 00:01:36,320
and and the operation of space vehicles

37
00:01:40,069 --> 00:01:37,040
and

38
00:01:42,469 --> 00:01:40,079

spaceships

39
00:01:44,469 --> 00:01:42,479
and so then got involved in the flying

40
00:01:46,069 --> 00:01:44,479
thing and of course flying is great and

41
00:01:47,190 --> 00:01:46,079
i've loved my flying career flew

42
00:01:49,190 --> 00:01:47,200
fighters

43
00:01:51,270 --> 00:01:49,200
went to test pilot school because that

44
00:01:53,429 --> 00:01:51,280
kind of brings the engineering side back

45
00:01:55,910 --> 00:01:53,439
into the flying it's kind of a rebirth

46
00:01:58,789 --> 00:01:55,920
about 10 years into my career and at

47
00:02:01,429 --> 00:01:58,799
that time i realized that wow you know

48
00:02:03,190 --> 00:02:01,439
i'm flying really cool stuff and they

49
00:02:05,590 --> 00:02:03,200
like to hire test pilots because each

50
00:02:07,590 --> 00:02:05,600
shuttle mission really is a test flight

51
00:02:08,869 --> 00:02:07,600
and so i went ahead and threw my name in

52
00:02:11,910 --> 00:02:08,879
the hat um

53
00:02:14,070 --> 00:02:11,920
my my my goal was to get an interview to

54
00:02:16,150 --> 00:02:14,080
come down meet some astronauts

55
00:02:18,390 --> 00:02:16,160
blow the ping-pong in between the lines

56
00:02:20,229 --> 00:02:18,400
you know do those sorts of things

57
00:02:22,790 --> 00:02:20,239
and so uh

58
00:02:24,790 --> 00:02:22,800
of course unexpected and very excited to

59
00:02:25,910 --> 00:02:24,800
get picked into the class a dozen years

60
00:02:27,750 --> 00:02:25,920
ago

61
00:02:29,270 --> 00:02:27,760
let me get you to tell us where that

62
00:02:31,430 --> 00:02:29,280
whole story began tell me about your

63
00:02:33,350 --> 00:02:31,440

hometown and you're growing up and and

64
00:02:35,190 --> 00:02:33,360
what it was like for you there

65
00:02:37,110 --> 00:02:35,200
well i kind of have two home towns i'll

66
00:02:39,110 --> 00:02:37,120
start with a hometown

67
00:02:41,509 --> 00:02:39,120
in fairborn ohio because that's where i

68
00:02:43,350 --> 00:02:41,519
ended up junior high in high school i

69
00:02:45,350 --> 00:02:43,360
was a military brat and we moved all

70
00:02:46,869 --> 00:02:45,360
around i was born in the uk and then we

71
00:02:48,710 --> 00:02:46,879
moved all over the united states ending

72
00:02:51,350 --> 00:02:48,720
in ohio when i was a senior in high

73
00:02:53,750 --> 00:02:51,360
school and so um

74
00:02:55,830 --> 00:02:53,760
i had amazing teachers in high school i

75
00:03:01,270 --> 00:02:55,840
had just support

76
00:03:04,070 --> 00:03:02,470
i kind of

77
00:03:05,430 --> 00:03:04,080
they used to tease me that i was like

78
00:03:07,509 --> 00:03:05,440
peanut butter because i was spread too

79
00:03:09,670 --> 00:03:07,519
thin because i was involved in so many

80
00:03:12,949 --> 00:03:09,680
different activities but i was always

81
00:03:15,910 --> 00:03:12,959
trying to do the best i could in every

82
00:03:17,270 --> 00:03:15,920
activity i was greatly involved in music

83
00:03:19,430 --> 00:03:17,280
and my dad was a

84
00:03:20,630 --> 00:03:19,440
musician my brother is a professional

85
00:03:22,710 --> 00:03:20,640
musician

86
00:03:24,869 --> 00:03:22,720
and so i really got into the band

87
00:03:28,470 --> 00:03:24,879
various bands rock bands high school

88
00:03:29,350 --> 00:03:28,480

band uh you know marching concert jazz

89
00:03:32,630 --> 00:03:29,360
and

90
00:03:35,509 --> 00:03:32,640
bob depiro

91
00:03:37,110 --> 00:03:35,519
he was a great mentor for me um

92
00:03:38,710 --> 00:03:37,120
kind of

93
00:03:39,990 --> 00:03:38,720
rubbed some rough edges off of me and

94
00:03:42,550 --> 00:03:40,000
taught me discipline and different

95
00:03:44,550 --> 00:03:42,560
things and and excelling in whatever

96
00:03:47,509 --> 00:03:44,560
you're doing doing the best that you can

97
00:03:49,509 --> 00:03:47,519
do and so that if i could characterize

98
00:03:51,030 --> 00:03:49,519
my high school years growing up in in

99
00:03:52,550 --> 00:03:51,040
ohio it was

100
00:03:54,309 --> 00:03:52,560
just trying to do the best that you can

101
00:03:56,070 --> 00:03:54,319
do and everything that you're doing and

102
00:03:58,070 --> 00:03:56,080
that kind of set me up for going to the

103
00:03:59,270 --> 00:03:58,080
air force academy which is kind of you

104
00:04:01,190 --> 00:03:59,280
do a whole bunch of things at the air

105
00:04:02,949 --> 00:04:01,200
force academy

106
00:04:03,990 --> 00:04:02,959
it's not just about academics it's not

107
00:04:05,509 --> 00:04:04,000
just about

108
00:04:06,710 --> 00:04:05,519
physical

109
00:04:08,070 --> 00:04:06,720
fitness

110
00:04:10,149 --> 00:04:08,080
it's not just about discipline it's kind

111
00:04:13,110 --> 00:04:10,159
of all three and so that was a perfect

112
00:04:15,429 --> 00:04:13,120
match for my college years did you get a

113
00:04:19,909 --> 00:04:15,439

chance to get a good look at fairborn

114
00:04:23,350 --> 00:04:19,919
ohio or colorado springs when you flew

115
00:04:25,110 --> 00:04:23,360
um well ohio you know south of michigan

116
00:04:26,390 --> 00:04:25,120
the hand is really easy to see and the

117
00:04:28,390 --> 00:04:26,400
great lakes

118
00:04:29,830 --> 00:04:28,400
and then you've got the ohio river

119
00:04:31,909 --> 00:04:29,840
but picking out

120
00:04:34,150 --> 00:04:31,919
i i looked at dayton i could see dayton

121
00:04:36,629 --> 00:04:34,160
and i knew about where fairborne was in

122
00:04:39,189 --> 00:04:36,639
relationship to dayton i think i saw the

123
00:04:43,270 --> 00:04:39,199
triangular runway at the right patterson

124
00:04:44,870 --> 00:04:43,280
air force airfield area b but it's a lot

125
00:04:46,629 --> 00:04:44,880
of the time on my last space shuttle

126
00:04:49,030 --> 00:04:46,639
flight we were flying over the over the

127
00:04:51,830 --> 00:04:49,040
u.s at night so it's a little bit

128
00:04:53,830 --> 00:04:51,840
difficult to see now my second hometown

129
00:04:55,749 --> 00:04:53,840
is traverse city michigan and that's

130
00:04:57,430 --> 00:04:55,759
where my dad that was my dad's permanent

131
00:05:00,390 --> 00:04:57,440
home of record it's where my mom and dad

132
00:05:03,430 --> 00:05:00,400
met and it's been kind of the summer and

133
00:05:05,189 --> 00:05:03,440
winter recreational ground we

134
00:05:07,430 --> 00:05:05,199
had a lake house up there and my

135
00:05:09,110 --> 00:05:07,440
grandparents lived there and it was the

136
00:05:11,909 --> 00:05:09,120
it was the warm homecoming place that i

137
00:05:14,150 --> 00:05:11,919
i would always go as a kid and in fact i

138
00:05:15,749 --> 00:05:14,160

still still share um

139
00:05:19,110 --> 00:05:15,759
a lake house up there with my brother

140
00:05:20,870 --> 00:05:19,120
and sister on that same location

141
00:05:22,230 --> 00:05:20,880
and so that was a lot easier to see

142
00:05:23,510 --> 00:05:22,240
because traverse city is right at the

143
00:05:24,469 --> 00:05:23,520
top of the hand

144
00:05:26,150 --> 00:05:24,479
and

145
00:05:28,390 --> 00:05:26,160
there aren't a lot of bright lights up

146
00:05:31,029 --> 00:05:28,400
in northern michigan so i could clearly

147
00:05:32,629 --> 00:05:31,039
see traverse city and i honestly with

148
00:05:34,469 --> 00:05:32,639
the moonlight think that i picked out

149
00:05:36,950 --> 00:05:34,479
long lake which is where the cottage

150
00:05:39,670 --> 00:05:36,960
sits and so you know when i think of two

151
00:05:42,230 --> 00:05:39,680
places in the u.s that bring me that

152
00:05:43,830 --> 00:05:42,240
kind of homecoming hometown feel it'd be

153
00:05:45,110 --> 00:05:43,840
fair board ohio and traverse city

154
00:05:46,629 --> 00:05:45,120
michigan

155
00:05:49,749 --> 00:05:46,639
you touched on this before let me get

156
00:05:51,749 --> 00:05:49,759
you to expand a bit on the the path from

157
00:05:53,029 --> 00:05:51,759
high school and to college and your air

158
00:05:55,350 --> 00:05:53,039
force career

159
00:05:57,909 --> 00:05:55,360
tell us those steps that you took that

160
00:06:00,550 --> 00:05:57,919
ended up you becoming an astronaut

161
00:06:03,430 --> 00:06:00,560
well uh i went to the air force academy

162
00:06:05,990 --> 00:06:03,440
of course i got a degree in uh

163
00:06:08,150 --> 00:06:06,000

aeronautical engineering

164
00:06:10,390 --> 00:06:08,160
went on to get a master's first

165
00:06:12,550 --> 00:06:10,400
kind of did that fill that square first

166
00:06:13,830 --> 00:06:12,560
because i knew once i started flying

167
00:06:15,110 --> 00:06:13,840
it might be more difficult to get a

168
00:06:17,350 --> 00:06:15,120
masters and i wanted to get a good

169
00:06:19,510 --> 00:06:17,360
master's in residence so i did that and

170
00:06:22,390 --> 00:06:19,520
then went off the fly

171
00:06:25,830 --> 00:06:22,400
i went to lubbock texas in at reese air

172
00:06:28,550 --> 00:06:25,840
force base it's since been closed

173
00:06:31,990 --> 00:06:28,560
and i trained in the undergraduate pilot

174
00:06:33,830 --> 00:06:32,000
training in the t-37 and the t-38 and

175
00:06:36,070 --> 00:06:33,840
lucky for me they decided to keep me as

176
00:06:38,070 --> 00:06:36,080
a t-38 instructor for three years so i

177
00:06:40,150 --> 00:06:38,080
taught guys to fly for for three years

178
00:06:42,070 --> 00:06:40,160
in lubbock that's where i met my wife

179
00:06:44,230 --> 00:06:42,080
carrie and we were married at the end of

180
00:06:46,550 --> 00:06:44,240
that tour and then i got a fighter out

181
00:06:48,710 --> 00:06:46,560
of there and moved her out of state to

182
00:06:54,070 --> 00:06:48,720
north carolina

183
00:06:56,070 --> 00:06:54,080
desert storm hit about that time and so

184
00:06:57,430 --> 00:06:56,080
i had a couple deployments out to the to

185
00:07:00,309 --> 00:06:57,440
the middle east

186
00:07:02,790 --> 00:07:00,319
uh and then uh finished that tour

187
00:07:04,710 --> 00:07:02,800
applying to test pilot school

188
00:07:07,270 --> 00:07:04,720

at which time i went out to edwards air

189
00:07:09,029 --> 00:07:07,280
force base tested the f-15

190
00:07:10,150 --> 00:07:09,039
and some and chased some other test

191
00:07:12,150 --> 00:07:10,160
programs

192
00:07:15,589 --> 00:07:12,160
but one interesting test program i had

193
00:07:17,990 --> 00:07:15,599
out at edwards was the active

194
00:07:19,510 --> 00:07:18,000
advanced vehicle technology i can't i

195
00:07:22,629 --> 00:07:19,520
can't tell you the acronym but in any

196
00:07:24,710 --> 00:07:22,639
case it was a thrust vectoring

197
00:07:27,189 --> 00:07:24,720
flight control kind of

198
00:07:28,710 --> 00:07:27,199
integration

199
00:07:29,830 --> 00:07:28,720
test program that was going to be used

200
00:07:31,189 --> 00:07:29,840
for the joint strike fighter and

201
00:07:33,029 --> 00:07:31,199
follow-on vehicles

202
00:07:35,430 --> 00:07:33,039
similar to what we're doing with the dto

203
00:07:37,350 --> 00:07:35,440
for the re-rendezvous for the follow-on

204
00:07:39,430 --> 00:07:37,360
vehicle same sort of thing

205
00:07:40,469 --> 00:07:39,440
but a really exciting program a lot of

206
00:07:42,550 --> 00:07:40,479
different

207
00:07:45,189 --> 00:07:42,560
agencies involved including nasa and i

208
00:07:48,309 --> 00:07:45,199
believe that probably my interaction

209
00:07:49,350 --> 00:07:48,319
with the active program at nasa dryden

210
00:07:53,110 --> 00:07:49,360
was

211
00:07:55,189 --> 00:07:53,120
one of those

212
00:07:57,589 --> 00:07:55,199
connections in the networking that gave

213
00:07:58,869 --> 00:07:57,599

me a a little something that hey i've

214
00:08:00,950 --> 00:07:58,879
worked with nasa i've done this really

215
00:08:02,710 --> 00:08:00,960
cool test program and we did get some

216
00:08:04,629 --> 00:08:02,720
awards for that test program as well so

217
00:08:07,029 --> 00:08:04,639
that was one of my

218
00:08:09,350 --> 00:08:07,039
feathers in my cap for maybe having a

219
00:08:10,469 --> 00:08:09,360
chance to be apply for nasa and be be

220
00:08:12,309 --> 00:08:10,479
selected

221
00:08:14,230 --> 00:08:12,319
i went to a leadership school after that

222
00:08:15,909 --> 00:08:14,240
they were heading me to the pentagon

223
00:08:17,270 --> 00:08:15,919
and about that time i threw my name in

224
00:08:18,869 --> 00:08:17,280
the hat came down for an interview and

225
00:08:20,790 --> 00:08:18,879
came here instead so instead of going to

226
00:08:21,749 --> 00:08:20,800
the pentagon to my first non-flying desk

227
00:08:22,950 --> 00:08:21,759
job

228
00:08:24,550 --> 00:08:22,960
i went to the

229
00:08:26,790 --> 00:08:24,560
i went to nasa

230
00:08:27,909 --> 00:08:26,800
you talked about going into the air

231
00:08:29,589 --> 00:08:27,919
force academy because you were

232
00:08:31,830 --> 00:08:29,599
interested in flying what i didn't ask

233
00:08:33,430 --> 00:08:31,840
you is what got you so interested in

234
00:08:38,230 --> 00:08:33,440
flying

235
00:08:41,509 --> 00:08:38,240
high school but i've just always been

236
00:08:43,029 --> 00:08:41,519
inspired and excited about airplanes i

237
00:08:45,030 --> 00:08:43,039
remember the first time that i flew an

238
00:08:47,670 --> 00:08:45,040

airplane overseas when i was

239
00:08:50,230 --> 00:08:47,680
it was about when i was seven it was 69

240
00:08:51,990 --> 00:08:50,240
we were we we saw the first lunar

241
00:08:54,470 --> 00:08:52,000
landing and then my dad was assigned to

242
00:08:56,550 --> 00:08:54,480
germany and i flew on my first airplane

243
00:08:58,150 --> 00:08:56,560
overseas at least the first one that i

244
00:09:00,230 --> 00:08:58,160
remember and i guess i must have been on

245
00:09:01,990 --> 00:09:00,240
airplanes before that but i was looking

246
00:09:05,030 --> 00:09:02,000
out the window with the clouds and i was

247
00:09:07,269 --> 00:09:05,040
just amazed at how the thing could fly

248
00:09:09,590 --> 00:09:07,279
and and that was always

249
00:09:11,190 --> 00:09:09,600
an exciting topic for me i was always

250
00:09:13,190 --> 00:09:11,200
asking questions about it to my parents

251
00:09:15,590 --> 00:09:13,200
trying to understand it paying attention

252
00:09:17,990 --> 00:09:15,600
in physics class in high school it it

253
00:09:20,150 --> 00:09:18,000
still amazes me when i go out and fly

254
00:09:21,829 --> 00:09:20,160
the t-38 and i look at those little

255
00:09:23,430 --> 00:09:21,839
short skinny little wings and that

256
00:09:25,990 --> 00:09:23,440
thing's flying it's just it's just

257
00:09:28,150 --> 00:09:26,000
amazing to me even now

258
00:09:30,870 --> 00:09:28,160
now you're in a career that where the

259
00:09:33,509 --> 00:09:30,880
the flying in space part of this career

260
00:09:35,269 --> 00:09:33,519
is one that has got some significant

261
00:09:37,269 --> 00:09:35,279
possible dangers to it a lot more than

262
00:09:39,190 --> 00:09:37,279
most people have in their jobs

263
00:09:41,269 --> 00:09:39,200

so greg what is it that you think we're

264
00:09:43,910 --> 00:09:41,279
getting as a result of flying people in

265
00:09:45,190 --> 00:09:43,920
space that makes it worth taking that

266
00:09:49,269 --> 00:09:45,200
risk

267
00:09:52,310 --> 00:09:49,279
different than driving in and out of

268
00:09:54,630 --> 00:09:52,320
houston every day but i'm kidding but

269
00:09:57,030 --> 00:09:54,640
but yeah the i think the risk is well

270
00:09:59,990 --> 00:09:57,040
worth it uh because

271
00:10:02,310 --> 00:10:00,000
we are an exploring country we're a

272
00:10:03,190 --> 00:10:02,320
leading edge technology country

273
00:10:04,389 --> 00:10:03,200
um

274
00:10:06,949 --> 00:10:04,399
and

275
00:10:08,870 --> 00:10:06,959
i tell i take my parenting very very

276
00:10:11,110 --> 00:10:08,880
seriously and i talk to my kids about

277
00:10:12,550 --> 00:10:11,120
being the lead dog

278
00:10:14,150 --> 00:10:12,560
and

279
00:10:16,150 --> 00:10:14,160
if you're the lead dog

280
00:10:17,910 --> 00:10:16,160
everybody else is looking at the tail

281
00:10:19,430 --> 00:10:17,920
end of the lead dog you know the you

282
00:10:22,310 --> 00:10:19,440
want to be the lead dog not the guys

283
00:10:23,829 --> 00:10:22,320
behind and we've been the lead dog and

284
00:10:26,470 --> 00:10:23,839
the reason we've been the lead dog is

285
00:10:28,870 --> 00:10:26,480
because we take those risks that we you

286
00:10:30,550 --> 00:10:28,880
know that we push technology and

287
00:10:33,269 --> 00:10:30,560
exploration forward

288
00:10:35,030 --> 00:10:33,279

and the space program is a perfect

289
00:10:36,790 --> 00:10:35,040
example of that

290
00:10:39,030 --> 00:10:36,800
and the technologies and the

291
00:10:41,190 --> 00:10:39,040
capabilities that we get from the space

292
00:10:43,030 --> 00:10:41,200
program and the economies i mean the

293
00:10:45,670 --> 00:10:43,040
economic impact is a little bit

294
00:10:47,990 --> 00:10:45,680
intangible but if you really go back and

295
00:10:49,269 --> 00:10:48,000
look at all the various spin-offs and

296
00:10:52,150 --> 00:10:49,279
things that we've gotten from the space

297
00:10:54,949 --> 00:10:52,160
program and how it's impacted our

298
00:10:57,910 --> 00:10:54,959
country and our world

299
00:11:01,110 --> 00:10:57,920
space is that next frontier that we need

300
00:11:02,630 --> 00:11:01,120
to explore and so i think it's extremely

301
00:11:04,870 --> 00:11:02,640
important to be involved with space and

302
00:11:06,630 --> 00:11:04,880
i think that we don't spend enough i

303
00:11:08,150 --> 00:11:06,640
think we should spend much more on our

304
00:11:10,310 --> 00:11:08,160
space program

305
00:11:11,750 --> 00:11:10,320
than we do these days but i know times

306
00:11:12,550 --> 00:11:11,760
are tight

307
00:11:15,509 --> 00:11:12,560
but

308
00:11:22,230 --> 00:11:15,519
so any risk to me personally

309
00:11:25,590 --> 00:11:23,590
you're a member of the crew of shuttle

310
00:11:28,230 --> 00:11:25,600
mission sts-134

311
00:11:31,030 --> 00:11:28,240
greg give me a summary of the goals of

312
00:11:33,190 --> 00:11:31,040
this flight and tell me what your job is

313
00:11:34,710 --> 00:11:33,200

okay sts-134

314
00:11:37,110 --> 00:11:34,720
we are

315
00:11:38,550 --> 00:11:37,120
an international space station assembly

316
00:11:40,550 --> 00:11:38,560
mission

317
00:11:43,110 --> 00:11:40,560
one of the the final ones we're taking

318
00:11:45,110 --> 00:11:43,120
up a very important experiment the alpha

319
00:11:46,870 --> 00:11:45,120
magnetic spectrometer

320
00:11:48,949 --> 00:11:46,880
a science experiment

321
00:11:50,710 --> 00:11:48,959
that could change the course of of

322
00:11:52,629 --> 00:11:50,720
physics

323
00:11:55,030 --> 00:11:52,639
and we're also taking some pieces and

324
00:11:56,870 --> 00:11:55,040
parts up to the space station

325
00:11:58,389 --> 00:11:56,880
in anticipation of the shuttle uh

326
00:12:00,389 --> 00:11:58,399
retiring because we only have a few more

327
00:12:02,629 --> 00:12:00,399
shuttle flights uh and so we're taking

328
00:12:05,990 --> 00:12:02,639
those parts up in an express uh

329
00:12:07,350 --> 00:12:06,000
logistics uh carrier uh and and uh

330
00:12:10,629 --> 00:12:07,360
perching that on top of the space

331
00:12:12,470 --> 00:12:10,639
station as well i'll be the pilot uh we

332
00:12:14,949 --> 00:12:12,480
have four mission specialists doing four

333
00:12:17,750 --> 00:12:14,959
space walks uh we have a lot of robotic

334
00:12:21,509 --> 00:12:17,760
arm operations and so i'm kind of the

335
00:12:22,949 --> 00:12:21,519
the head arm operator overall uh

336
00:12:24,870 --> 00:12:22,959
overseeing what we're doing with both

337
00:12:27,670 --> 00:12:24,880
the shuttle and the space station uh

338
00:12:29,670 --> 00:12:27,680

robotic arms and i'll be taking part in

339
00:12:30,790 --> 00:12:29,680
in both sides of that uh

340
00:12:32,550 --> 00:12:30,800
endeavor

341
00:12:34,150 --> 00:12:32,560
moving the robotic arms moving the

342
00:12:36,710 --> 00:12:34,160
pieces of parts around inspecting the

343
00:12:38,790 --> 00:12:36,720
shuttle uh uh prior to re-entry and and

344
00:12:41,350 --> 00:12:38,800
after launch

345
00:12:42,790 --> 00:12:41,360
and uh i'll also be the pilot sitting in

346
00:12:45,829 --> 00:12:42,800
the right seat so i'll be monitoring a

347
00:12:47,509 --> 00:12:45,839
lot of this you know shuttle uh systems

348
00:12:49,350 --> 00:12:47,519
as well as

349
00:12:51,030 --> 00:12:49,360
doing um

350
00:12:53,030 --> 00:12:51,040
different duties aboard the shuttle

351
00:12:54,710 --> 00:12:53,040
looking over the um

352
00:12:56,710 --> 00:12:54,720
the toilet for example that's one of my

353
00:12:58,230 --> 00:12:56,720
jobs i'll be making sure that everybody

354
00:13:00,470 --> 00:12:58,240
gets their meals and those sorts of

355
00:13:03,910 --> 00:13:00,480
things i won't be doing any space walks

356
00:13:05,030 --> 00:13:03,920
uh but i will be back in markup as kind

357
00:13:06,949 --> 00:13:05,040
of the

358
00:13:09,509 --> 00:13:06,959
the other pilot on board

359
00:13:11,750 --> 00:13:09,519
almost everybody on this crew has been

360
00:13:13,350 --> 00:13:11,760
to the space station before in fact two

361
00:13:15,829 --> 00:13:13,360
of your crewmates have finished long

362
00:13:18,150 --> 00:13:15,839
duration missions on the station has

363
00:13:19,590 --> 00:13:18,160

that kind of experience paid off for you

364
00:13:20,470 --> 00:13:19,600
guys as you've been preparing for this

365
00:13:22,870 --> 00:13:20,480
flight

366
00:13:25,509 --> 00:13:22,880
oh yeah absolutely i mean everybody on

367
00:13:28,470 --> 00:13:25,519
our crew has kind of a unique uh

368
00:13:29,829 --> 00:13:28,480
experience base uh bringing to this crew

369
00:13:31,269 --> 00:13:29,839
and we all have very different

370
00:13:33,350 --> 00:13:31,279
backgrounds and

371
00:13:34,790 --> 00:13:33,360
like my similar my last flight a whole

372
00:13:36,230 --> 00:13:34,800
bunch of different kind of personalities

373
00:13:39,350 --> 00:13:36,240
but you put them all together and

374
00:13:41,910 --> 00:13:39,360
synergize is a is a great team

375
00:13:43,990 --> 00:13:41,920
roberto from italy i'm really looking

376
00:13:46,870 --> 00:13:44,000
forward to him we trained as astronaut

377
00:13:48,310 --> 00:13:46,880
candidates way back a dozen years ago

378
00:13:49,910 --> 00:13:48,320
and then we've got a couple guys who

379
00:13:51,350 --> 00:13:49,920
have lived on the space station for six

380
00:13:53,670 --> 00:13:51,360
or 12 months

381
00:13:56,150 --> 00:13:53,680
uh mark kelly is a very experienced

382
00:13:57,750 --> 00:13:56,160
pilot i've been working with him

383
00:14:00,389 --> 00:13:57,760
since day one

384
00:14:02,389 --> 00:14:00,399
uh and uh and and it's an honor to serve

385
00:14:04,550 --> 00:14:02,399
as his pilot on this mission

386
00:14:07,189 --> 00:14:04,560
and then finally drew feustel who's you

387
00:14:10,470 --> 00:14:07,199
know one of the greatest spacewalkers

388
00:14:12,550 --> 00:14:10,480

he's he's been to hubble and so he uh

389
00:14:14,870 --> 00:14:12,560
he is kind of heading up the spacewalk

390
00:14:17,670 --> 00:14:14,880
team so pretty much the whole crew

391
00:14:19,670 --> 00:14:17,680
is a is a very experienced and very

392
00:14:20,870 --> 00:14:19,680
dedicated

393
00:14:22,710 --> 00:14:20,880
member of the team and i'm looking

394
00:14:24,550 --> 00:14:22,720
forward to working with all of them

395
00:14:26,790 --> 00:14:24,560
let me get you to tell us some about the

396
00:14:27,829 --> 00:14:26,800
the cargo the things you're delivering

397
00:14:30,629 --> 00:14:27,839
the

398
00:14:31,910 --> 00:14:30,639
what is express logistics carrier 3 and

399
00:14:33,829 --> 00:14:31,920
what does that do

400
00:14:36,310 --> 00:14:33,839
when you get it to the station

401
00:14:38,470 --> 00:14:36,320
well it's a big pallet that basically

402
00:14:40,870 --> 00:14:38,480
holds a bunch of stuff that we're taking

403
00:14:41,910 --> 00:14:40,880
up to the space station

404
00:14:46,949 --> 00:14:41,920
the

405
00:14:48,470 --> 00:14:46,959
when we get up to orbit and which which

406
00:14:50,550 --> 00:14:48,480
is interesting once we attach to the

407
00:14:51,829 --> 00:14:50,560
space station we're going to say hi

408
00:14:52,870 --> 00:14:51,839
we're going to get some safety briefs

409
00:14:54,550 --> 00:14:52,880
and immediately we're going to get to

410
00:14:57,030 --> 00:14:54,560
work on there for that very first flight

411
00:14:59,509 --> 00:14:57,040
day because we want to get those heavy

412
00:15:03,269 --> 00:14:59,519
cargo items out of the shuttle that's

413
00:15:05,030 --> 00:15:03,279

the highest priority and so uh the ams

414
00:15:07,430 --> 00:15:05,040
the alpha magnetic spectrometer and the

415
00:15:08,230 --> 00:15:07,440
elc are both um

416
00:15:10,550 --> 00:15:08,240
uh

417
00:15:13,509 --> 00:15:10,560
very important but the elc happens to

418
00:15:15,269 --> 00:15:13,519
have a cg impact so we're taking it out

419
00:15:17,110 --> 00:15:15,279
first so we're doing that on flight day

420
00:15:21,189 --> 00:15:17,120
three

421
00:15:24,069 --> 00:15:21,199
and roberto and i believe it is um

422
00:15:25,590 --> 00:15:24,079
spanky mike fink are operating the

423
00:15:29,189 --> 00:15:25,600
shuttle's robotic arm they're going to

424
00:15:30,629 --> 00:15:29,199
lift the elc out of the shuttle and

425
00:15:32,550 --> 00:15:30,639
just kind of hold them out hold it out

426
00:15:35,430 --> 00:15:32,560
in space and then

427
00:15:38,310 --> 00:15:35,440
taz and i are going to use the space

428
00:15:40,310 --> 00:15:38,320
station robotic arm grab the elc from

429
00:15:41,829 --> 00:15:40,320
them and attach it onto the space

430
00:15:44,150 --> 00:15:41,839
station

431
00:15:46,150 --> 00:15:44,160
taz and i are doing both of those uh

432
00:15:48,150 --> 00:15:46,160
handoffs from the space station robotic

433
00:15:49,430 --> 00:15:48,160
arm side taz will be the primary

434
00:15:52,710 --> 00:15:49,440
operator and i'll be backing them up

435
00:15:54,629 --> 00:15:52,720
with elc and then we'll swap roles

436
00:15:56,790 --> 00:15:54,639
for the ams

437
00:15:59,269 --> 00:15:56,800
is the is that all it takes to install

438
00:16:00,550 --> 00:15:59,279

this thing just to if you will simple

439
00:16:02,470 --> 00:16:00,560
plug-in

440
00:16:05,030 --> 00:16:02,480
uh yeah it's essentially that's what's

441
00:16:06,870 --> 00:16:05,040
going on we have some robotic maneuvers

442
00:16:08,389 --> 00:16:06,880
uh to get there

443
00:16:10,710 --> 00:16:08,399
uh and the handoff

444
00:16:12,069 --> 00:16:10,720
you ha it has to be precise and but

445
00:16:13,670 --> 00:16:12,079
those guys have

446
00:16:16,150 --> 00:16:13,680
have done a great job in the simulation

447
00:16:19,030 --> 00:16:16,160
we've done a full simulation from it

448
00:16:20,389 --> 00:16:19,040
being in the cargo bay all the way to

449
00:16:22,389 --> 00:16:20,399
where we're going to hand it off and

450
00:16:25,749 --> 00:16:22,399
then we attach it and then once we get

451
00:16:28,310 --> 00:16:25,759
it up there there's also another uh

452
00:16:29,430 --> 00:16:28,320
process to get it physically attached to

453
00:16:30,550 --> 00:16:29,440
the truss

454
00:16:35,430 --> 00:16:30,560
and

455
00:16:37,590 --> 00:16:35,440
do that job as well for the elc he's the

456
00:16:39,910 --> 00:16:37,600
primary arm operator and i'm the primary

457
00:16:42,230 --> 00:16:39,920
claw guy and then we'll swap roles for

458
00:16:44,069 --> 00:16:42,240
the ams but the whole operation will

459
00:16:45,749 --> 00:16:44,079
take maybe uh

460
00:16:48,389 --> 00:16:45,759
two and a half hours i imagine for the

461
00:16:49,910 --> 00:16:48,399
whole thing so it won't add a whole lot

462
00:16:51,269 --> 00:16:49,920
of time to the rendezvous day but the

463
00:16:52,629 --> 00:16:51,279

rendezvous day of course is a really

464
00:16:54,230 --> 00:16:52,639
long day

465
00:16:55,910 --> 00:16:54,240
that attachment then is something that

466
00:16:59,670 --> 00:16:55,920
you guys do from inside

467
00:17:01,509 --> 00:16:59,680
uh yes we do it's all computer-based and

468
00:17:03,749 --> 00:17:01,519
and it'll be interesting because we've

469
00:17:05,590 --> 00:17:03,759
got the two greg's doing those two

470
00:17:07,189 --> 00:17:05,600
different things backing each other up

471
00:17:09,429 --> 00:17:07,199
so there's there's going to be some

472
00:17:11,669 --> 00:17:09,439
humor on on the loops i imagine as we do

473
00:17:12,630 --> 00:17:11,679
the com protocols handing it off to each

474
00:17:15,270 --> 00:17:12,640
other

475
00:17:17,990 --> 00:17:15,280
elc is being delivered with some

476
00:17:20,390 --> 00:17:18,000
spare parts on it already right yes one

477
00:17:23,270 --> 00:17:20,400
of the spare parts that's on elc is the

478
00:17:24,710 --> 00:17:23,280
spdm and spdm arm

479
00:17:26,390 --> 00:17:24,720
and i have

480
00:17:30,150 --> 00:17:26,400
close to my heart

481
00:17:32,310 --> 00:17:30,160
the spdm because we took the spdm on my

482
00:17:34,950 --> 00:17:32,320
last flight and assemble it on orbit

483
00:17:39,029 --> 00:17:34,960
with a lot of spacewalks so we're taking

484
00:17:40,710 --> 00:17:39,039
spdm arm and parts up there as well as

485
00:17:42,789 --> 00:17:40,720
some other items

486
00:17:44,630 --> 00:17:42,799
the second big payload you've got you

487
00:17:47,590 --> 00:17:44,640
mentioned before the alpha magnetic

488
00:17:49,270 --> 00:17:47,600

spectrometer tell me what that does once

489
00:17:50,789 --> 00:17:49,280
it's installed out on the space

490
00:17:53,830 --> 00:17:50,799
station's truss

491
00:17:58,789 --> 00:17:53,840
well the alpha magnetic spectrometer or

492
00:18:03,029 --> 00:18:01,110
15 years in the making

493
00:18:04,950 --> 00:18:03,039
i don't know how much money and how much

494
00:18:06,310 --> 00:18:04,960
manpower has gone into this thing but i

495
00:18:08,150 --> 00:18:06,320
know a whole bunch of smart guys

496
00:18:09,350 --> 00:18:08,160
including a nobel nor laureate have been

497
00:18:12,789 --> 00:18:09,360
involved

498
00:18:14,549 --> 00:18:12,799
and uh so the ams is really exciting

499
00:18:16,070 --> 00:18:14,559
and it's one of those kinds of

500
00:18:19,430 --> 00:18:16,080
experiments one of those rare kinds of

501
00:18:21,669 --> 00:18:19,440
experiments that it really might

502
00:18:24,470 --> 00:18:21,679
just open some new doors that we never

503
00:18:27,909 --> 00:18:24,480
even knew existed uh it's a particle

504
00:18:30,150 --> 00:18:27,919
detector uh it it measures uh it

505
00:18:31,909 --> 00:18:30,160
collects various cosmic particles that

506
00:18:35,029 --> 00:18:31,919
can't come through our atmosphere to

507
00:18:36,470 --> 00:18:35,039
earth so this this particular experiment

508
00:18:38,710 --> 00:18:36,480
can't be on the

509
00:18:40,150 --> 00:18:38,720
surface of the planet because you can't

510
00:18:41,110 --> 00:18:40,160
get the kind of data that you can out in

511
00:18:42,390 --> 00:18:41,120
space

512
00:18:43,990 --> 00:18:42,400
so the first thing it needs to be out in

513
00:18:45,510 --> 00:18:44,000

space it needs to be stationary it needs

514
00:18:48,950 --> 00:18:45,520
to be zero gravity it needs to be

515
00:18:50,390 --> 00:18:48,960
undisturbed and collecting its data

516
00:18:52,070 --> 00:18:50,400
and then the particles are going to come

517
00:18:53,990 --> 00:18:52,080
into the thing and we're going to get

518
00:18:56,870 --> 00:18:54,000
signatures of those particles and then

519
00:18:58,230 --> 00:18:56,880
learn about those particles i

520
00:18:59,510 --> 00:18:58,240
one of the things we're studying is dark

521
00:19:01,669 --> 00:18:59,520
matter we're going to try to look at

522
00:19:03,669 --> 00:19:01,679
naturally occurring antimatter but

523
00:19:05,990 --> 00:19:03,679
there's also other particles probably

524
00:19:08,630 --> 00:19:06,000
out there that we don't even know exist

525
00:19:10,710 --> 00:19:08,640
and so that thing i expect the ams to

526
00:19:13,190 --> 00:19:10,720
discover new particles that we didn't

527
00:19:16,310 --> 00:19:13,200
even know existed and possibly will open

528
00:19:18,470 --> 00:19:16,320
doors in in particle physics

529
00:19:19,909 --> 00:19:18,480
give me a sense of the importance of

530
00:19:21,909 --> 00:19:19,919
what it may find i mean they've

531
00:19:23,909 --> 00:19:21,919
described this as looking for data that

532
00:19:25,990 --> 00:19:23,919
can help understand the origins of the

533
00:19:27,350 --> 00:19:26,000
universe which is frankly a pretty big

534
00:19:29,430 --> 00:19:27,360
deal

535
00:19:30,630 --> 00:19:29,440
yes and and you know

536
00:19:33,270 --> 00:19:30,640
as we

537
00:19:35,029 --> 00:19:33,280
press forward in technology we learn new

538
00:19:38,230 --> 00:19:35,039

things that we didn't know

539
00:19:39,430 --> 00:19:38,240
the hubble telescope for example looks

540
00:19:44,470 --> 00:19:39,440
so

541
00:19:46,710 --> 00:19:44,480
that we actually visually can understand

542
00:19:49,350 --> 00:19:46,720
the or some some elements of the origin

543
00:19:51,990 --> 00:19:49,360
of our universe for hubble telescope

544
00:19:54,549 --> 00:19:52,000
this is a particle detector so it's not

545
00:19:57,510 --> 00:19:54,559
on on the visual spectrum but it's

546
00:19:59,350 --> 00:19:57,520
cosmic particles in the other

547
00:20:00,310 --> 00:19:59,360
of different sorts that this thing is

548
00:20:02,789 --> 00:20:00,320
collecting

549
00:20:05,029 --> 00:20:02,799
anti naturally occurring anti-matter

550
00:20:07,350 --> 00:20:05,039
dark matter a very big question out

551
00:20:09,190 --> 00:20:07,360
there trying to understand what this

552
00:20:11,350 --> 00:20:09,200
dark matter is and where it is and

553
00:20:12,549 --> 00:20:11,360
accounting for it and those sorts of

554
00:20:13,830 --> 00:20:12,559
particles

555
00:20:16,310 --> 00:20:13,840
are going to be collected by this

556
00:20:18,230 --> 00:20:16,320
particle detector and then the very

557
00:20:20,149 --> 00:20:18,240
smart people that understand all this

558
00:20:22,549 --> 00:20:20,159
stuff are going to put it all together

559
00:20:24,149 --> 00:20:22,559
and learn new secrets about the origin

560
00:20:24,950 --> 00:20:24,159
of our universe and a lot of other

561
00:20:26,789 --> 00:20:24,960
things

562
00:20:28,630 --> 00:20:26,799
you know whenever there's an experiment

563
00:20:30,470 --> 00:20:28,640

like this that the goal is to for

564
00:20:34,470 --> 00:20:30,480
example

565
00:20:36,310 --> 00:20:34,480
learn about the origin of the universe

566
00:20:37,510 --> 00:20:36,320
what history has told us is when we have

567
00:20:39,909 --> 00:20:37,520
these sorts of experiments and

568
00:20:41,190 --> 00:20:39,919
explorations that we learn

569
00:20:42,149 --> 00:20:41,200
things that we didn't even know were

570
00:20:43,510 --> 00:20:42,159
there

571
00:20:45,270 --> 00:20:43,520
for example the lewis and clark

572
00:20:47,350 --> 00:20:45,280
expedition they went to go find the

573
00:20:48,549 --> 00:20:47,360
northwest passage and yet they didn't

574
00:20:50,630 --> 00:20:48,559
find it

575
00:20:51,510 --> 00:20:50,640
and they were way over budget by the way

576
00:20:53,669 --> 00:20:51,520
but

577
00:20:54,870 --> 00:20:53,679
they were an amazing success because of

578
00:20:55,830 --> 00:20:54,880
all the other things that they found

579
00:20:57,669 --> 00:20:55,840
that they didn't even know were out

580
00:20:59,029 --> 00:20:57,679
there the unknown unknowns

581
00:21:00,710 --> 00:20:59,039
i'm not going to find out any of these

582
00:21:03,110 --> 00:21:00,720
things until you and your crewmates get

583
00:21:04,710 --> 00:21:03,120
it installed tell me how you go about

584
00:21:06,070 --> 00:21:04,720
putting ams

585
00:21:07,510 --> 00:21:06,080
taking it out of the payload bay and

586
00:21:11,110 --> 00:21:07,520
putting it on the truss

587
00:21:12,710 --> 00:21:11,120
well part of the problem of ams and elc

588
00:21:15,190 --> 00:21:12,720

for that matter both of the tasks are

589
00:21:17,110 --> 00:21:15,200
very similar and as i said before

590
00:21:18,710 --> 00:21:17,120
taz and i are going to be working

591
00:21:20,390 --> 00:21:18,720
together

592
00:21:21,669 --> 00:21:20,400
getting it in place and then attaching

593
00:21:25,430 --> 00:21:21,679
it

594
00:21:27,110 --> 00:21:25,440
and a lot of the assembly of the space

595
00:21:29,350 --> 00:21:27,120
station

596
00:21:30,710 --> 00:21:29,360
was using cameras that are on the bottom

597
00:21:31,909 --> 00:21:30,720
portion of the trust so when we get up

598
00:21:33,990 --> 00:21:31,919
to the top of the trust there aren't a

599
00:21:36,230 --> 00:21:34,000
lot of good cameras up there so it's a

600
00:21:38,230 --> 00:21:36,240
little bit challenging trying to get

601
00:21:39,990 --> 00:21:38,240
good visual views of where we're putting

602
00:21:41,909 --> 00:21:40,000
the thing

603
00:21:44,549 --> 00:21:41,919
the shuttle robotic arm is helping us

604
00:21:46,230 --> 00:21:44,559
out it's going to reach out and look at

605
00:21:48,390 --> 00:21:46,240
a certain angle that helps us it's kind

606
00:21:49,830 --> 00:21:48,400
of like a remote camera if you will

607
00:21:51,750 --> 00:21:49,840
that'll be helping us and that'll be a

608
00:21:53,350 --> 00:21:51,760
primary view for us as we attach it onto

609
00:21:55,669 --> 00:21:53,360
the space station we're also going to

610
00:21:58,390 --> 00:21:55,679
move very very slowly

611
00:22:01,270 --> 00:21:58,400
and so once we get it into place there's

612
00:22:03,909 --> 00:22:01,280
three v guides with claws

613
00:22:05,909 --> 00:22:03,919

and actually a big claw that

614
00:22:08,149 --> 00:22:05,919
grabs it in the middle and we'll just

615
00:22:09,990 --> 00:22:08,159
basically stick it in place and then the

616
00:22:13,029 --> 00:22:10,000
claws will close around it and attach it

617
00:22:15,510 --> 00:22:13,039
onto the space station

618
00:22:17,510 --> 00:22:15,520
this mission also has a plan for four

619
00:22:19,590 --> 00:22:17,520
space walks to be conducted by three

620
00:22:20,870 --> 00:22:19,600
different pairs of of your crewmates

621
00:22:23,430 --> 00:22:20,880
going outside

622
00:22:25,990 --> 00:22:23,440
what's your role going to be while your

623
00:22:27,350 --> 00:22:26,000
crewmates are conducting these evas well

624
00:22:29,430 --> 00:22:27,360
i'm going to make sure they're well fed

625
00:22:31,909 --> 00:22:29,440
prior to going out and make sure they're

626
00:22:33,750 --> 00:22:31,919
well fed coming back in i'm just kidding

627
00:22:34,950 --> 00:22:33,760
yeah that but that but that is a very

628
00:22:37,270 --> 00:22:34,960
important part and i didn't really

629
00:22:38,710 --> 00:22:37,280
realize how much how important it was on

630
00:22:41,110 --> 00:22:38,720
the last flight that i went on where we

631
00:22:43,029 --> 00:22:41,120
had five space walks those guys get

632
00:22:44,230 --> 00:22:43,039
really tired and the fourth space walk

633
00:22:45,830 --> 00:22:44,240
the meal is probably going to be the

634
00:22:48,710 --> 00:22:45,840
most important thing on their mind once

635
00:22:51,270 --> 00:22:48,720
they get in they're tired they're hungry

636
00:22:54,789 --> 00:22:51,280
and they're ready to relax but

637
00:22:57,430 --> 00:22:54,799
during the spacewalks eva2 and eva4 i

638
00:22:58,630 --> 00:22:57,440

have a robotic operation

639
00:23:01,430 --> 00:22:58,640
part in that

640
00:23:04,070 --> 00:23:01,440
for eva2 i'll be

641
00:23:06,630 --> 00:23:04,080
holding on to the spdm

642
00:23:07,750 --> 00:23:06,640
and drew is going to lubricate some of

643
00:23:13,510 --> 00:23:07,760
the

644
00:23:15,909 --> 00:23:13,520
pin he's gonna

645
00:23:19,110 --> 00:23:15,919
lubricate some of those snares holding

646
00:23:20,149 --> 00:23:19,120
mr dexter the spdm he's a big object and

647
00:23:22,149 --> 00:23:20,159
so

648
00:23:24,310 --> 00:23:22,159
moving him around as we lubricate him is

649
00:23:25,909 --> 00:23:24,320
going to be an interesting proposition

650
00:23:28,149 --> 00:23:25,919
we're not able to practice that in the

651
00:23:30,310 --> 00:23:28,159
pool uh with one for one geometry

652
00:23:32,310 --> 00:23:30,320
because we can't grab an spdm and move

653
00:23:34,870 --> 00:23:32,320
it around in the pool uh so we use this

654
00:23:37,029 --> 00:23:34,880
little rinky dinky i call it son of spdm

655
00:23:39,270 --> 00:23:37,039
that we use to practice it but we do get

656
00:23:41,750 --> 00:23:39,280
to see the geometry in the virtual

657
00:23:43,750 --> 00:23:41,760
reality labs so we have seen how it's

658
00:23:46,549 --> 00:23:43,760
going to work but it's going to be a

659
00:23:47,590 --> 00:23:46,559
an interesting uh exercise once we get

660
00:23:49,269 --> 00:23:47,600
up there

661
00:23:52,630 --> 00:23:49,279
but i'm sure it'll be fine we've got a

662
00:23:55,029 --> 00:23:52,640
good plan and and and it'll be a success

663
00:23:57,430 --> 00:23:55,039

uh for eva four

664
00:24:00,630 --> 00:23:57,440
uh we're moving the obss

665
00:24:03,269 --> 00:24:00,640
the boom uh and and attaching it on top

666
00:24:05,590 --> 00:24:03,279
of the truss

667
00:24:07,350 --> 00:24:05,600
spanky and taz are the two that are

668
00:24:09,269 --> 00:24:07,360
going to be up there uh accepting the

669
00:24:12,230 --> 00:24:09,279
boom and attaching it and then we're

670
00:24:14,549 --> 00:24:12,240
going to modify the grapple fixture

671
00:24:17,110 --> 00:24:14,559
attached to the boom

672
00:24:19,230 --> 00:24:17,120
i did get to do this particular robotic

673
00:24:21,029 --> 00:24:19,240
operation on my last flight on on

674
00:24:23,269 --> 00:24:21,039
sts-123 so

675
00:24:25,029 --> 00:24:23,279
uh that's all i do i guess when i go up

676
00:24:27,029 --> 00:24:25,039
is attach booms on top of the space

677
00:24:28,310 --> 00:24:27,039
station but we'll be doing it again we

678
00:24:30,070 --> 00:24:28,320
learned from some of the things we did

679
00:24:32,070 --> 00:24:30,080
on the last flight uh

680
00:24:33,350 --> 00:24:32,080
for this uh for this

681
00:24:34,230 --> 00:24:33,360
exercise

682
00:24:38,230 --> 00:24:34,240
and

683
00:24:40,149 --> 00:24:38,240
attach it to the top of the boom top of

684
00:24:43,510 --> 00:24:40,159
the truss and then

685
00:24:45,029 --> 00:24:43,520
i will meet uh taz over toward the more

686
00:24:47,190 --> 00:24:45,039
center section of the of the space

687
00:24:48,549 --> 00:24:47,200
station he'll go get on the robotic arm

688
00:24:50,870 --> 00:24:48,559

and then i'll be moving him around on

689
00:24:53,029 --> 00:24:50,880
the robotic arm doing his work replacing

690
00:24:55,510 --> 00:24:53,039
the grapple fixture

691
00:24:57,430 --> 00:24:55,520
what is different than last time is that

692
00:24:59,830 --> 00:24:57,440
this time the obss is going to stay

693
00:25:02,470 --> 00:24:59,840
behind on the station permanently right

694
00:25:04,549 --> 00:25:02,480
that's absolutely right and

695
00:25:07,269 --> 00:25:04,559
although we're doing the same task the

696
00:25:09,190 --> 00:25:07,279
use of the obss for the subsequent

697
00:25:11,909 --> 00:25:09,200
mission is quite different

698
00:25:13,830 --> 00:25:11,919
we were on sts-123 our job was to get

699
00:25:17,029 --> 00:25:13,840
the boom up there so that the follow-on

700
00:25:17,750 --> 00:25:17,039
mission sts-124 could use it to inspect

701
00:25:19,990 --> 00:25:17,760
their

702
00:25:21,190 --> 00:25:20,000
thermal protection system and the reason

703
00:25:24,230 --> 00:25:21,200
for that was

704
00:25:26,390 --> 00:25:24,240
the japanese lab was too big

705
00:25:27,669 --> 00:25:26,400
to hold the obss in addition so we had

706
00:25:30,470 --> 00:25:27,679
to leave it up there so they could use

707
00:25:32,789 --> 00:25:30,480
it this time we're leaving the obss up

708
00:25:34,710 --> 00:25:32,799
there for future contingencies for the

709
00:25:37,430 --> 00:25:34,720
space station

710
00:25:39,590 --> 00:25:37,440
the and so it has sensors for example

711
00:25:41,350 --> 00:25:39,600
that are used to inspect the thermal

712
00:25:43,510 --> 00:25:41,360
protection system of the shuttle we

713
00:25:46,230 --> 00:25:43,520

don't have to keep those alive but we

714
00:25:48,470 --> 00:25:46,240
what we do want to do is make it useful

715
00:25:50,950 --> 00:25:48,480
so it can be grabbed by the space

716
00:25:52,470 --> 00:25:50,960
shuttle or space station arm to extend

717
00:25:55,350 --> 00:25:52,480
the length of the arm to make repairs

718
00:25:57,990 --> 00:25:55,360
like what happened on sts-120 when they

719
00:25:58,950 --> 00:25:58,000
repaired the solar arrays uh that were

720
00:26:00,310 --> 00:25:58,960
torn

721
00:26:01,909 --> 00:26:00,320
so um

722
00:26:03,750 --> 00:26:01,919
it we're not planning on using that

723
00:26:05,830 --> 00:26:03,760
thing on future iss missions but it's

724
00:26:08,149 --> 00:26:05,840
going to allow us to extend the space

725
00:26:10,470 --> 00:26:08,159
station arm another 50 feet

726
00:26:12,710 --> 00:26:10,480
and otherwise during the spacewalks then

727
00:26:14,950 --> 00:26:12,720
i guess you're involved in in transfers

728
00:26:17,430 --> 00:26:14,960
and and work of that kind oh yeah i'll

729
00:26:19,510 --> 00:26:17,440
be doing a transfer a lot of transfer

730
00:26:20,950 --> 00:26:19,520
during eva one and three i'll also be

731
00:26:22,789 --> 00:26:20,960
taking photos

732
00:26:24,310 --> 00:26:22,799
and uh you know one of the most

733
00:26:26,149 --> 00:26:24,320
important things we do up there is

734
00:26:27,669 --> 00:26:26,159
taking photos and people don't realize

735
00:26:29,909 --> 00:26:27,679
you know you don't have a press crew up

736
00:26:31,669 --> 00:26:29,919
there to take photos for you so they

737
00:26:34,310 --> 00:26:31,679
volunteered to go

738
00:26:35,669 --> 00:26:34,320

and we've got an open seat yeah

739
00:26:38,470 --> 00:26:35,679
so you got to put your name in the hat

740
00:26:39,990 --> 00:26:38,480
for that one but uh we uh we get a lot

741
00:26:43,750 --> 00:26:40,000
of training on on

742
00:26:46,230 --> 00:26:43,760
photo tv in order to get the right shots

743
00:26:47,830 --> 00:26:46,240
in in the right clarity and to tell the

744
00:26:49,750 --> 00:26:47,840
right story to document what we're doing

745
00:26:51,350 --> 00:26:49,760
up there so uh

746
00:26:54,470 --> 00:26:51,360
and i'm probably

747
00:26:56,710 --> 00:26:54,480
on the bottom half of my photo tv class

748
00:26:58,630 --> 00:26:56,720
so i work really hard on getting all

749
00:27:00,549 --> 00:26:58,640
those settings right for the for the

750
00:27:02,710 --> 00:27:00,559
shots and so i'll get to practice that

751
00:27:05,110 --> 00:27:02,720
when i'm on over as well

752
00:27:07,029 --> 00:27:05,120
during the rendezvous and docking on

753
00:27:09,669 --> 00:27:07,039
this mission and then again

754
00:27:11,190 --> 00:27:09,679
after undocking and the fly around your

755
00:27:12,950 --> 00:27:11,200
crew is going to be gathering data for a

756
00:27:16,230 --> 00:27:12,960
development test objective that's known

757
00:27:18,310 --> 00:27:16,240
as storm that stands for sensor test for

758
00:27:19,990 --> 00:27:18,320
orion relative navigation risk

759
00:27:21,750 --> 00:27:20,000
mitigation

760
00:27:24,310 --> 00:27:21,760
this includes something that we've never

761
00:27:27,110 --> 00:27:24,320
seen before a re-rendezvous with the

762
00:27:28,470 --> 00:27:27,120
station after the separation

763
00:27:30,470 --> 00:27:28,480

you're going to be flying tell me what

764
00:27:32,830 --> 00:27:30,480
you guys are going to be doing here

765
00:27:35,830 --> 00:27:32,840
well uh the the

766
00:27:38,149 --> 00:27:35,840
storm test objective there

767
00:27:41,029 --> 00:27:38,159
is to basically um

768
00:27:43,029 --> 00:27:41,039
analyze and evaluate a sensor system

769
00:27:45,669 --> 00:27:43,039
that could be used on a follow-on space

770
00:27:48,389 --> 00:27:45,679
vehicle and so the final mission

771
00:27:50,389 --> 00:27:48,399
of any vehicle aerospace vehicle

772
00:27:53,029 --> 00:27:50,399
typically we'll be testing stuff that

773
00:27:54,950 --> 00:27:53,039
will replace that vehicle airplanes are

774
00:27:57,269 --> 00:27:54,960
the same have the same thing and so we

775
00:28:00,310 --> 00:27:57,279
test future radars on the current

776
00:28:01,909 --> 00:28:00,320
airframes that have all the ability to

777
00:28:03,750 --> 00:28:01,919
all the things around that sensor that

778
00:28:05,990 --> 00:28:03,760
you can analyze it with

779
00:28:08,470 --> 00:28:06,000
so uh we're going to

780
00:28:11,510 --> 00:28:08,480
undock and then instead of departing and

781
00:28:13,750 --> 00:28:11,520
coming back home we're going to go out

782
00:28:16,389 --> 00:28:13,760
several thousand feet and then come back

783
00:28:18,389 --> 00:28:16,399
in and re-rendezvous with a totally

784
00:28:20,870 --> 00:28:18,399
different sensor

785
00:28:23,269 --> 00:28:20,880
um it's a whole

786
00:28:24,950 --> 00:28:23,279
unique array of burns

787
00:28:26,230 --> 00:28:24,960
the trajectory is something very

788
00:28:29,029 --> 00:28:26,240

different than what we've ever flown

789
00:28:30,789 --> 00:28:29,039
before but it's but it's all in the same

790
00:28:32,789 --> 00:28:30,799
sorts of things that we've been doing

791
00:28:34,710 --> 00:28:32,799
with rendezvous just looks different

792
00:28:36,870 --> 00:28:34,720
the pilot traditionally flies the

793
00:28:37,909 --> 00:28:36,880
separation and the fly around are you

794
00:28:38,870 --> 00:28:37,919
still going to be on the stick on the

795
00:28:42,789 --> 00:28:38,880
way back

796
00:28:45,269 --> 00:28:42,799
i'll oh well okay rendezvous we we

797
00:28:47,590 --> 00:28:45,279
typically aren't uh

798
00:28:51,430 --> 00:28:47,600
on the stick till you get very close

799
00:28:54,470 --> 00:28:51,440
uh we do um we do a series of burns but

800
00:28:55,430 --> 00:28:54,480
we're not physically um the commander

801
00:28:57,909 --> 00:28:55,440
for the ron

802
00:29:00,070 --> 00:28:57,919
typical rendezvous isn't making a lot of

803
00:29:03,029 --> 00:29:00,080
inputs until we're within about a mile

804
00:29:04,789 --> 00:29:03,039
and so a lot of this test is going to be

805
00:29:07,110 --> 00:29:04,799
outside of a mile

806
00:29:09,110 --> 00:29:07,120
and actually will only get no closer

807
00:29:10,870 --> 00:29:09,120
than 600 feet but typically when we

808
00:29:12,870 --> 00:29:10,880
practice it we're about you know eight

809
00:29:14,630 --> 00:29:12,880
or nine hundred feet away when we knock

810
00:29:17,029 --> 00:29:14,640
it off and then press on

811
00:29:18,470 --> 00:29:17,039
with our re-entry plans and all those

812
00:29:20,470 --> 00:29:18,480
sorts of things

813
00:29:22,230 --> 00:29:20,480

but uh but i will be flying the fly

814
00:29:24,149 --> 00:29:22,240
around and i'll do the separation burns

815
00:29:26,389 --> 00:29:24,159
like we normally do and then somewhere

816
00:29:28,630 --> 00:29:26,399
in there we'll swap rolls and mark will

817
00:29:30,389 --> 00:29:28,640
be kind of watching out the back and

818
00:29:32,070 --> 00:29:30,399
i'll be up front but

819
00:29:33,830 --> 00:29:32,080
typically the pilot does a lot of those

820
00:29:35,190 --> 00:29:33,840
little burns i won't be at the stick if

821
00:29:36,710 --> 00:29:35,200
you will but i'll be making some of the

822
00:29:39,029 --> 00:29:36,720
burns but we're all working together to

823
00:29:40,950 --> 00:29:39,039
get the job done describe the

824
00:29:42,710 --> 00:29:40,960
different approach that you're going to

825
00:29:44,470 --> 00:29:42,720
make this time what's different about

826
00:29:47,269 --> 00:29:44,480
the way you're going to fly back than

827
00:29:49,110 --> 00:29:47,279
the way we are used to seeing shuttles

828
00:29:51,909 --> 00:29:49,120
approach the space station

829
00:29:54,149 --> 00:29:51,919
that's an interesting question pat

830
00:29:56,630 --> 00:29:54,159
the the trajectory that you we normally

831
00:29:58,950 --> 00:29:56,640
see are a series of loops as we raise

832
00:30:00,630 --> 00:29:58,960
our uh orbit and then we target a

833
00:30:03,269 --> 00:30:00,640
particular point underneath the space

834
00:30:05,590 --> 00:30:03,279
station so we can do our rpm our

835
00:30:07,430 --> 00:30:05,600
rotation pitch maneuver a rendezvous

836
00:30:09,350 --> 00:30:07,440
pitch maneuver that enables the station

837
00:30:11,190 --> 00:30:09,360
to take pictures of our tile

838
00:30:13,669 --> 00:30:11,200

and then we come in and attach from the

839
00:30:15,350 --> 00:30:13,679
front uh this particular trajectory we

840
00:30:16,470 --> 00:30:15,360
just kind of go out in a in a straight

841
00:30:17,990 --> 00:30:16,480
line

842
00:30:19,750 --> 00:30:18,000
we do the burn such that we're really

843
00:30:21,590 --> 00:30:19,760
just describing a straight line away

844
00:30:23,510 --> 00:30:21,600
from the space station and then a

845
00:30:25,269 --> 00:30:23,520
straight line back in

846
00:30:27,669 --> 00:30:25,279
and then just come up like this so there

847
00:30:29,990 --> 00:30:27,679
there's no loops or strange orbital

848
00:30:31,990 --> 00:30:30,000
adjustments or phase adjustments like we

849
00:30:33,269 --> 00:30:32,000
see on a regular rendezvous it's it's

850
00:30:36,710 --> 00:30:33,279
more of a

851
00:30:39,350 --> 00:30:36,720
kind of a linear series of burns that

852
00:30:41,350 --> 00:30:39,360
that bring us out and then back in and

853
00:30:42,950 --> 00:30:41,360
and frankly i thought it was kind of

854
00:30:44,710 --> 00:30:42,960
interesting that we were they're able to

855
00:30:46,230 --> 00:30:44,720
design a trajectory that looked like a

856
00:30:47,669 --> 00:30:46,240
straight line out in space because it's

857
00:30:48,950 --> 00:30:47,679
really hard with orbital mechanics to

858
00:30:51,110 --> 00:30:48,960
get that done so you have to have the

859
00:30:52,710 --> 00:30:51,120
perfect burns to make that happen and i

860
00:30:53,909 --> 00:30:52,720
have to leave that up for the scientists

861
00:30:55,430 --> 00:30:53,919
you have to ask them about how they

862
00:30:57,669 --> 00:30:55,440
managed to do that

863
00:31:00,630 --> 00:30:57,679

as you noted it's it's interesting that

864
00:31:04,070 --> 00:31:00,640
we're testing out uh stuff for new

865
00:31:06,470 --> 00:31:04,080
spacecraft on sts-134 which is the last

866
00:31:07,909 --> 00:31:06,480
scheduled flight of this spacecraft of

867
00:31:10,149 --> 00:31:07,919
endeavour

868
00:31:12,310 --> 00:31:10,159
what are your thoughts about this ship's

869
00:31:14,230 --> 00:31:12,320
place in the history of the shuttle

870
00:31:15,909 --> 00:31:14,240
program and and the shuttle program's

871
00:31:18,549 --> 00:31:15,919
place in the history of human space

872
00:31:20,310 --> 00:31:18,559
flight wow that's a big question let's

873
00:31:21,750 --> 00:31:20,320
start with endeavor endeavor's always

874
00:31:23,430 --> 00:31:21,760
been my favorite vehicle and i guess

875
00:31:26,230 --> 00:31:23,440
because it's the newest

876
00:31:28,789 --> 00:31:26,240
of the vehicles um when i first became

877
00:31:30,389 --> 00:31:28,799
an astronaut a dozen years ago one of my

878
00:31:31,590 --> 00:31:30,399
early jobs was

879
00:31:32,389 --> 00:31:31,600
to help

880
00:31:34,950 --> 00:31:32,399
prepare

881
00:31:37,509 --> 00:31:34,960
uh the vehicle and and the crews for

882
00:31:40,230 --> 00:31:37,519
launch at the cape flipping switches

883
00:31:41,110 --> 00:31:40,240
setting up uh procedures taping things

884
00:31:43,830 --> 00:31:41,120
down

885
00:31:45,830 --> 00:31:43,840
uh and so i became familiar with all of

886
00:31:48,230 --> 00:31:45,840
the different shuttles that we i spent a

887
00:31:50,310 --> 00:31:48,240
lot of time in all of them and endeavour

888
00:31:52,070 --> 00:31:50,320

always looked the cleanest it was the

889
00:31:54,149 --> 00:31:52,080
most pristine and it was my favorite

890
00:31:56,149 --> 00:31:54,159
vehicle from the very start and so of

891
00:31:59,509 --> 00:31:56,159
course my last flight i was on endeavor

892
00:32:01,590 --> 00:31:59,519
it was the 25th flight of endeavour and

893
00:32:03,190 --> 00:32:01,600
and i was just tickled pink to be on

894
00:32:04,310 --> 00:32:03,200
endeavor on my first flight and i

895
00:32:06,149 --> 00:32:04,320
thought that might have been my only

896
00:32:08,230 --> 00:32:06,159
flight and so then i get this this

897
00:32:10,470 --> 00:32:08,240
flight and i'm just amazed that i'm on

898
00:32:12,070 --> 00:32:10,480
endeavor's last flight potentially last

899
00:32:13,110 --> 00:32:12,080
flight uh

900
00:32:16,710 --> 00:32:13,120
but uh

901
00:32:18,149 --> 00:32:16,720
so so yeah i i i love endeavor uh among

902
00:32:19,350 --> 00:32:18,159
the space shuttles i love all the space

903
00:32:21,830 --> 00:32:19,360
shuttles but i'm really happy to be on

904
00:32:26,070 --> 00:32:21,840
endeavors last flight as far as the

905
00:32:27,830 --> 00:32:26,080
space shuttle uh place within the whole

906
00:32:29,110 --> 00:32:27,840
manned space flight

907
00:32:30,549 --> 00:32:29,120
program

908
00:32:32,710 --> 00:32:30,559
you know the shuttle

909
00:32:35,029 --> 00:32:32,720
the shuttle's been around for 30 years

910
00:32:37,750 --> 00:32:35,039
we've done a lot of great work

911
00:32:38,789 --> 00:32:37,760
we've helped assemble the space station

912
00:32:40,870 --> 00:32:38,799
we've

913
00:32:42,389 --> 00:32:40,880

fixed the hubble telescope

914
00:32:44,630 --> 00:32:42,399
launched satellites

915
00:32:46,630 --> 00:32:44,640
a lot of things that other vehicles just

916
00:32:48,630 --> 00:32:46,640
frankly couldn't do

917
00:32:51,350 --> 00:32:48,640
it's our 18-wheeler in the sky you know

918
00:32:53,269 --> 00:32:51,360
we've got that big cargo bay we take all

919
00:32:54,870 --> 00:32:53,279
big stuff up with us and we've got the

920
00:32:57,750 --> 00:32:54,880
cab where all the people

921
00:33:00,470 --> 00:32:57,760
live and and operate the vehicle um it's

922
00:33:01,509 --> 00:33:00,480
it's a one-of-a-kind spacecraft and and

923
00:33:03,830 --> 00:33:01,519
um

924
00:33:06,149 --> 00:33:03,840
it there's not an immediate replacement

925
00:33:07,750 --> 00:33:06,159
for it right now as far as a concept

926
00:33:10,470 --> 00:33:07,760
that will fill

927
00:33:12,470 --> 00:33:10,480
the bill of being a space shuttle

928
00:33:13,350 --> 00:33:12,480
so i think it was an amazing vehicle and

929
00:33:14,470 --> 00:33:13,360
i was

930
00:33:16,310 --> 00:33:14,480
i'm just

931
00:33:18,549 --> 00:33:16,320
thrilled to have been a part of that

932
00:33:20,230 --> 00:33:18,559
whole program i do think it's been

933
00:33:22,070 --> 00:33:20,240
around a while i think there are some

934
00:33:23,350 --> 00:33:22,080
design issues with the space shuttle

935
00:33:25,350 --> 00:33:23,360
system

936
00:33:28,870 --> 00:33:25,360
that have caused us difficulty

937
00:33:29,750 --> 00:33:28,880
and so like any uh aerospace system it's

938
00:33:34,070 --> 00:33:29,760

time

939
00:33:35,350 --> 00:33:34,080
to the next thing and so out with the

940
00:33:36,870 --> 00:33:35,360
old and then with the new so it's

941
00:33:39,269 --> 00:33:36,880
bittersweet the shuttle's done a great

942
00:33:40,389 --> 00:33:39,279
job but i also look forward to whatever

943
00:33:43,430 --> 00:33:40,399
kind of

944
00:33:45,590 --> 00:33:43,440
technology we have to replace it

945
00:33:47,190 --> 00:33:45,600
you're going to be flying this mission

946
00:33:49,830 --> 00:33:47,200
right around

947
00:33:51,750 --> 00:33:49,840
the 50th anniversary of the first human

948
00:33:53,509 --> 00:33:51,760
space flight which is also the 30th

949
00:33:55,269 --> 00:33:53,519
anniversary of the first space shuttle

950
00:33:56,789 --> 00:33:55,279
flight

951
00:33:59,190 --> 00:33:56,799
and the 50th anniversary of the first

952
00:34:00,710 --> 00:33:59,200
american space flight

953
00:34:03,110 --> 00:34:00,720
what are your thoughts about the fact

954
00:34:05,190 --> 00:34:03,120
that you're going to be in space while

955
00:34:07,269 --> 00:34:05,200
we're all thinking about these historic

956
00:34:08,149 --> 00:34:07,279
milestones

957
00:34:09,990 --> 00:34:08,159
well

958
00:34:11,589 --> 00:34:10,000
that doesn't come to my mind as much as

959
00:34:13,829 --> 00:34:11,599
the fact that i

960
00:34:14,790 --> 00:34:13,839
i guess i'm getting pretty old because i

961
00:34:19,510 --> 00:34:14,800
was

962
00:34:21,349 --> 00:34:19,520
those things i do remember watching the

963
00:34:23,589 --> 00:34:21,359

first lunar landing when i was seven

964
00:34:26,470 --> 00:34:23,599
years old so that's what comes to mind

965
00:34:30,069 --> 00:34:26,480
there you know pat i am i think

966
00:34:32,310 --> 00:34:30,079
milestones like 30th year 50th year last

967
00:34:34,710 --> 00:34:32,320
shuttle flight those sorts of things are

968
00:34:37,030 --> 00:34:34,720
wonderful it's it's wonderful to

969
00:34:39,430 --> 00:34:37,040
um consider that i might be a part of a

970
00:34:42,629 --> 00:34:39,440
milestone especially an amazing thing

971
00:34:45,750 --> 00:34:42,639
like man space flight but i think those

972
00:34:47,589 --> 00:34:45,760
milestones are kind of looking back you

973
00:34:50,470 --> 00:34:47,599
know you look back at those and you say

974
00:34:52,790 --> 00:34:50,480
wow that was cool like i look back on

975
00:34:54,869 --> 00:34:52,800
milestones that my kids had like the

976
00:34:56,950 --> 00:34:54,879
last time that they rode their bike with

977
00:34:58,790 --> 00:34:56,960
training wheels for example but that's

978
00:35:01,990 --> 00:34:58,800
not something that you really look

979
00:35:03,670 --> 00:35:02,000
forward to so when i was at the time and

980
00:35:05,910 --> 00:35:03,680
my kid was on his

981
00:35:07,829 --> 00:35:05,920
last training wheel

982
00:35:09,190 --> 00:35:07,839
bike ride it wasn't that big of a deal

983
00:35:12,310 --> 00:35:09,200
that it might be the last time they ride

984
00:35:13,990 --> 00:35:12,320
with training wheels and so i guess with

985
00:35:15,829 --> 00:35:14,000
me you know

986
00:35:18,710 --> 00:35:15,839
all the shuttle flights that we've had

987
00:35:20,630 --> 00:35:18,720
are very important and so being the last

988
00:35:22,390 --> 00:35:20,640

of a shuttle flight or the second last

989
00:35:24,630 --> 00:35:22,400
of a shuttle flight or whatever those

990
00:35:26,790 --> 00:35:24,640
milestones aren't important for a couple

991
00:35:28,069 --> 00:35:26,800
reasons for one because

992
00:35:30,630 --> 00:35:28,079
and i don't mean to be they're not

993
00:35:33,190 --> 00:35:30,640
important but they're not on my radar

994
00:35:37,430 --> 00:35:36,150
the last shuttle flight was sts-132 and

995
00:35:39,670 --> 00:35:37,440
right now

996
00:35:42,069 --> 00:35:39,680
sts-132 is the last flight and we don't

997
00:35:43,910 --> 00:35:42,079
take any flights for granted and uh and

998
00:35:45,589 --> 00:35:43,920
i'm hoping that we'll fly a few more

999
00:35:47,030 --> 00:35:45,599
shuttle flights but

1000
00:35:49,589 --> 00:35:47,040
we don't take this for granted every

1001
00:35:51,990 --> 00:35:49,599
flight is a test flight and um and so

1002
00:35:55,109 --> 00:35:52,000
right now sts-132 is the last flight and

1003
00:35:57,109 --> 00:35:55,119
then 133 you know should they

1004
00:35:59,589 --> 00:35:57,119
launch on schedule they'll be the last

1005
00:36:01,510 --> 00:35:59,599
flight and then we'll be and so you know

1006
00:36:03,510 --> 00:36:01,520
maybe some quirk of fatal allow us to

1007
00:36:05,510 --> 00:36:03,520
have even more shuttle flights

1008
00:36:08,470 --> 00:36:05,520
on the one hand then you're going to be

1009
00:36:10,230 --> 00:36:08,480
in space about 50 years after the first

1010
00:36:11,750 --> 00:36:10,240
human space flight and things have

1011
00:36:13,990 --> 00:36:11,760
changed an awful lot from the days of

1012
00:36:15,910 --> 00:36:14,000
yuri gagarin and alan shepard

1013
00:36:17,829 --> 00:36:15,920

so where do you think we're going to be

1014
00:36:19,750 --> 00:36:17,839
50 years in the future

1015
00:36:22,230 --> 00:36:19,760
wow that's a great question

1016
00:36:24,870 --> 00:36:22,240
you know i think in 50 years

1017
00:36:27,349 --> 00:36:24,880
i would be very surprised that we hadn't

1018
00:36:28,790 --> 00:36:27,359
landed on another planet

1019
00:36:30,310 --> 00:36:28,800
either the moon

1020
00:36:31,190 --> 00:36:30,320
or mars

1021
00:36:33,589 --> 00:36:31,200
or

1022
00:36:35,030 --> 00:36:33,599
heading toward an asteroid i mean i

1023
00:36:36,870 --> 00:36:35,040
think that we're going to land on a

1024
00:36:39,829 --> 00:36:36,880
surface

1025
00:36:42,310 --> 00:36:39,839
i believe that we will have learned as

1026
00:36:44,150 --> 00:36:42,320
we look back a lot of new things that we

1027
00:36:46,230 --> 00:36:44,160
didn't even know existed

1028
00:36:48,230 --> 00:36:46,240
and i think that space flight will be

1029
00:36:50,710 --> 00:36:48,240
more commonplace that's what i believe

1030
00:36:52,950 --> 00:36:50,720
to be true just if you think about the

1031
00:36:54,470 --> 00:36:52,960
airplane airline industry back in the

1032
00:36:56,870 --> 00:36:54,480
30s

1033
00:37:00,790 --> 00:36:56,880
nobody was flying on airplanes and 50

1034
00:37:01,990 --> 00:37:00,800
years later on just a week's salary

1035
00:37:03,030 --> 00:37:02,000
from a very

1036
00:37:05,750 --> 00:37:03,040
basic

1037
00:37:08,230 --> 00:37:05,760
job you can fly from coast to coast and

1038
00:37:10,870 --> 00:37:08,240

so i think that space flight although

1039
00:37:12,310 --> 00:37:10,880
it's hard for us right now

1040
00:37:14,870 --> 00:37:12,320
we'll learn

1041
00:37:16,550 --> 00:37:14,880
new technologies and and new ways to do