



1
00:00:03,669 --> 00:00:02,230
dr tyson this is houston please call the

2
00:00:04,550 --> 00:00:03,679
station for a voice check this is

3
00:00:06,789 --> 00:00:04,560
houston

4
00:00:11,030 --> 00:00:06,799
station this is neil degrasse tyson how

5
00:00:14,230 --> 00:00:12,709
i hear you loud and clear aboard the

6
00:00:16,630 --> 00:00:14,240
international space station it's a

7
00:00:19,189 --> 00:00:16,640
pleasure to speak to you today

8
00:00:20,710 --> 00:00:19,199
it is my pleasure to speak with you

9
00:00:25,750 --> 00:00:20,720
shannon

10
00:00:29,029 --> 00:00:27,429
things are absolutely fantastic up here

11
00:00:30,390 --> 00:00:29,039
in orbit it couldn't be a better place

12
00:00:31,669 --> 00:00:30,400
to be

13
00:00:33,670 --> 00:00:31,679

i was going to say how's the weather

14

00:00:37,110 --> 00:00:33,680

there but of course

15

00:00:39,670 --> 00:00:37,120

above the sky there is no weather

16

00:00:42,549 --> 00:00:39,680

it's not every day one gets to speak to

17

00:00:45,430 --> 00:00:42,559

a an astronaut actively floating in

18

00:00:46,630 --> 00:00:45,440

space i've got a zillion questions that

19

00:00:48,229 --> 00:00:46,640

i'm sure

20

00:00:50,950 --> 00:00:48,239

most of my audience and i even want to

21

00:00:54,549 --> 00:00:50,960

know the answer to so if i go rapid fire

22

00:00:57,750 --> 00:00:56,549

i'm ready fire away

23

00:00:59,910 --> 00:00:57,760

okay

24

00:01:01,830 --> 00:00:59,920

i have to know because when i go on long

25

00:01:03,830 --> 00:01:01,840

car trips i get a little queasy stomach

26

00:01:05,910 --> 00:01:03,840

and i'm pretty sure that weightless is

27

00:01:07,190 --> 00:01:05,920

an extreme version of that and i see

28

00:01:09,429 --> 00:01:07,200

that you've been on at least a half a

29

00:01:11,830 --> 00:01:09,439

dozen seven or eight missions

30

00:01:13,429 --> 00:01:11,840

what do you ever get accustomed to being

31

00:01:14,870 --> 00:01:13,439

weightless or is there a sort of a

32

00:01:18,710 --> 00:01:14,880

queasiness every morning after your

33

00:01:21,990 --> 00:01:20,310

actually this is my first trip into

34

00:01:23,910 --> 00:01:22,000

space and

35

00:01:26,390 --> 00:01:23,920

when you first get into space it feels a

36

00:01:28,950 --> 00:01:26,400

bit odd it is very uh a very unusual

37

00:01:30,550 --> 00:01:28,960

situation to be in but uh depending on

38

00:01:32,390 --> 00:01:30,560

the person your inner air settles down

39

00:01:34,230 --> 00:01:32,400

fairly quickly mine uh settled down

40

00:01:36,870 --> 00:01:34,240

right away and i had very little trouble

41

00:01:38,390 --> 00:01:36,880

adjusting to zero g

42

00:01:40,630 --> 00:01:38,400

so you would have been so you're really

43

00:01:41,910 --> 00:01:40,640

good at amusement parks you're not one

44

00:01:45,670 --> 00:01:41,920

of these people who we have to keep

45

00:01:50,550 --> 00:01:45,680

rushing to the to the bathroom on the

46

00:01:55,109 --> 00:01:51,990

that's true i am a big fan of roller

47

00:01:57,429 --> 00:01:55,119

coaster so i have no problems with those

48

00:01:58,950 --> 00:01:57,439

so i see if i if i have your bio

49

00:02:01,109 --> 00:01:58,960

correctly here you've got

50

00:02:03,030 --> 00:02:01,119

your degree in physics at ba in physics

51

00:02:05,109 --> 00:02:03,040

as am i by the way it's a great

52

00:02:08,550 --> 00:02:05,119

perspective on the world and you went on

53

00:02:09,830 --> 00:02:08,560

for a phd in space physics and is this

54

00:02:12,309 --> 00:02:09,840

the kind of background that every

55

00:02:13,830 --> 00:02:12,319

astronaut requires or or you're a

56

00:02:17,910 --> 00:02:13,840

particular kind of astronaut for this

57

00:02:20,790 --> 00:02:19,510

well we have astronauts from all

58

00:02:22,630 --> 00:02:20,800

different backgrounds some from the

59

00:02:25,510 --> 00:02:22,640

military from some from the civilian

60

00:02:27,430 --> 00:02:25,520

world and in general uh astronauts have

61

00:02:29,990 --> 00:02:27,440

a background in science or engineering

62

00:02:31,910 --> 00:02:30,000

mathematics medical field so

63

00:02:33,430 --> 00:02:31,920

we have lots of different types of

64

00:02:35,110 --> 00:02:33,440
astronauts and

65

00:02:38,150 --> 00:02:35,120
for me personally i'm

66

00:02:38,949 --> 00:02:38,160
obviously a scientist type astronaut

67

00:02:40,790 --> 00:02:38,959
and

68

00:02:43,110 --> 00:02:40,800
what's your relationship to robotics

69

00:02:44,869 --> 00:02:43,120
because clearly robotics is such a

70

00:02:46,869 --> 00:02:44,879
fundamental part of the future of space

71

00:02:51,670 --> 00:02:46,879
exploration so is that part of your

72

00:02:56,630 --> 00:02:54,869
um it is actually um in fact it's part

73

00:02:58,790 --> 00:02:56,640
of my history of working at the johnson

74

00:03:00,949 --> 00:02:58,800
space center we have several robotic

75

00:03:02,869 --> 00:03:00,959
arms up here that we use uh the biggest

76
00:03:04,390 --> 00:03:02,879
of which is the canadian robotic arm and

77
00:03:06,710 --> 00:03:04,400
i have been trained to use that and have

78
00:03:08,550 --> 00:03:06,720
used that while i'm up here the japanese

79
00:03:10,949 --> 00:03:08,560
have a robotic arm and for both of these

80
00:03:12,710 --> 00:03:10,959
we can move payloads equipment and uh

81
00:03:14,470 --> 00:03:12,720
with the canadian arm even move people

82
00:03:16,790 --> 00:03:14,480
around

83
00:03:19,350 --> 00:03:16,800
so you've got

84
00:03:22,710 --> 00:03:19,360
so you have the ideal dream job for a

85
00:03:24,869 --> 00:03:22,720
kid that ever plays video games

86
00:03:27,830 --> 00:03:24,879
you're just controlling things through

87
00:03:30,630 --> 00:03:27,840
through remote control and

88
00:03:34,470 --> 00:03:30,640

uh that sounds like like a kid's kid's

89

00:03:39,110 --> 00:03:36,710

absolutely it was certainly my dream and

90

00:03:40,949 --> 00:03:39,120

it is it is uh i can't even describe how

91

00:03:43,110 --> 00:03:40,959

much fun it is to operate the robotics

92

00:03:45,990 --> 00:03:43,120

and to be up here

93

00:03:48,149 --> 00:03:46,000

and so so you mentioned various robotic

94

00:03:53,350 --> 00:03:48,159

arms does the united states have a

95

00:03:57,429 --> 00:03:55,910

we do not have one of our own all our

96

00:03:59,350 --> 00:03:57,439

arms are have been built by our

97

00:04:01,030 --> 00:03:59,360

international partners

98

00:04:03,990 --> 00:04:01,040

i understand you're speaking to us from

99

00:04:06,229 --> 00:04:04,000

the kibo japanese module up there and

100

00:04:08,869 --> 00:04:06,239

from what i understand the space station

101
00:04:11,990 --> 00:04:08,879
is this amalgam of

102
00:04:13,910 --> 00:04:12,000
national modules where astronauts from

103
00:04:15,990 --> 00:04:13,920
the various participating countries

104
00:04:18,629 --> 00:04:16,000
conduct experiments of interest to their

105
00:04:21,430 --> 00:04:18,639
nation or their scientists and i'm just

106
00:04:23,350 --> 00:04:21,440
curious it in each module do they serve

107
00:04:25,510 --> 00:04:23,360
their sort of local foods so if you

108
00:04:27,030 --> 00:04:25,520
wanted like a russian cuisine one night

109
00:04:29,350 --> 00:04:27,040
you just sort of float over to their

110
00:04:31,590 --> 00:04:29,360
module or you want some sushi you go to

111
00:04:33,189 --> 00:04:31,600
japan how's what's the coordination of

112
00:04:38,070 --> 00:04:33,199
these various modules and how do they

113
00:04:41,590 --> 00:04:39,830

uh well to answer your question on the

114

00:04:43,990 --> 00:04:41,600

food we do have a variety of food up

115

00:04:45,590 --> 00:04:44,000

here from all nationalities so yes i can

116

00:04:47,830 --> 00:04:45,600

have russian food one night and japanese

117

00:04:49,110 --> 00:04:47,840

food the next night and food from europe

118

00:04:50,469 --> 00:04:49,120

the night after that and of course

119

00:04:51,830 --> 00:04:50,479

american food

120

00:04:53,510 --> 00:04:51,840

all the modules all the laboratory

121

00:04:54,870 --> 00:04:53,520

modules work together and we are

122

00:04:58,390 --> 00:04:54,880

scheduled

123

00:05:00,150 --> 00:04:58,400

all of them so i have conducted

124

00:05:01,990 --> 00:05:00,160

experiments for the japanese in the

125

00:05:03,670 --> 00:05:02,000

japanese module for the europeans and

126

00:05:06,230 --> 00:05:03,680

the european module and of course for

127

00:05:08,469 --> 00:05:06,240

the americans in the american module and

128

00:05:09,909 --> 00:05:08,479

the russians are heavily

129

00:05:11,909 --> 00:05:09,919

conducting experiments down in their

130

00:05:13,350 --> 00:05:11,919

module

131

00:05:15,670 --> 00:05:13,360

so you've been you've been to russia

132

00:05:17,670 --> 00:05:15,680

before uh how was how was your russian

133

00:05:20,550 --> 00:05:17,680

right now and i understand that you're

134

00:05:22,629 --> 00:05:20,560

coming back in the in the soyuz capsule

135

00:05:25,110 --> 00:05:22,639

i visited russia some years ago and got

136

00:05:27,430 --> 00:05:25,120

to visited star city and they had a

137

00:05:28,790 --> 00:05:27,440

mock-up of the soyuz i barely fit in it

138

00:05:30,310 --> 00:05:28,800

but i guess you're not in there for very

139

00:05:34,230 --> 00:05:30,320

long you're just coming back to earth's

140

00:05:38,390 --> 00:05:36,230

coming back yeah we're only in there for

141

00:05:40,550 --> 00:05:38,400

a few hours coming up it was about two

142

00:05:42,550 --> 00:05:40,560

days that we were in the soyuz module

143

00:05:45,350 --> 00:05:42,560

i'm actually on the co-pilot on the

144

00:05:47,350 --> 00:05:45,360

soyuz module so my russian is very

145

00:05:49,110 --> 00:05:47,360

technical in nature and it's good enough

146

00:05:51,029 --> 00:05:49,120

to communicate with the control center

147

00:05:52,629 --> 00:05:51,039

and with my russian commander on the

148

00:05:54,230 --> 00:05:52,639

soyuz

149

00:05:55,830 --> 00:05:54,240

so if you see something really cool out

150

00:06:00,469 --> 00:05:55,840

the window you have no russian for that

151

00:06:03,510 --> 00:06:01,830

it would probably pop out in english

152

00:06:06,390 --> 00:06:03,520

first and then i know a few russian

153

00:06:08,870 --> 00:06:06,400

words to say how cool things are but it

154

00:06:11,110 --> 00:06:08,880

would be a short conversation

155

00:06:11,990 --> 00:06:11,120

now i did some back of the envelope math

156

00:06:13,830 --> 00:06:12,000

here

157

00:06:15,670 --> 00:06:13,840

rather simple math i think

158

00:06:17,830 --> 00:06:15,680

you you're going

159

00:06:19,909 --> 00:06:17,840

about 18 000 miles an hour sideways

160

00:06:21,510 --> 00:06:19,919

around the earth taking about an hour

161

00:06:24,950 --> 00:06:21,520

and a half so you should be getting

162

00:06:29,110 --> 00:06:24,960

about 16 sunrises and sunsets a day is

163

00:06:33,270 --> 00:06:31,670

that is absolutely correct

164

00:06:36,870 --> 00:06:33,280

okay so if you get that kind of view of

165

00:06:39,990 --> 00:06:36,880

the earth you get like lead stories on

166

00:06:42,230 --> 00:06:40,000

on volcanoes or hurricanes or oil fires

167

00:06:43,510 --> 00:06:42,240

or things that reveal themselves on

168

00:06:44,950 --> 00:06:43,520

earth's surface

169

00:06:46,710 --> 00:06:44,960

is there anything you can report on in

170

00:06:49,270 --> 00:06:46,720

the last several

171

00:06:53,270 --> 00:06:49,280

days that you've seen or do you look out

172

00:06:57,589 --> 00:06:55,430

i do look out the window a lot whenever

173

00:07:00,070 --> 00:06:57,599

we have a chance to the ground keeps us

174

00:07:01,749 --> 00:07:00,080

pretty busy and and so i don't get to

175

00:07:03,909 --> 00:07:01,759

spend many hours a day looking out the

176
00:07:06,070 --> 00:07:03,919
window one thing about going around the

177
00:07:07,270 --> 00:07:06,080
earth you don't always cover every part

178
00:07:09,510 --> 00:07:07,280
of the earth so when something

179
00:07:11,510 --> 00:07:09,520
interesting is happening say the

180
00:07:13,110 --> 00:07:11,520
volcano that's been erupting in

181
00:07:15,110 --> 00:07:13,120
indonesia

182
00:07:17,110 --> 00:07:15,120
we've actually been traversing that part

183
00:07:19,670 --> 00:07:17,120
of the world during the night time so we

184
00:07:21,430 --> 00:07:19,680
we cannot see it uh easily from space

185
00:07:23,189 --> 00:07:21,440
but we've seen lots of hurricanes from

186
00:07:25,589 --> 00:07:23,199
up here and

187
00:07:28,550 --> 00:07:25,599
the oil slick in the gulf of mexico was

188
00:07:31,830 --> 00:07:28,560

very easy for us to see from up here

189

00:07:34,550 --> 00:07:31,840

so that so that's interesting so your

190

00:07:36,710 --> 00:07:34,560

the the things that you notice it's not

191

00:07:38,870 --> 00:07:36,720

obvious i think to the average person

192

00:07:40,550 --> 00:07:38,880

that that you don't see the entire earth

193

00:07:43,189 --> 00:07:40,560

in every view you're a couple of hundred

194

00:07:45,110 --> 00:07:43,199

miles up so your horizon of view from

195

00:07:48,070 --> 00:07:45,120

one edge to the other it might be a

196

00:07:50,550 --> 00:07:48,080

thousand miles i suppose or less so you

197

00:07:53,749 --> 00:07:50,560

don't have a complete earth-wide view

198

00:07:55,670 --> 00:07:53,759

and and for that reason things could be

199

00:07:57,350 --> 00:07:55,680

happening that would take several orbits

200

00:08:00,869 --> 00:07:57,360

for you to catch up with i guess is that

201
00:08:04,469 --> 00:08:02,869
in a sense that's right we do have the

202
00:08:06,550 --> 00:08:04,479
cupola that's on the station and it

203
00:08:07,990 --> 00:08:06,560
gives us a pretty good 360 view of the

204
00:08:09,589 --> 00:08:08,000
earth so i can see

205
00:08:11,909 --> 00:08:09,599
the earth's horizon

206
00:08:13,670 --> 00:08:11,919
from one end to the other fairly well

207
00:08:15,830 --> 00:08:13,680
but of course you're looking uh at a

208
00:08:17,029 --> 00:08:15,840
long distance at a pretty shallow angle

209
00:08:18,710 --> 00:08:17,039
so you're not going to be able to see

210
00:08:20,869 --> 00:08:18,720
what's happening on the ground pretty

211
00:08:23,350 --> 00:08:20,879
far away so you really need to be going

212
00:08:25,510 --> 00:08:23,360
over something to to get a good view of

213
00:08:26,710 --> 00:08:25,520

what's going on underneath you

214

00:08:28,150 --> 00:08:26,720

see i'm pretty sure i wouldn't make a

215

00:08:29,589 --> 00:08:28,160

good astronaut because i would just you

216

00:08:30,869 --> 00:08:29,599

know park an easy chair up in the

217

00:08:32,630 --> 00:08:30,879

coppola and

218

00:08:34,709 --> 00:08:32,640

i daydream

219

00:08:36,230 --> 00:08:34,719

all day there so but

220

00:08:41,430 --> 00:08:36,240

on that subject what did what are your

221

00:08:47,110 --> 00:08:44,149

well i've done quite a variety of things

222

00:08:49,670 --> 00:08:47,120

a lot of experiments i've i've done and

223

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

and helped the ground do really a lot of

224

00:08:52,630 --> 00:08:51,120

it is setting up the experiment so the

225

00:08:53,990 --> 00:08:52,640

researchers on the ground can run them

226
00:08:55,910 --> 00:08:54,000
remotely

227
00:08:57,269 --> 00:08:55,920
i've been involved as a test subject for

228
00:08:59,190 --> 00:08:57,279
a lot of the medical

229
00:09:00,710 --> 00:08:59,200
experiments that we're doing and of

230
00:09:02,230 --> 00:09:00,720
course as i've mentioned i've done

231
00:09:04,550 --> 00:09:02,240
robotics activities when we had our

232
00:09:06,790 --> 00:09:04,560
spacewalkers outside i was on the inside

233
00:09:09,110 --> 00:09:06,800
helping them with robotics

234
00:09:11,269 --> 00:09:09,120
so what's an example of

235
00:09:12,870 --> 00:09:11,279
the guinea pig type things that you were

236
00:09:14,790 --> 00:09:12,880
subject to

237
00:09:16,870 --> 00:09:14,800
i'm just curious if you're not only

238
00:09:19,430 --> 00:09:16,880

conducting the experiment you're also

239

00:09:21,509 --> 00:09:19,440

the human subjects of

240

00:09:25,190 --> 00:09:21,519

physiology experiments but what might

241

00:09:28,710 --> 00:09:27,269

well some of what we're doing is uh

242

00:09:30,710 --> 00:09:28,720

there's one

243

00:09:32,790 --> 00:09:30,720

interesting study that i think is on

244

00:09:34,470 --> 00:09:32,800

nutrition we've known for a long time

245

00:09:35,430 --> 00:09:34,480

that when astronauts are in space they

246

00:09:37,430 --> 00:09:35,440

lose

247

00:09:39,590 --> 00:09:37,440

muscle mass and bone density and we're

248

00:09:41,509 --> 00:09:39,600

actually looking at how diet can

249

00:09:43,910 --> 00:09:41,519

mitigate some of those effects we're

250

00:09:46,070 --> 00:09:43,920

looking at how the types of protein a

251
00:09:48,310 --> 00:09:46,080
person eats and the amount of potassium

252
00:09:49,990 --> 00:09:48,320
a person eats will actually perhaps

253
00:09:52,550 --> 00:09:50,000
lessen the amount of bone loss they get

254
00:09:53,750 --> 00:09:52,560
so a few times that i've been up here

255
00:09:55,350 --> 00:09:53,760
while i've been up here i've eaten a

256
00:09:56,949 --> 00:09:55,360
special diet and then i have to give

257
00:09:59,350 --> 00:09:56,959
samples blood and urine samples that

258
00:10:01,829 --> 00:09:59,360
will be studied once they return uh to

259
00:10:02,550 --> 00:10:01,839
the earth on the shuttle to see how my

260
00:10:04,790 --> 00:10:02,560
uh

261
00:10:06,310 --> 00:10:04,800
bone loss is progressing

262
00:10:07,590 --> 00:10:06,320
so just like hospitals down here on the

263
00:10:12,389 --> 00:10:07,600

surface they're pulling liquids out of

264

00:10:15,750 --> 00:10:14,230

pretty much pretty much except with the

265

00:10:17,509 --> 00:10:15,760

uh with the blood we have to do it

266

00:10:19,750 --> 00:10:17,519

ourselves

267

00:10:21,509 --> 00:10:19,760

oh wow so that's so so that's part of

268

00:10:23,269 --> 00:10:21,519

what it is to be the right stuff to pull

269

00:10:25,110 --> 00:10:23,279

out your own blood

270

00:10:27,269 --> 00:10:25,120

the last time i gave blood i was very

271

00:10:28,389 --> 00:10:27,279

queasy and lightheaded and so

272

00:10:29,990 --> 00:10:28,399

i guess i would only just be the

273

00:10:34,230 --> 00:10:30,000

adequate stuff

274

00:10:37,509 --> 00:10:35,829

yeah i really felt sorry for the people

275

00:10:39,190 --> 00:10:37,519

that were the guinea pigs when we were

276

00:10:40,710 --> 00:10:39,200

training to learn how to actually take

277

00:10:45,430 --> 00:10:40,720

blood because we had some very brave

278

00:10:49,829 --> 00:10:47,670

so a few more things here the

279

00:10:52,069 --> 00:10:49,839

uh with regard to space food uh what is

280

00:10:54,150 --> 00:10:52,079

your favorite i spent some time uh

281

00:10:57,350 --> 00:10:54,160

filming for nova science now

282

00:10:58,710 --> 00:10:57,360

at the johnson space lab the the food

283

00:11:01,190 --> 00:10:58,720

laboratory there

284

00:11:02,790 --> 00:11:01,200

and i remind people they don't like when

285

00:11:05,990 --> 00:11:02,800

you call it a kitchen it's like a food

286

00:11:07,910 --> 00:11:06,000

lab and i i got to taste like a 20 year

287

00:11:09,030 --> 00:11:07,920

old pork chop and

288

00:11:10,710 --> 00:11:09,040

and

289

00:11:12,870 --> 00:11:10,720

so is there some favorite or least

290

00:11:14,150 --> 00:11:12,880

favorite food that that you can report

291

00:11:19,030 --> 00:11:14,160

on while you're up there for in the

292

00:11:22,230 --> 00:11:20,230

well it's funny you should mention the

293

00:11:23,670 --> 00:11:22,240

pork chop because the pork chops we have

294

00:11:25,430 --> 00:11:23,680

out there hopefully aren't that old and

295

00:11:27,030 --> 00:11:25,440

they're actually pretty tasty so i

296

00:11:28,710 --> 00:11:27,040

always enjoy that

297

00:11:30,389 --> 00:11:28,720

we've got some barbecue beef that tastes

298

00:11:33,269 --> 00:11:30,399

pretty good it tastes like barbecue from

299

00:11:35,030 --> 00:11:33,279

home so that's always a

300

00:11:36,389 --> 00:11:35,040

i always enjoy that when that shows up

301
00:11:38,069 --> 00:11:36,399
in the menu

302
00:11:40,069 --> 00:11:38,079
some of the other things a variety of

303
00:11:41,030 --> 00:11:40,079
vegetables it's pretty standard fare up

304
00:11:42,630 --> 00:11:41,040
here

305
00:11:44,550 --> 00:11:42,640
the biggest difficulty i have with the

306
00:11:47,269 --> 00:11:44,560
food is it's rather monotonous we just

307
00:11:49,030 --> 00:11:47,279
don't have that much variety

308
00:11:51,269 --> 00:11:49,040
and have you been thinking about what it

309
00:11:53,670 --> 00:11:51,279
might be to travel to mars

310
00:11:55,110 --> 00:11:53,680
because you're up there

311
00:11:56,949 --> 00:11:55,120
folks on the space station when they're

312
00:11:59,430 --> 00:11:56,959
up there a long time it's maybe a few

313
00:12:01,910 --> 00:11:59,440

weeks at most a couple of months but of

314

00:12:02,870 --> 00:12:01,920

course mars is a multi-year mission

315

00:12:04,790 --> 00:12:02,880

and

316

00:12:07,430 --> 00:12:04,800

is that something you might volunteer

317

00:12:08,150 --> 00:12:07,440

for if it comes in our in near enough in

318

00:12:11,910 --> 00:12:08,160

your

319

00:12:13,509 --> 00:12:11,920

and if it is is it something that scares

320

00:12:15,269 --> 00:12:13,519

you a little to be away from home that

321

00:12:18,069 --> 00:12:15,279

long or to be away from a home-cooked

322

00:12:19,670 --> 00:12:18,079

meal for that long what's the psychology

323

00:12:23,990 --> 00:12:19,680

of you and your fellow astronauts

324

00:12:27,990 --> 00:12:25,350

you know that's a that's a very good

325

00:12:29,430 --> 00:12:28,000

question um these days when uh people

326

00:12:31,829 --> 00:12:29,440

live on the space station we live for

327

00:12:33,590 --> 00:12:31,839

about six months at a time um so it's

328

00:12:35,110 --> 00:12:33,600

it's a pretty good chunk of the year

329

00:12:36,949 --> 00:12:35,120

that we're away from home and then with

330

00:12:38,389 --> 00:12:36,959

training i was in training for this

331

00:12:40,230 --> 00:12:38,399

mission almost three years actually

332

00:12:42,310 --> 00:12:40,240

three years so i spent a lot of time

333

00:12:44,470 --> 00:12:42,320

from away from home so the the time away

334

00:12:46,069 --> 00:12:44,480

from home it would not be that difficult

335

00:12:47,590 --> 00:12:46,079

per se except that you wouldn't be with

336

00:12:50,389 --> 00:12:47,600

your friends and family for that long so

337

00:12:52,150 --> 00:12:50,399

it is it is a bit difficult um

338

00:12:54,230 --> 00:12:52,160

yeah i would i would certainly consider

339

00:12:56,949 --> 00:12:54,240

a mission to mars if that opportunity

340

00:12:58,949 --> 00:12:56,959

came up it would certainly be quite a

341

00:13:00,790 --> 00:12:58,959

fantastic thing to do

342

00:13:03,590 --> 00:13:00,800

now i notice you're also married to an

343

00:13:04,550 --> 00:13:03,600

astronaut so just send him along too and

344

00:13:08,310 --> 00:13:04,560

then

345

00:13:11,190 --> 00:13:09,750

yeah that would work for me i don't know

346

00:13:13,990 --> 00:13:11,200

if nasa would go for it would you be

347

00:13:19,190 --> 00:13:14,949

that's true because married people

348

00:13:24,150 --> 00:13:21,190

so that we'll have to monitor that one

349

00:13:26,230 --> 00:13:24,160

uh real closely and i want to nip it in

350

00:13:27,509 --> 00:13:26,240

the bud here and now that because i can

351

00:13:30,230 --> 00:13:27,519

tell people but they just simply don't

352

00:13:32,550 --> 00:13:30,240

believe me that right so i need a real

353

00:13:34,790 --> 00:13:32,560

astronaut to say to our listen our star

354

00:13:38,870 --> 00:13:34,800

talk listening audience that there is no

355

00:13:40,870 --> 00:13:38,880

zero g room you walk into in houston

356

00:13:43,110 --> 00:13:40,880

down in houston that in fact you have to

357

00:13:45,509 --> 00:13:43,120

sort of simulate zero g in this huge

358

00:13:47,990 --> 00:13:45,519

swimming pool and you only experience

359

00:13:49,670 --> 00:13:48,000

zero g in these airplanes that that give

360

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

you these parabolic orbits or just in

361

00:13:52,870 --> 00:13:51,680

orbit so i needed you to say that so

362

00:13:56,470 --> 00:13:52,880

please go ahead and do that because no

363

00:13:59,030 --> 00:13:57,670

okay well they ought to believe you

364

00:14:02,230 --> 00:13:59,040

because that's absolutely correct there

365

00:14:04,310 --> 00:14:02,240

is no zero g room and we do simulate uh

366

00:14:05,670 --> 00:14:04,320

working in space in our swimming pool of

367

00:14:07,189 --> 00:14:05,680

course when you're in the swimming pool

368

00:14:08,550 --> 00:14:07,199

you still have a sense of gravity you

369

00:14:09,910 --> 00:14:08,560

still feel up and down and if you're

370

00:14:11,350 --> 00:14:09,920

upside down the blood rushes to your

371

00:14:13,350 --> 00:14:11,360

head so it's not

372

00:14:15,110 --> 00:14:13,360

an exact analogy of being in space and

373

00:14:17,030 --> 00:14:15,120

we do have the zero g plane that does

374

00:14:20,870 --> 00:14:17,040

the parabolas and on your way down you

375

00:14:22,550 --> 00:14:20,880

get about 25 seconds of zero g at a time

376

00:14:24,150 --> 00:14:22,560

so those planes yeah i guess one day

377

00:14:26,150 --> 00:14:24,160

i'll i'll try to do one of those planes

378

00:14:28,710 --> 00:14:26,160

but like i said i get a little queasy

379

00:14:32,470 --> 00:14:28,720

even just in cars so it's not the number

380

00:14:34,470 --> 00:14:32,480

one uh item on my list but so this is

381

00:14:37,430 --> 00:14:34,480

interesting so you train in this huge

382

00:14:43,189 --> 00:14:37,440

swimming pool and how how how accurate

383

00:14:47,269 --> 00:14:45,110

well i have not been uh able to do a

384

00:14:48,949 --> 00:14:47,279

spacewalk myself but from what

385

00:14:50,550 --> 00:14:48,959

the the swimming pool is primarily used

386

00:14:53,590 --> 00:14:50,560

to train the spacewalks and i hear it's

387

00:14:55,269 --> 00:14:53,600

a very accurate uh simulator when folks

388

00:14:56,550 --> 00:14:55,279

go outside to work on the outside of the

389

00:14:58,069 --> 00:14:56,560

station they say

390

00:14:59,670 --> 00:14:58,079

it looks exactly like being in the

391

00:15:02,230 --> 00:14:59,680

swimming pool so i hear it's a very good

392

00:15:03,030 --> 00:15:02,240

simulator to be in

393

00:15:04,550 --> 00:15:03,040

and

394

00:15:06,710 --> 00:15:04,560

tell me something since you have a

395

00:15:08,069 --> 00:15:06,720

background in physics if i were in the

396

00:15:10,389 --> 00:15:08,079

space station

397

00:15:12,470 --> 00:15:10,399

all i'd be doing is sort of inventing

398

00:15:13,990 --> 00:15:12,480

physics experiments that will do

399

00:15:16,629 --> 00:15:14,000

different things in zero g than they

400

00:15:18,949 --> 00:15:16,639

would on earth's surface is there some

401
00:15:22,310 --> 00:15:18,959
bit of physics you can share with us

402
00:15:24,470 --> 00:15:22,320
where in orbit it's just really cool to

403
00:15:25,990 --> 00:15:24,480
do and to watch that no one on earth

404
00:15:28,389 --> 00:15:26,000
would have any sense of because we're

405
00:15:32,310 --> 00:15:28,399
just sort of stuck here in a 1g

406
00:15:36,710 --> 00:15:33,749
oh you know there's so many things you

407
00:15:38,550 --> 00:15:36,720
can do when there's no gravity around

408
00:15:40,150 --> 00:15:38,560
of course a lot of the fun things to do

409
00:15:42,150 --> 00:15:40,160
are things like playing with your food

410
00:15:44,629 --> 00:15:42,160
and making little bubbles and have them

411
00:15:46,389 --> 00:15:44,639
uh go here and there

412
00:15:47,829 --> 00:15:46,399
there's a lot of different things i you

413
00:15:50,629 --> 00:15:47,839

know it's tough to say right off the top

414

00:15:52,949 --> 00:15:50,639

of my head what uh

415

00:15:54,949 --> 00:15:52,959

some of the really cool things to do

416

00:15:56,389 --> 00:15:54,959

other than playing with your food

417

00:15:58,629 --> 00:15:56,399

yeah that's what i that's what i would

418

00:16:00,310 --> 00:15:58,639

do all day i would like flick peas

419

00:16:02,230 --> 00:16:00,320

around and watch them ricochet off the

420

00:16:06,069 --> 00:16:02,240

sides of the

421

00:16:08,389 --> 00:16:06,079

wonder how much food is embedded in the

422

00:16:10,230 --> 00:16:08,399

electronics up there anyway because

423

00:16:13,990 --> 00:16:10,240

the temptation to do that has got to be

424

00:16:17,670 --> 00:16:15,910

it is huge but of course we have to

425

00:16:18,949 --> 00:16:17,680

clean everything up so we have to temper

426

00:16:20,310 --> 00:16:18,959

our excitement

427

00:16:23,509 --> 00:16:20,320

with the realities of keeping the

428

00:16:25,829 --> 00:16:23,519

station clean

429

00:16:28,310 --> 00:16:25,839

there's a lot of talk about whether we

430

00:16:30,389 --> 00:16:28,320

live in a risk-averse time because the

431

00:16:33,030 --> 00:16:30,399

astronauts are sort of the best example

432

00:16:34,790 --> 00:16:33,040

of very visible people unlike mountain

433

00:16:36,389 --> 00:16:34,800

climbers where you don't necessarily

434

00:16:38,389 --> 00:16:36,399

know who they are but they put their

435

00:16:40,870 --> 00:16:38,399

lives at risk astronauts are some of the

436

00:16:44,069 --> 00:16:40,880

most visible people in society yet you

437

00:16:47,590 --> 00:16:44,079

willingly strap yourself into a machine

438

00:16:50,069 --> 00:16:47,600

that launches you 18 000 miles into 80

439

00:16:52,550 --> 00:16:50,079

000 miles an hour into orbit so how do

440

00:16:54,790 --> 00:16:52,560

you do the the cost benefit calculation

441

00:16:56,870 --> 00:16:54,800

in your own head about the risk or are

442

00:16:59,509 --> 00:16:56,880

you just that special subset of human

443

00:17:01,829 --> 00:16:59,519

beings that they see a risk and they say

444

00:17:06,549 --> 00:17:01,839

i'm all for it because i'm ready for the

445

00:17:11,510 --> 00:17:08,789

you know i think it's a

446

00:17:13,829 --> 00:17:11,520

a big combination of different factors

447

00:17:15,270 --> 00:17:13,839

for me i've been fortunate having worked

448

00:17:17,590 --> 00:17:15,280

at the johnson space center my whole

449

00:17:19,029 --> 00:17:17,600

career that i know the engineers who are

450

00:17:20,549 --> 00:17:19,039

building the hardware i know the

451
00:17:22,069 --> 00:17:20,559
managers who are making the decisions

452
00:17:24,069 --> 00:17:22,079
about how safe the hardware is and

453
00:17:25,669 --> 00:17:24,079
whether or not we're ready to fly so i

454
00:17:28,390 --> 00:17:25,679
um having sort of that inside

455
00:17:30,789 --> 00:17:28,400
information there's a lot of comfort in

456
00:17:32,870 --> 00:17:30,799
getting onto a rocket and coming up here

457
00:17:35,190 --> 00:17:32,880
but by the same token just like you say

458
00:17:36,310 --> 00:17:35,200
there is a certain aspect of of me that

459
00:17:38,390 --> 00:17:36,320
says hey this sounds like a great

460
00:17:40,870 --> 00:17:38,400
adventure let's just go do it um and i

461
00:17:43,510 --> 00:17:40,880
think that's um sort of innate in humans

462
00:17:45,350 --> 00:17:43,520
to go explore and go go further and go

463
00:17:47,029 --> 00:17:45,360

learn new things

464

00:17:48,710 --> 00:17:47,039

i surely think it's an aid in the

465

00:17:50,710 --> 00:17:48,720

species but it's certainly not innate in

466

00:17:52,230 --> 00:17:50,720

every member of that species they're

467

00:17:54,310 --> 00:17:52,240

people who would just always take the

468

00:17:56,549 --> 00:17:54,320

safest way around and so we're all

469

00:17:58,310 --> 00:17:56,559

fortunate to be in the company of folks

470

00:18:00,549 --> 00:17:58,320

who see risk as a fundamental part of

471

00:18:01,990 --> 00:18:00,559

what it is to be alive and to

472

00:18:05,990 --> 00:18:02,000

advance

473

00:18:07,750 --> 00:18:06,000

all that the human species is without

474

00:18:10,070 --> 00:18:07,760

folks such as that we i guess we'd all

475

00:18:12,950 --> 00:18:10,080

still be in the cave we're running short

476

00:18:14,950 --> 00:18:12,960

on time and but i will try to end with

477

00:18:16,870 --> 00:18:14,960

some of your thoughts about the future

478

00:18:17,990 --> 00:18:16,880

there's a lot of talk about space

479

00:18:19,110 --> 00:18:18,000

tourism

480

00:18:21,190 --> 00:18:19,120

and you know you look at all the

481

00:18:23,830 --> 00:18:21,200

training that astronauts famously go

482

00:18:25,590 --> 00:18:23,840

through to go into space and then

483

00:18:27,029 --> 00:18:25,600

then at the end of the day someone says

484

00:18:30,230 --> 00:18:27,039

oh i got 20 million dollars i'll just

485

00:18:32,310 --> 00:18:30,240

buy a seed and bypass it all and and

486

00:18:34,789 --> 00:18:32,320

it's what how what's the attitude that

487

00:18:36,630 --> 00:18:34,799

the astronaut corps has to tourism or

488

00:18:41,510 --> 00:18:36,640

what is your general sense of the future

489

00:18:45,029 --> 00:18:42,789

uh well a couple of things i think

490

00:18:47,110 --> 00:18:45,039

tourism is definitely the future of what

491

00:18:49,430 --> 00:18:47,120

will happen in space um and as far as

492

00:18:51,750 --> 00:18:49,440

the tourists who have bought seats they

493

00:18:53,430 --> 00:18:51,760

do get a certain amount of training they

494

00:18:55,110 --> 00:18:53,440

go through about six months of training

495

00:18:56,710 --> 00:18:55,120

in russia before they're allowed to get

496

00:18:58,470 --> 00:18:56,720

on a soyuz rocket so they're just not

497

00:18:59,990 --> 00:18:58,480

walking in up to the counter and

498

00:19:02,549 --> 00:19:00,000

plunking down their money and flying so

499

00:19:04,150 --> 00:19:02,559

they they have to be trained on how to

500

00:19:07,110 --> 00:19:04,160

how to operate in a rocket and how to

501
00:19:08,470 --> 00:19:07,120
operate uh in a space station so i think

502
00:19:10,710 --> 00:19:08,480
one of the biggest hurdles that we're

503
00:19:13,029 --> 00:19:10,720
gonna have to face with space tourism is

504
00:19:14,230 --> 00:19:13,039
they need a destination to go to and so

505
00:19:15,909 --> 00:19:14,240
i really hope that some of these

506
00:19:18,549 --> 00:19:15,919
companies that want to build hotels in

507
00:19:20,470 --> 00:19:18,559
space or other places for people to go i

508
00:19:21,990 --> 00:19:20,480
hope they're successful so we can have a

509
00:19:24,310 --> 00:19:22,000
destination for the tourists and then we

510
00:19:25,830 --> 00:19:24,320
can continue to conduct science on the

511
00:19:27,990 --> 00:19:25,840
on the space station which is a national

512
00:19:29,750 --> 00:19:28,000
laboratory

513
00:19:31,830 --> 00:19:29,760

so that's great because the national

514

00:19:34,390 --> 00:19:31,840

laboratory like the other national labs

515

00:19:37,909 --> 00:19:34,400

across the country like los alamos and

516

00:19:39,750 --> 00:19:37,919

um i i i was around on the nasa advisory

517

00:19:41,430 --> 00:19:39,760

council when we were talking about

518

00:19:43,830 --> 00:19:41,440

possibly converting the space station

519

00:19:46,549 --> 00:19:43,840

into that status so that's that's good

520

00:19:47,590 --> 00:19:46,559

that's good to hear and so so this is

521

00:19:49,990 --> 00:19:47,600

great

522

00:19:52,310 --> 00:19:50,000

thanks for being on star talk radio with

523

00:19:53,750 --> 00:19:52,320

us this has been exciting for us and for

524

00:19:55,669 --> 00:19:53,760

listeners it's not every day we get to

525

00:19:58,390 --> 00:19:55,679

speak to someone on the job who also

526
00:20:02,390 --> 00:19:58,400
happens to be just floating 18 000 miles

527
00:20:04,390 --> 00:20:02,400
an hour sideways around the earth and

528
00:20:06,870 --> 00:20:04,400
good luck on the rest of your mission

529
00:20:08,870 --> 00:20:06,880
and uh maybe we can do this again

530
00:20:10,710 --> 00:20:08,880
sometime on

531
00:20:13,110 --> 00:20:10,720
on the next mission possibly to mars or

532
00:20:17,270 --> 00:20:13,120
whatever is in line for the space

533
00:20:20,870 --> 00:20:18,789
well thank you it's been my pleasure to

534
00:20:23,510 --> 00:20:20,880
be able to speak with you today and sure

535
00:20:25,029 --> 00:20:23,520
any time i'll be happy to to speak with

536
00:20:26,630 --> 00:20:25,039
you and speak with your listeners it's

537
00:20:27,990 --> 00:20:26,640
it's been a thrill

538
00:20:29,190 --> 00:20:28,000

and when and when you come and when you

539

00:20:31,669 --> 00:20:29,200

come back

540

00:20:33,510 --> 00:20:31,679

maybe we can run up to run into you on

541

00:20:35,190 --> 00:20:33,520

on earth's surface just remind me

542

00:20:36,630 --> 00:20:35,200

quickly what's your hometown and your

543

00:20:38,950 --> 00:20:36,640

high school you went to because the

544

00:20:40,789 --> 00:20:38,960

folks at hometown love love astronauts

545

00:20:43,990 --> 00:20:40,799

like the best loved celebrities there

546

00:20:48,230 --> 00:20:45,750

well interestingly enough i'm from

547

00:20:50,070 --> 00:20:48,240

houston texas and i am the first native

548

00:20:51,430 --> 00:20:50,080

houstonian to fly in space

549

00:20:52,710 --> 00:20:51,440

and i went to westbury senior high

550

00:20:54,310 --> 00:20:52,720

school

551
00:20:55,669 --> 00:20:54,320
wow

552
00:20:58,070 --> 00:20:55,679
that well that should be embarrassing

553
00:20:59,510 --> 00:20:58,080
for houston to for

554
00:21:00,830 --> 00:20:59,520
mission control to be there and then

555
00:21:03,110 --> 00:21:00,840
you're the first one

556
00:21:04,470 --> 00:21:03,120
so maybe it'll be the first of many

557
00:21:08,470 --> 00:21:04,480
because it just takes a role model to

558
00:21:12,230 --> 00:21:10,070
i agree i hope so i hope a lot of people

559
00:21:13,909 --> 00:21:12,240
follow in my footsteps and and but let's

560
00:21:15,270 --> 00:21:13,919
be fair it's a lot of people apply for

561
00:21:16,710 --> 00:21:15,280
the job and the

562
00:21:18,390 --> 00:21:16,720
united states is a big country so we've

563
00:21:20,549 --> 00:21:18,400

got a lot of qualified people all all

564

00:21:22,149 --> 00:21:20,559

over the country that apply

565

00:21:24,390 --> 00:21:22,159

all the more that makes you the right

566

00:21:26,310 --> 00:21:24,400

stuff and the rest of us just adequate

567

00:21:28,870 --> 00:21:26,320

stuff

568

00:21:30,870 --> 00:21:28,880

all right we're done so shannon walker

569

00:21:32,870 --> 00:21:30,880

thanks again for being on star talk

570

00:21:35,750 --> 00:21:32,880

enjoy the rest of your mission signing

571

00:21:39,830 --> 00:21:38,149

thank you very much