



1
00:00:07,030 --> 00:00:03,189
station this is houston are you ready

2
00:00:12,390 --> 00:00:10,709
i am ready for the event

3
00:00:14,629 --> 00:00:12,400
google zeitgeist this is mission control

4
00:00:24,470 --> 00:00:14,639
houston please call station for a voice

5
00:00:31,750 --> 00:00:26,070
i

6
00:00:33,750 --> 00:00:31,760
an echo but uh not too bad

7
00:00:35,350 --> 00:00:33,760
well i see you're in the japanese

8
00:00:36,790 --> 00:00:35,360
laboratory with the little airlock

9
00:00:38,389 --> 00:00:36,800
behind you

10
00:00:40,549 --> 00:00:38,399
i actually brought this module up to

11
00:00:41,910 --> 00:00:40,559
space on my third flight and we're gonna

12
00:00:43,910 --> 00:00:41,920
line some folks up here at the

13
00:00:45,350 --> 00:00:43,920

microphones so why don't we start

14

00:00:46,470 --> 00:00:45,360

getting people up because this is an

15

00:00:49,350 --> 00:00:46,480

opportunity

16

00:00:51,670 --> 00:00:49,360

for all of you to ask him some questions

17

00:00:57,029 --> 00:00:51,680

but i'm going to start off and say just

18

00:01:01,430 --> 00:00:59,029

feeling pretty good although uh i just

19

00:01:04,070 --> 00:01:01,440

had an eye exam so my eyes are dilated

20

00:01:05,750 --> 00:01:04,080

but uh i can't see you guys anyway so it

21

00:01:07,190 --> 00:01:05,760

doesn't matter i'm just staring into a

22

00:01:08,469 --> 00:01:07,200

camera but it is kind of bright in here

23

00:01:10,710 --> 00:01:08,479

and that's why i'm

24

00:01:14,070 --> 00:01:10,720

i'm uh squinting but uh we had a busy

25

00:01:15,670 --> 00:01:14,080

day did some medical eye tests and uh

26

00:01:17,350 --> 00:01:15,680

getting ready for a

27

00:01:21,190 --> 00:01:17,360

spacewalk next week so we spent a lot of

28

00:01:24,710 --> 00:01:23,350

and your first question is from

29

00:01:26,310 --> 00:01:24,720

adam getty

30

00:01:28,070 --> 00:01:26,320

to keep your brother honest he made a

31

00:01:30,230 --> 00:01:28,080

promise to you that we'd ask a question

32

00:01:32,149 --> 00:01:30,240

you've probably never been asked

33

00:01:40,630 --> 00:01:32,159

so what's the one question you want to

34

00:01:45,510 --> 00:01:42,789

you know it's interesting i i get a lot

35

00:01:47,830 --> 00:01:45,520

of the same questions uh over and over

36

00:01:50,149 --> 00:01:47,840

so i get pretty good at answering those

37

00:01:53,109 --> 00:01:50,159

and um i had uh

38

00:01:54,630 --> 00:01:53,119

one space reporter a few months ago

39

00:01:55,590 --> 00:01:54,640

actually his name is bill harwood he

40

00:01:58,950 --> 00:01:55,600

asked me

41

00:02:02,630 --> 00:01:58,960

some uh some tough questions about uh

42

00:02:05,590 --> 00:02:02,640

you know space policy and the budget and

43

00:02:07,910 --> 00:02:05,600

funding for commercial crew

44

00:02:09,830 --> 00:02:07,920

and you know i kind of liked answering

45

00:02:11,589 --> 00:02:09,840

those questions i can't think of a

46

00:02:13,750 --> 00:02:11,599

specific one

47

00:02:16,790 --> 00:02:13,760

that i've never been asked but uh you

48

00:02:18,869 --> 00:02:16,800

know getting the uh the non-standard

49

00:02:21,830 --> 00:02:18,879

uh the questions we don't get all the

50

00:02:26,070 --> 00:02:21,840

time are the ones i kind of enjoy asking

51
00:02:30,390 --> 00:02:28,470
so so scott the next uh question is

52
00:02:32,150 --> 00:02:30,400
coming from an army guy

53
00:02:34,229 --> 00:02:32,160
so i'm going to apologize in advance but

54
00:02:36,150 --> 00:02:34,239
this is kit parker

55
00:02:42,390 --> 00:02:36,160
try to use small words so the kelly

56
00:02:47,110 --> 00:02:45,270
so i think i'm like a lot of people when

57
00:02:49,509 --> 00:02:47,120
when we're going to unmanned aerial

58
00:02:51,750 --> 00:02:49,519
vehicles and driverless cars everyone's

59
00:02:53,270 --> 00:02:51,760
wondering why we're still doing manned

60
00:02:55,110 --> 00:02:53,280
space flights

61
00:02:56,309 --> 00:02:55,120
and it i understand that it used to be

62
00:02:59,589 --> 00:02:56,319
that you could either have an unmanned

63
00:03:02,790 --> 00:02:59,599

flight or a manned flight but now with

64

00:03:05,110 --> 00:03:02,800

work that darpa is doing the nih

65

00:03:06,229 --> 00:03:05,120

the defense reduction agency now we have

66

00:03:08,710 --> 00:03:06,239

in between

67

00:03:11,589 --> 00:03:08,720

organs on chips where we can put parts

68

00:03:13,430 --> 00:03:11,599

of humans made from stem cells that can

69

00:03:15,430 --> 00:03:13,440

do various physiological functions we

70

00:03:16,949 --> 00:03:15,440

can take data from them we can make

71

00:03:18,390 --> 00:03:16,959

cellular computers

72

00:03:20,710 --> 00:03:18,400

have you ever thought about or is anyone

73

00:03:22,710 --> 00:03:20,720

discussing the whole idea of exploring

74

00:03:26,550 --> 00:03:22,720

the in between between a manned space

75

00:03:27,910 --> 00:03:26,560

flight and an unmanned space flight

76

00:03:30,470 --> 00:03:27,920

hey scotland

77

00:03:33,030 --> 00:03:30,480

second i think well actually uh

78

00:03:35,190 --> 00:03:33,040

the other day and we talked about this

79

00:03:37,190 --> 00:03:35,200

the other day and what he's referring to

80

00:03:39,509 --> 00:03:37,200

actually is maybe you send parts of

81

00:03:41,509 --> 00:03:39,519

people yeah correct organs on ships

82

00:03:47,350 --> 00:03:41,519

where you have specific parts of a human

83

00:03:51,830 --> 00:03:49,589

you know i i'd never heard that and uh

84

00:03:54,070 --> 00:03:51,840

actually i've never uh thought about

85

00:03:56,630 --> 00:03:54,080

that before it is an interesting uh

86

00:03:58,789 --> 00:03:56,640

interesting idea you know when people

87

00:04:01,270 --> 00:03:58,799

talk about the advantages and

88

00:04:04,309 --> 00:04:01,280

disadvantages of of human space flight

89

00:04:06,149 --> 00:04:04,319

versus uh robotics you know things that

90

00:04:07,509 --> 00:04:06,159

are often brought up and i i would agree

91

00:04:09,910 --> 00:04:07,519

with this and i think the people that do

92

00:04:11,990 --> 00:04:09,920

a lot of the robotics uh

93

00:04:14,789 --> 00:04:12,000

science especially on mars will agree

94

00:04:17,349 --> 00:04:14,799

that uh you know so far humans are able

95

00:04:19,430 --> 00:04:17,359

to do a lot more work than uh than

96

00:04:21,830 --> 00:04:19,440

robots now they of course need a lot

97

00:04:24,070 --> 00:04:21,840

more support and you need to take care

98

00:04:26,070 --> 00:04:24,080

of them a lot better than you do robots

99

00:04:28,469 --> 00:04:26,080

but the uh you know the mars rovers that

100

00:04:30,230 --> 00:04:28,479

have been operating on mars for for well

101
00:04:31,510 --> 00:04:30,240
over a decade now

102
00:04:33,670 --> 00:04:31,520
have done

103
00:04:35,189 --> 00:04:33,680
the amount of science that uh you know a

104
00:04:36,710 --> 00:04:35,199
few astronauts could have done there in

105
00:04:38,950 --> 00:04:36,720
a matter of days

106
00:04:41,189 --> 00:04:38,960
so it's uh

107
00:04:43,430 --> 00:04:41,199
you know there are there are advantages

108
00:04:46,230 --> 00:04:43,440
and uh and disadvantages to human

109
00:04:47,510 --> 00:04:46,240
exploration i think certainly the uh

110
00:04:50,230 --> 00:04:47,520
you know just the

111
00:04:52,150 --> 00:04:50,240
the romantic aspect aspect of it the the

112
00:04:54,710 --> 00:04:52,160
fact that you know people are we are

113
00:04:56,550 --> 00:04:54,720

naturally naturally explorers

114

00:04:58,870 --> 00:04:56,560

i think the uh you know the motivation

115

00:05:01,110 --> 00:04:58,880

that provides for kids and uh you know

116

00:05:03,270 --> 00:05:01,120

their desire to be educated in the

117

00:05:05,670 --> 00:05:03,280

science is also a factor with human

118

00:05:08,150 --> 00:05:05,680

exploration but the question you as ask

119

00:05:12,710 --> 00:05:08,160

is really a uh you know a great one and

120

00:05:16,070 --> 00:05:14,390

so he does with scott the next question

121

00:05:18,870 --> 00:05:16,080

is from alan eustis

122

00:05:21,590 --> 00:05:18,880

and alan's a google executive who jumped

123

00:05:23,909 --> 00:05:21,600

from 135 000 feet

124

00:05:26,070 --> 00:05:23,919

only human i believe to ever survive

125

00:05:28,070 --> 00:05:26,080

being supersonic in a suit

126

00:05:30,790 --> 00:05:28,080

um so alan

127

00:05:32,469 --> 00:05:30,800

go ahead so uh the uh

128

00:05:34,629 --> 00:05:32,479

i know you do a lot of experiments up

129

00:05:36,629 --> 00:05:34,639

there and i was curious about the

130

00:05:39,029 --> 00:05:36,639

experiments that you do do you know what

131

00:05:40,629 --> 00:05:39,039

the science is behind those experiments

132

00:05:42,870 --> 00:05:40,639

and what's an experiment that you did

133

00:05:44,870 --> 00:05:42,880

that surprised you with an outcome in

134

00:05:49,590 --> 00:05:44,880

zero gravity that

135

00:05:53,670 --> 00:05:51,510

well alan first of all i'd like to say

136

00:05:55,830 --> 00:05:53,680

uh you know i was really impressed with

137

00:05:58,390 --> 00:05:55,840

your your feet and i uh

138

00:06:01,110 --> 00:05:58,400

i want to challenge you to someday jump

139

00:06:02,710 --> 00:06:01,120

off the space station and parachute back

140

00:06:05,029 --> 00:06:02,720

to earth that would be really exciting

141

00:06:07,110 --> 00:06:05,039

to see so you can put that on your list

142

00:06:08,309 --> 00:06:07,120

of of things to do

143

00:06:10,629 --> 00:06:08,319

but uh

144

00:06:12,710 --> 00:06:10,639

as far as our um

145

00:06:14,150 --> 00:06:12,720

you know as far as the science we do up

146

00:06:16,790 --> 00:06:14,160

here and uh

147

00:06:20,469 --> 00:06:16,800

and knowing um you know what the science

148

00:06:22,950 --> 00:06:20,479

is and what the the outcomes are

149

00:06:24,629 --> 00:06:22,960

it just depends there's

150

00:06:27,110 --> 00:06:24,639

throughout the course of the year i'm

151

00:06:30,150 --> 00:06:27,120

here there's 400 different

152

00:06:31,909 --> 00:06:30,160

scientific experiments going on

153

00:06:33,749 --> 00:06:31,919

you know some of those go on outside the

154

00:06:35,510 --> 00:06:33,759

space station and are almost completely

155

00:06:36,870 --> 00:06:35,520

transparent to us for instance my

156

00:06:38,790 --> 00:06:36,880

brother brought up the

157

00:06:41,029 --> 00:06:38,800

alpha magnetic spectrometer that's

158

00:06:42,950 --> 00:06:41,039

looking for dark matter and you know

159

00:06:45,189 --> 00:06:42,960

anti-matter and trying to figure out

160

00:06:47,189 --> 00:06:45,199

where you know most of the stuff most of

161

00:06:49,589 --> 00:06:47,199

the mass in the universe is is coming

162

00:06:52,309 --> 00:06:49,599

from and that stuff goes from the you

163

00:06:54,870 --> 00:06:52,319

know the sensor the spectrometer outside

164

00:06:56,950 --> 00:06:54,880

into the computer in here and uh down to

165

00:06:59,350 --> 00:06:56,960

the ground for analysis and we have

166

00:07:01,029 --> 00:06:59,360

almost zero interaction with it although

167

00:07:02,710 --> 00:07:01,039

on a space walk next week we're going to

168

00:07:04,150 --> 00:07:02,720

put some insulating blankets on it

169

00:07:06,710 --> 00:07:04,160

because the cooling system's not

170

00:07:08,469 --> 00:07:06,720

behaving uh properly

171

00:07:09,510 --> 00:07:08,479

uh you know that's one extreme the other

172

00:07:11,830 --> 00:07:09,520

extreme

173

00:07:14,870 --> 00:07:11,840

is uh you know stuff that we are

174

00:07:16,790 --> 00:07:14,880

intimately involved in um you know

175

00:07:18,870 --> 00:07:16,800

which is mostly data collection on

176

00:07:20,790 --> 00:07:18,880

ourselves like these eye exams i was

177

00:07:23,909 --> 00:07:20,800

doing uh this week

178

00:07:26,150 --> 00:07:23,919

um you know as far as how the data uh

179

00:07:27,270 --> 00:07:26,160

looks and you know what we're learning

180

00:07:28,710 --> 00:07:27,280

from that

181

00:07:30,950 --> 00:07:28,720

you know there is there is some

182

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

involvement um you know i get do get

183

00:07:36,230 --> 00:07:33,280

some feedback but a lot of these things

184

00:07:38,629 --> 00:07:36,240

like these scans we do we have a uh

185

00:07:41,110 --> 00:07:38,639

you know this uh laser scanning device

186

00:07:43,029 --> 00:07:41,120

for our eyes a we have a funda scope we

187

00:07:45,270 --> 00:07:43,039

have an ultrasound you know all that

188

00:07:47,749 --> 00:07:45,280

data gets uh sent to the ground and and

189

00:07:50,710 --> 00:07:47,759

uh gets analyzed over time

190

00:07:52,710 --> 00:07:50,720

um but but i do have some understanding

191

00:07:55,909 --> 00:07:52,720

of of what's going on for instance you

192

00:07:58,390 --> 00:07:55,919

know there has been some changes in my

193

00:08:00,230 --> 00:07:58,400

my uh you know my eye structure similar

194

00:08:02,230 --> 00:08:00,240

to what i had last time on my six-month

195

00:08:04,230 --> 00:08:02,240

flight but there are you know things

196

00:08:07,909 --> 00:08:04,240

that have happened with my you know my

197

00:08:09,110 --> 00:08:07,919

op the optic nerve the disc uh

198

00:08:10,790 --> 00:08:09,120

itself

199

00:08:14,869 --> 00:08:10,800

um

200

00:08:17,350 --> 00:08:14,879

and then as far as surprises of uh

201
00:08:19,350 --> 00:08:17,360
things that that we've learned that i

202
00:08:20,869 --> 00:08:19,360
didn't expect

203
00:08:23,350 --> 00:08:20,879
that's a tough question i'll i'll have

204
00:08:28,070 --> 00:08:23,360
to think about that one some more and uh

205
00:08:31,990 --> 00:08:29,430
next question

206
00:08:34,870 --> 00:08:32,000
hi scott josh mcclure air force academy

207
00:08:36,870 --> 00:08:34,880
96 you're fulfilling a dream of mine and

208
00:08:38,469 --> 00:08:36,880
many of my friends

209
00:08:41,350 --> 00:08:38,479
i i'm working for a company called

210
00:08:43,990 --> 00:08:41,360
health anonymous and we've been talking

211
00:08:45,269 --> 00:08:44,000
a lot about health here and especially

212
00:08:47,670 --> 00:08:45,279
public health

213
00:08:49,750 --> 00:08:47,680

you must have some sort of pathology lab

214

00:08:51,509 --> 00:08:49,760

or mass spec analysis or something up

215

00:08:52,790 --> 00:08:51,519

there if you could tell us a little bit

216

00:08:54,630 --> 00:08:52,800

about the

217

00:08:56,790 --> 00:08:54,640

the tests that you do

218

00:08:59,190 --> 00:08:56,800

to monitor your health you must have

219

00:09:01,350 --> 00:08:59,200

some sort of a personal dashboard health

220

00:09:04,150 --> 00:09:01,360

dashboard and that's a dream of ours i

221

00:09:05,670 --> 00:09:04,160

think to get a personal health dashboard

222

00:09:07,590 --> 00:09:05,680

and periodic testing if you could tell

223

00:09:11,670 --> 00:09:07,600

us more about that i think everyone

224

00:09:16,150 --> 00:09:13,509

yeah so we have a lot of

225

00:09:19,030 --> 00:09:16,160

a lot of devices medical devices like i

226
00:09:22,630 --> 00:09:19,040
was saying the ultrasound fundoscope a

227
00:09:24,550 --> 00:09:22,640
laser device for our eyes

228
00:09:27,430 --> 00:09:24,560
we do

229
00:09:29,910 --> 00:09:27,440
data collection for science with those

230
00:09:31,509 --> 00:09:29,920
and then we also do things for our

231
00:09:34,550 --> 00:09:31,519
periodic

232
00:09:37,110 --> 00:09:34,560
health assessments but those are pretty

233
00:09:39,430 --> 00:09:37,120
basic kind of things like uh

234
00:09:41,590 --> 00:09:39,440
you know taking pictures of our ears we

235
00:09:43,190 --> 00:09:41,600
do uh vision tests

236
00:09:45,990 --> 00:09:43,200
um that are

237
00:09:47,829 --> 00:09:46,000
uh pretty you know fairly benign like

238
00:09:49,670 --> 00:09:47,839

you might see in uh you know when you go

239

00:09:51,430 --> 00:09:49,680

into your eye doctor we do tranometry

240

00:09:53,269 --> 00:09:51,440

which measures the pressure

241

00:09:55,430 --> 00:09:53,279

in our eye you know we take our our

242

00:09:58,310 --> 00:09:55,440

blood pressure

243

00:10:00,310 --> 00:09:58,320

we don't do things like labs we don't do

244

00:10:02,949 --> 00:10:00,320

blood work up here although the russians

245

00:10:06,069 --> 00:10:02,959

do have some capability to do some some

246

00:10:08,230 --> 00:10:06,079

rudimentary stuff but uh you know we do

247

00:10:11,190 --> 00:10:08,240

take a lot of our own blood

248

00:10:13,430 --> 00:10:11,200

and uh it we do centrifuge it but it's

249

00:10:15,590 --> 00:10:13,440

uh you know sent down to the ground for

250

00:10:17,750 --> 00:10:15,600

analysis and we do that you know when we

251
00:10:19,190 --> 00:10:17,760
have the opportunity and again that's

252
00:10:22,790 --> 00:10:19,200
mostly for

253
00:10:25,190 --> 00:10:22,800
uh scientific purposes and not um health

254
00:10:26,550 --> 00:10:25,200
monitoring purposes we haven't gotten to

255
00:10:28,870 --> 00:10:26,560
the point where

256
00:10:31,110 --> 00:10:28,880
you know we would have a device like

257
00:10:32,550 --> 00:10:31,120
you're talking about maybe like

258
00:10:34,710 --> 00:10:32,560
you know i understand that you know the

259
00:10:35,509 --> 00:10:34,720
apple watch has some health monitoring

260
00:10:37,750 --> 00:10:35,519
uh

261
00:10:39,670 --> 00:10:37,760
capability

262
00:10:41,910 --> 00:10:39,680
you know we we we haven't quite gotten

263
00:10:45,030 --> 00:10:41,920

there yet we do do uh

264

00:10:47,110 --> 00:10:45,040

uh this uh vo2 max test so you'll have

265

00:10:48,389 --> 00:10:47,120

uh you know electrocardiogram on while

266

00:10:49,350 --> 00:10:48,399

you're doing the

267

00:10:53,750 --> 00:10:49,360

uh

268

00:10:54,710 --> 00:10:53,760

our cardiac health

269

00:10:56,550 --> 00:10:54,720

um

270

00:10:59,350 --> 00:10:56,560

but uh you know kind of like a personal

271

00:11:00,870 --> 00:10:59,360

personal dashboard type thing where

272

00:11:03,990 --> 00:11:00,880

you get a lot of

273

00:11:06,710 --> 00:11:04,000

maybe real time and continuous

274

00:11:09,990 --> 00:11:06,720

monitoring of our health we we don't

275

00:11:12,870 --> 00:11:11,350

i think what happens is they try to get

276

00:11:15,910 --> 00:11:12,880

him in a pretty good spot before he

277

00:11:17,750 --> 00:11:15,920

launches and then he's on his own

278

00:11:19,509 --> 00:11:17,760

so then you know what happens happens in

279

00:11:22,949 --> 00:11:19,519

a year later you're going to come home

280

00:11:25,269 --> 00:11:22,959

something gets really bad kidney stone

281

00:11:28,230 --> 00:11:25,279

have a major issue there's always

282

00:11:30,710 --> 00:11:28,240

the option of leaving next question hey

283

00:11:32,870 --> 00:11:30,720

scott jimmy crawford orbital insight so

284

00:11:35,670 --> 00:11:32,880

we had some really interesting yesterday

285

00:11:37,670 --> 00:11:35,680

about north korea and and presentations

286

00:11:40,389 --> 00:11:37,680

from some folks who had grown up there

287

00:11:42,870 --> 00:11:40,399

and then immigrated to the u.s and told

288

00:11:45,910 --> 00:11:42,880

some amazing stories so i'm really

289

00:11:48,069 --> 00:11:45,920

curious from your very perspective do

290

00:11:50,389 --> 00:11:48,079

you see a difference when you look at

291

00:11:52,870 --> 00:11:50,399

north korea versus south korea or the

292

00:11:54,870 --> 00:11:52,880

other areas in terms of how developed it

293

00:11:56,389 --> 00:11:54,880

appears from you from the space station

294

00:11:58,389 --> 00:11:56,399

do you see the difference in the

295

00:12:00,069 --> 00:11:58,399

nighttime lights that we see in some of

296

00:12:04,069 --> 00:12:00,079

the satellite pictures with your own

297

00:12:06,150 --> 00:12:05,030

it is

298

00:12:07,350 --> 00:12:06,160

shocking

299

00:12:08,150 --> 00:12:07,360

in

300

00:12:10,550 --> 00:12:08,160

you know

301

00:12:12,870 --> 00:12:10,560

the how the situation is so bleak over

302

00:12:14,470 --> 00:12:12,880

there for those people uh you know from

303

00:12:16,069 --> 00:12:14,480

what we can see here especially with

304

00:12:17,430 --> 00:12:16,079

regards to you know their their

305

00:12:21,190 --> 00:12:17,440

electricity

306

00:12:24,069 --> 00:12:21,200

uh pyongyang uh from space looks like a

307

00:12:25,269 --> 00:12:24,079

little smudge of light a speck in the

308

00:12:29,030 --> 00:12:25,279

ocean

309

00:12:30,389 --> 00:12:29,040

of darkness which is north korea and

310

00:12:33,750 --> 00:12:30,399

you see that

311

00:12:35,509 --> 00:12:33,760

compared to seoul which is uh you know

312

00:12:37,269 --> 00:12:35,519

just to the south

313

00:12:44,710 --> 00:12:37,279

and

314

00:12:46,069 --> 00:12:44,720

sad to see

315

00:12:50,310 --> 00:12:46,079

during the daytime when you look at

316

00:12:52,870 --> 00:12:50,320

north korea surprisingly it's very

317

00:12:53,590 --> 00:12:52,880

the air is doesn't look very clean but

318

00:12:58,949 --> 00:12:53,600

it's

319

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

lot of the pollution that just gets

320

00:13:02,949 --> 00:13:00,800

blown over from china

321

00:13:05,750 --> 00:13:02,959

so you know not only do they not have

322

00:13:08,629 --> 00:13:05,760

electricity but they are also uh you

323

00:13:10,710 --> 00:13:08,639

know have you know crappy crappy hair

324

00:13:12,949 --> 00:13:10,720

because of the the pollution that china

325

00:13:15,110 --> 00:13:12,959

generates it's really a you know bad

326

00:13:17,030 --> 00:13:15,120

situation all the way around and uh like

327

00:13:24,230 --> 00:13:17,040

i said very shocking to see with your

328

00:13:27,030 --> 00:13:24,949

hi

329

00:13:28,870 --> 00:13:27,040

my name is nickelodemasi i run a public

330

00:13:30,710 --> 00:13:28,880

company that makes games called glue and

331

00:13:32,310 --> 00:13:30,720

i've got a lighthearted question then a

332

00:13:33,990 --> 00:13:32,320

more serious one for you the

333

00:13:36,470 --> 00:13:34,000

lighthearted question is do any of you

334

00:13:37,829 --> 00:13:36,480

actually kill time by playing games on

335

00:13:39,430 --> 00:13:37,839

the space station

336

00:13:40,790 --> 00:13:39,440

and the more serious one is do you think

337

00:13:43,670 --> 00:13:40,800

a round trip

338

00:13:45,509 --> 00:13:43,680

to mars will lead to any permanent

339

00:13:47,350 --> 00:13:45,519

physical side effects or will it be

340

00:13:53,910 --> 00:13:47,360

something that can be sustainably

341

00:13:57,990 --> 00:13:55,829

so um

342

00:13:59,750 --> 00:13:58,000

none of the crew members up here now

343

00:14:02,949 --> 00:13:59,760

play any kind of games i know we've had

344

00:14:04,949 --> 00:14:02,959

people in the past play electronic chess

345

00:14:07,110 --> 00:14:04,959

with people on the ground we don't have

346

00:14:09,509 --> 00:14:07,120

any uh we we do have the capability you

347

00:14:12,150 --> 00:14:09,519

know with our laptops to have some

348

00:14:13,910 --> 00:14:12,160

some video games we have

349

00:14:16,310 --> 00:14:13,920

you know we have ipads and i'm sure

350

00:14:18,069 --> 00:14:16,320

there's some games on here we actually

351
00:14:19,110 --> 00:14:18,079
use google for

352
00:14:23,590 --> 00:14:19,120
our

353
00:14:25,350 --> 00:14:23,600
and uh

354
00:14:27,670 --> 00:14:25,360
and there are games on there but i

355
00:14:30,230 --> 00:14:27,680
personally don't plan we're really

356
00:14:31,910 --> 00:14:30,240
really busy up here

357
00:14:33,910 --> 00:14:31,920
and there's very

358
00:14:35,110 --> 00:14:33,920
very little spare time in the spare time

359
00:14:37,430 --> 00:14:35,120
i do have i

360
00:14:39,750 --> 00:14:37,440
generally you know look out the window

361
00:14:41,110 --> 00:14:39,760
to take pictures of the earth or

362
00:14:43,110 --> 00:14:41,120
you know watch a

363
00:14:44,550 --> 00:14:43,120

movie or some sports or something or

364

00:14:46,470 --> 00:14:44,560

read and

365

00:14:48,710 --> 00:14:46,480

also we spend a lot of time on email and

366

00:14:51,269 --> 00:14:48,720

on the phone

367

00:14:54,470 --> 00:14:51,279

as far as the round trip to to mars

368

00:14:56,470 --> 00:14:54,480

question and doing it multiple times

369

00:14:58,389 --> 00:14:56,480

you know there are some challenges to

370

00:15:00,949 --> 00:14:58,399

going to mars i think they're not

371

00:15:03,269 --> 00:15:00,959

things we can't overcome but you know

372

00:15:06,550 --> 00:15:03,279

one of the big ones is radiation

373

00:15:08,550 --> 00:15:06,560

and you know on my first flight

374

00:15:10,550 --> 00:15:08,560

which was to the hubble space telescope

375

00:15:12,629 --> 00:15:10,560

which was about twice the altitude we're

376
00:15:14,310 --> 00:15:12,639
at now

377
00:15:15,189 --> 00:15:14,320
in seven days

378
00:15:33,110 --> 00:15:15,199
i

379
00:15:37,110 --> 00:15:33,120
my

380
00:15:39,269 --> 00:15:37,120
lifetime radiation that i'll get

381
00:15:41,910 --> 00:15:39,279
over the course of being in space for

382
00:15:43,910 --> 00:15:41,920
500 days mostly at this altitude

383
00:15:46,710 --> 00:15:43,920
protected by the magnetic field of the

384
00:15:47,829 --> 00:15:46,720
earth and the earth's atmosphere will

385
00:15:51,590 --> 00:15:47,839
give me a

386
00:15:53,910 --> 00:15:51,600
one percent chance of dying of

387
00:15:56,310 --> 00:15:53,920
cancer as a result of that radiation

388
00:15:58,230 --> 00:15:56,320

exposure so someone going to mars is

389

00:15:59,829 --> 00:15:58,240

going to have you know 10

390

00:16:01,990 --> 00:15:59,839

20 chance

391

00:16:04,310 --> 00:16:02,000

and you know to

392

00:16:06,790 --> 00:16:04,320

do multiple trips you would uh you know

393

00:16:09,350 --> 00:16:06,800

without finding a very uh

394

00:16:10,310 --> 00:16:09,360

practical and very uh

395

00:16:12,150 --> 00:16:10,320

um

396

00:16:14,069 --> 00:16:12,160

you know efficient a good way to protect

397

00:16:16,550 --> 00:16:14,079

them from the radiation is gonna have uh

398

00:16:17,910 --> 00:16:16,560

you know there's significant radiation

399

00:16:19,749 --> 00:16:17,920

effects that we're gonna have to deal

400

00:16:22,230 --> 00:16:19,759

with that i think uh

401
00:16:23,749 --> 00:16:22,240
you know is possible but you know

402
00:16:28,150 --> 00:16:23,759
something that needs definitely needs

403
00:16:32,550 --> 00:16:29,590
scott i'm going to jump in here for a

404
00:16:33,509 --> 00:16:32,560
second so as the american who has now

405
00:16:35,910 --> 00:16:33,519
spent

406
00:16:38,710 --> 00:16:35,920
the most time in space

407
00:16:41,030 --> 00:16:38,720
what do you think about the prospect of

408
00:16:42,790 --> 00:16:41,040
somebody not necessarily you

409
00:16:45,910 --> 00:16:42,800
but as an individual

410
00:16:48,069 --> 00:16:45,920
making a one-way trip to mars with the

411
00:16:50,230 --> 00:16:48,079
plan of living in that harsh environment

412
00:16:54,870 --> 00:16:50,240
and never having the opportunity to go

413
00:16:58,629 --> 00:16:56,550

so you know and

414

00:16:59,829 --> 00:16:58,639

you know if i was a little younger um

415

00:17:01,430 --> 00:16:59,839

you know i

416

00:17:03,509 --> 00:17:01,440

and it was

417

00:17:05,350 --> 00:17:03,519

something that would uh

418

00:17:07,029 --> 00:17:05,360

you know worked out for me and you know

419

00:17:08,150 --> 00:17:07,039

eventually someone's going to go to mars

420

00:17:09,990 --> 00:17:08,160

i would

421

00:17:11,829 --> 00:17:10,000

definitely love to

422

00:17:13,510 --> 00:17:11,839

be part of that mission would be a

423

00:17:16,230 --> 00:17:13,520

volunteer would be willing to do it i

424

00:17:18,390 --> 00:17:16,240

would not be willing to go on a

425

00:17:20,870 --> 00:17:18,400

you know a one-way trip

426

00:17:22,949 --> 00:17:20,880

to a uh you know a destination where you

427

00:17:25,750 --> 00:17:22,959

are gonna spend the rest of your life in

428

00:17:27,829 --> 00:17:25,760

a uh you know in a closed environment or

429

00:17:29,270 --> 00:17:27,839

in a uh you know a spacesuit when you go

430

00:17:31,430 --> 00:17:29,280

outside

431

00:17:33,590 --> 00:17:31,440

besides you know having been up here now

432

00:17:35,350 --> 00:17:33,600

for over 200 days

433

00:17:37,190 --> 00:17:35,360

you know besides the personal connection

434

00:17:39,830 --> 00:17:37,200

you miss with people on earth the next

435

00:17:40,870 --> 00:17:39,840

thing i miss is going outside the

436

00:17:43,350 --> 00:17:40,880

freedom

437

00:17:45,350 --> 00:17:43,360

to uh you know walk out my front door

438

00:17:47,430 --> 00:17:45,360

feel the sun on my face

439

00:17:50,789 --> 00:17:47,440

you know the wind at my back

440

00:17:52,870 --> 00:17:50,799

uh you know put my feet in the grass

441

00:17:54,549 --> 00:17:52,880

you know those kind of things

442

00:17:56,549 --> 00:17:54,559

is something that

443

00:17:58,390 --> 00:17:56,559

i definitely would not want to

444

00:18:00,549 --> 00:17:58,400

live the rest of my life with you know i

445

00:18:03,510 --> 00:18:00,559

could without i could do it for maybe a

446

00:18:09,510 --> 00:18:03,520

few years but um you know i would never

447

00:18:14,070 --> 00:18:12,070

uh hi scott my name is louis cole i run

448

00:18:16,390 --> 00:18:14,080

a popular travel adventure daily

449

00:18:18,630 --> 00:18:16,400

vlogging channel on youtube i actually

450

00:18:20,950 --> 00:18:18,640

uh spoke to you well via like a video

451
00:18:22,789 --> 00:18:20,960
message earlier in the year in may nasa

452
00:18:24,230 --> 00:18:22,799
approached a few vloggers

453
00:18:26,470 --> 00:18:24,240
it was hosted on the nasa website i

454
00:18:29,110 --> 00:18:26,480
don't know if you remember but it's uh

455
00:18:32,230 --> 00:18:29,120
it's an honor to actually have a live

456
00:18:35,029 --> 00:18:32,240
uh chat with you now um my question is

457
00:18:37,909 --> 00:18:35,039
um i imagine the thought of returning

458
00:18:40,630 --> 00:18:37,919
when you do back to earth um there's a

459
00:18:41,909 --> 00:18:40,640
lot of positives and is exciting and i'm

460
00:18:44,310 --> 00:18:41,919
sure you're looking forward to it but is

461
00:18:46,950 --> 00:18:44,320
there anything that you fear on uh maybe

462
00:18:48,390 --> 00:18:46,960
psychological or health or

463
00:18:54,310 --> 00:18:48,400

you know is there anything you fear

464

00:18:58,310 --> 00:18:55,990

that's an interesting point you know i

465

00:19:00,470 --> 00:18:58,320

just started thinking about coming back

466

00:19:02,710 --> 00:19:00,480

recently i tried not to you know for a

467

00:19:05,430 --> 00:19:02,720

long time and uh

468

00:19:07,669 --> 00:19:05,440

you know it's you know people uh

469

00:19:09,990 --> 00:19:07,679

that have been in situations uh you know

470

00:19:11,590 --> 00:19:10,000

where they can't go home have given me

471

00:19:13,909 --> 00:19:11,600

the advice that you know you don't want

472

00:19:16,870 --> 00:19:13,919

to count down you want to count up

473

00:19:18,390 --> 00:19:16,880

the number of days but it has entered my

474

00:19:19,990 --> 00:19:18,400

mind and i think

475

00:19:21,510 --> 00:19:20,000

you know i've been here over 200 days

476

00:19:23,510 --> 00:19:21,520

and it seems like i've been here a

477

00:19:25,110 --> 00:19:23,520

really long time it's almost like i feel

478

00:19:26,070 --> 00:19:25,120

like i've forgotten

479

00:19:28,470 --> 00:19:26,080

uh

480

00:19:31,590 --> 00:19:28,480

what it's like to live on earth

481

00:19:33,350 --> 00:19:31,600

and i um you know

482

00:19:35,990 --> 00:19:33,360

i do

483

00:19:38,870 --> 00:19:36,000

feel a little bit apprehension of you

484

00:19:41,669 --> 00:19:38,880

know what it will be like to get

485

00:19:44,390 --> 00:19:41,679

adjusted even though i really look

486

00:19:46,630 --> 00:19:44,400

forward to it and uh but i think there

487

00:19:48,470 --> 00:19:46,640

is some uh there will be an adjustment

488

00:19:51,110 --> 00:19:48,480

period and it does give me a little bit

489

00:19:53,669 --> 00:19:51,120

of an apprehension for what that will be

490

00:19:57,110 --> 00:19:53,679

like the last time i flew a long

491

00:19:59,110 --> 00:19:57,120

duration flight it was 159 days

492

00:20:01,029 --> 00:19:59,120

about six months and it took me about

493

00:20:03,350 --> 00:20:01,039

six months to feel back to normal

494

00:20:05,110 --> 00:20:03,360

getting back into the routine of

495

00:20:07,029 --> 00:20:05,120

of a

496

00:20:08,789 --> 00:20:07,039

you know your daily life where it's kind

497

00:20:10,789 --> 00:20:08,799

of up to you to decide what you're going

498

00:20:12,630 --> 00:20:10,799

to do and we have this we have this

499

00:20:15,270 --> 00:20:12,640

timeline here with a

500

00:20:16,789 --> 00:20:15,280

with a you know line marching across the

501
00:20:19,029 --> 00:20:16,799
screen and it shows us what we're going

502
00:20:21,350 --> 00:20:19,039
to do in like five minute blocks you

503
00:20:23,110 --> 00:20:21,360
know some of the activities are much

504
00:20:24,710 --> 00:20:23,120
longer than that but you know it's

505
00:20:27,270 --> 00:20:24,720
basically telling you what to do all the

506
00:20:28,789 --> 00:20:27,280
time and then you get home and you know

507
00:20:30,710 --> 00:20:28,799
you don't have this i think in a lot of

508
00:20:33,270 --> 00:20:30,720
ways it might be like you know how

509
00:20:35,590 --> 00:20:33,280
someone who's coming out of prison has a

510
00:20:37,110 --> 00:20:35,600
uh you know an adjustment period and in

511
00:20:38,470 --> 00:20:37,120
some ways they're more comfortable in

512
00:20:41,270 --> 00:20:38,480
prison because

513
00:20:43,350 --> 00:20:41,280

they're uh you know their life is so uh

514

00:20:44,950 --> 00:20:43,360

you know regimented and they they've

515

00:20:46,310 --> 00:20:44,960

gotten used to it so

516

00:20:47,350 --> 00:20:46,320

um you know i'm not worried about the

517

00:20:49,590 --> 00:20:47,360

physical

518

00:20:51,110 --> 00:20:49,600

uh part of that but i am starting to

519

00:20:53,669 --> 00:20:51,120

think a little bit about you know

520

00:20:55,029 --> 00:20:53,679

psychologically what it'll be like

521

00:20:56,710 --> 00:20:55,039

leaving

522

00:21:01,029 --> 00:20:56,720

this environment and going back to one

523

00:21:08,470 --> 00:21:03,110

taylor

524

00:21:11,190 --> 00:21:08,480

to ask a little bit about the radiation

525

00:21:13,669 --> 00:21:11,200

environment on the iss i know it's low

526

00:21:16,149 --> 00:21:13,679

earth orbit and you're shielded by the

527

00:21:18,149 --> 00:21:16,159

earth's magnetic field but do you have a

528

00:21:20,230 --> 00:21:18,159

shielded section or semi-shielded

529

00:21:21,270 --> 00:21:20,240

section and what are kind of the dose

530

00:21:23,350 --> 00:21:21,280

production

531

00:21:25,350 --> 00:21:23,360

predictions over your your mission that

532

00:21:27,750 --> 00:21:25,360

was the first question if i can ask the

533

00:21:29,750 --> 00:21:27,760

second one if it would be

534

00:21:32,390 --> 00:21:29,760

what are some of the experiments you're

535

00:21:35,510 --> 00:21:32,400

working on right now as part of the

536

00:21:40,870 --> 00:21:35,520

iss national laboratory system and maybe

537

00:21:45,909 --> 00:21:42,549

yeah so

538

00:21:47,909 --> 00:21:45,919

there are certain areas that

539

00:21:50,470 --> 00:21:47,919

the only areas that are actually you

540

00:21:53,750 --> 00:21:50,480

know were shielded by design

541

00:21:55,750 --> 00:21:53,760

our our crew quarters have some uh

542

00:21:57,029 --> 00:21:55,760

special we call them bricks but they're

543

00:21:59,510 --> 00:21:57,039

radiation

544

00:22:01,510 --> 00:21:59,520

absorbent material in them to give us

545

00:22:02,789 --> 00:22:01,520

more radiation protection while we're

546

00:22:04,789 --> 00:22:02,799

sleeping and

547

00:22:06,950 --> 00:22:04,799

one of the crew quarters that

548

00:22:08,070 --> 00:22:06,960

the russian guys stay in doesn't have

549

00:22:09,750 --> 00:22:08,080

those

550

00:22:11,110 --> 00:22:09,760

so that person actually gets a lot more

551
00:22:13,190 --> 00:22:11,120
radiation than the guy that's just

552
00:22:15,270 --> 00:22:13,200
sleeping across the hall from them

553
00:22:16,789 --> 00:22:15,280
don't ask me why it's like that but it

554
00:22:18,310 --> 00:22:16,799
is

555
00:22:19,750 --> 00:22:18,320
and you can see it in some of their

556
00:22:20,630 --> 00:22:19,760
radiation monitors they have these

557
00:22:22,789 --> 00:22:20,640
certain

558
00:22:25,029 --> 00:22:22,799
monitoring devices that's like a gel and

559
00:22:27,190 --> 00:22:25,039
you could see these specs that are where

560
00:22:29,110 --> 00:22:27,200
this gel got

561
00:22:30,870 --> 00:22:29,120
radiated

562
00:22:33,750 --> 00:22:30,880
and if you're the guy that lives without

563
00:22:35,830 --> 00:22:33,760

them you can see what your gel is

564

00:22:37,830 --> 00:22:35,840

getting along with the gel in the test

565

00:22:38,549 --> 00:22:37,840

tube

566

00:22:42,310 --> 00:22:38,559

so

567

00:22:43,430 --> 00:22:42,320

the the dosage we get um

568

00:22:46,149 --> 00:22:43,440

i'm trying to

569

00:22:48,470 --> 00:22:46,159

recall what the units are

570

00:22:49,350 --> 00:22:48,480

um

571

00:22:50,870 --> 00:22:49,360

i'm

572

00:22:53,110 --> 00:22:50,880

i don't want to be wrong but i was

573

00:22:56,549 --> 00:22:53,120

thinking miller ram perhaps and you can

574

00:22:58,630 --> 00:22:56,559

correct me if i'm if i'm uh kind of

575

00:22:59,750 --> 00:22:58,640

completely out to lunch there

576

00:23:03,029 --> 00:22:59,760

but uh

577

00:23:05,510 --> 00:23:03,039

i think over the course of the six

578

00:23:10,950 --> 00:23:05,520

months i've been here or seven months so

579

00:23:13,029 --> 00:23:10,960

far i've gotten about uh 50 to 60 and

580

00:23:15,990 --> 00:23:13,039

correct me if i'm wrong on the units

581

00:23:28,149 --> 00:23:18,549

no i think it's miller and so yeah

582

00:23:35,190 --> 00:23:31,270

and the second part of your question um

583

00:23:39,750 --> 00:23:37,430

a few months ago seems like you know an

584

00:23:40,950 --> 00:23:39,760

eternity ago we did a lot of experiments

585

00:23:44,149 --> 00:23:40,960

with uh

586

00:23:45,510 --> 00:23:44,159

with some rodents mice and uh some of

587

00:23:49,029 --> 00:23:45,520

those rodents

588

00:23:51,909 --> 00:23:49,039

were national laboratory rodents and uh

589

00:23:54,070 --> 00:23:51,919

you know we used to we dissect dissected

590

00:23:56,549 --> 00:23:54,080

them you euthanized them dissected them

591

00:23:58,630 --> 00:23:56,559

and you know removed their organs

592

00:24:00,549 --> 00:23:58,640

uh some of the stuff uh some of their

593

00:24:02,549 --> 00:24:00,559

bones we x-rayed up here while they were

594

00:24:04,870 --> 00:24:02,559

still alive see what kind of bone loss

595

00:24:06,630 --> 00:24:04,880

they were experiencing and then you know

596

00:24:09,029 --> 00:24:06,640

we're sending um

597

00:24:10,870 --> 00:24:09,039

you know samples back to the back to

598

00:24:13,350 --> 00:24:10,880

earth you know some of those are for a

599

00:24:15,590 --> 00:24:13,360

biotech company some of the research the

600

00:24:18,470 --> 00:24:15,600

national laboratory research was and

601
00:24:20,390 --> 00:24:18,480
some of its nasa research more uh you

602
00:24:22,789 --> 00:24:20,400
know dedicated to understanding you know

603
00:24:25,750 --> 00:24:22,799
what happens to us in this environment

604
00:24:28,230 --> 00:24:25,760
for ex exploration purposes versus the

605
00:24:30,310 --> 00:24:28,240
national lab that's more about improving

606
00:24:34,470 --> 00:24:30,320
you know health on earth and and for the

607
00:24:41,269 --> 00:24:35,750
meredith

608
00:24:44,470 --> 00:24:41,279
i've always wanted to go to space and i

609
00:24:47,190 --> 00:24:44,480
will hopefully before i die

610
00:24:49,190 --> 00:24:47,200
so uh mike i also have two questions

611
00:24:50,950 --> 00:24:49,200
really quickly um do you think that

612
00:24:53,029 --> 00:24:50,960
prolonged periods of time in zero

613
00:24:54,870 --> 00:24:53,039

gravity um you know many years is

614

00:24:57,110 --> 00:24:54,880

something that humans could get used to

615

00:24:58,710 --> 00:24:57,120

or do you think that if we actually end

616

00:25:00,390 --> 00:24:58,720

up living in

617

00:25:02,870 --> 00:25:00,400

actual outer space

618

00:25:05,430 --> 00:25:02,880

uh we'll need to simulate gravity by

619

00:25:07,669 --> 00:25:05,440

spinning the spacecraft and and why

620

00:25:09,190 --> 00:25:07,679

don't you guys spin this the spacecraft

621

00:25:10,710 --> 00:25:09,200

at all you know just to give you guys a

622

00:25:13,029 --> 00:25:10,720

break every now and then and then my

623

00:25:14,789 --> 00:25:13,039

second question is um

624

00:25:17,269 --> 00:25:14,799

how has being

625

00:25:18,950 --> 00:25:17,279

sorry um

626
00:25:19,990 --> 00:25:18,960
not that kind of spinning you know what

627
00:25:21,350 --> 00:25:20,000
i mean

628
00:25:22,950 --> 00:25:21,360
um

629
00:25:24,950 --> 00:25:22,960
how is being in space for such a long

630
00:25:29,269 --> 00:25:24,960
period of time change your perspective

631
00:25:34,390 --> 00:25:31,909
yeah so that's a few questions and if i

632
00:25:35,510 --> 00:25:34,400
if i don't hit them all just ask me

633
00:25:36,710 --> 00:25:35,520
again but

634
00:25:38,549 --> 00:25:36,720
um

635
00:25:40,230 --> 00:25:38,559
you know we've talked about that it

636
00:25:43,269 --> 00:25:40,240
would be more

637
00:25:44,470 --> 00:25:43,279
convenient and more efficient to have

638
00:25:46,549 --> 00:25:44,480

gravity

639

00:25:47,830 --> 00:25:46,559

up here um

640

00:25:49,590 --> 00:25:47,840

you know

641

00:25:51,590 --> 00:25:49,600

so many things that you do become so

642

00:25:54,149 --> 00:25:51,600

much more complicated because you can't

643

00:25:56,310 --> 00:25:54,159

put anything down you got a velcro stuff

644

00:25:58,149 --> 00:25:56,320

to the wall you lose things you know

645

00:25:59,669 --> 00:25:58,159

things float away from you although you

646

00:26:00,630 --> 00:25:59,679

get better at it

647

00:26:03,110 --> 00:26:00,640

um

648

00:26:03,990 --> 00:26:03,120

you know it's it's uh you know something

649

00:26:06,630 --> 00:26:04,000

that

650

00:26:09,029 --> 00:26:06,640

you just have to learn to manage

651
00:26:10,390 --> 00:26:09,039
and you know a little bit of gravity not

652
00:26:13,750 --> 00:26:10,400
earth's gravity but a little bit of

653
00:26:16,070 --> 00:26:13,760
gravity you know keeping stuff um

654
00:26:19,110 --> 00:26:16,080
where it needs to be would go a long way

655
00:26:21,830 --> 00:26:19,120
you know the systems could be designed

656
00:26:24,710 --> 00:26:21,840
more easily perhaps with

657
00:26:26,950 --> 00:26:24,720
with some gravity why don't we do that

658
00:26:29,110 --> 00:26:26,960
up here i think it's just the you know

659
00:26:31,350 --> 00:26:29,120
the engineering complexity of it and the

660
00:26:34,149 --> 00:26:31,360
fact that

661
00:26:36,310 --> 00:26:34,159
just making things more convenient for

662
00:26:38,710 --> 00:26:36,320
a space station like this is probably

663
00:26:41,110 --> 00:26:38,720

not a good reason with regards to maybe

664

00:26:43,269 --> 00:26:41,120

the cost that it would uh

665

00:26:45,909 --> 00:26:43,279

take to do that which i'm not

666

00:26:48,230 --> 00:26:45,919

sure what that is

667

00:26:50,950 --> 00:26:48,240

as far as us physically

668

00:26:52,870 --> 00:26:50,960

you do get used to living up here and

669

00:26:55,029 --> 00:26:52,880

you know sometimes i think i feel

670

00:26:57,750 --> 00:26:55,039

completely normal but then the next day

671

00:27:00,470 --> 00:26:57,760

i think you know i don't you know i

672

00:27:03,269 --> 00:27:00,480

still feel some uh stuffiness and

673

00:27:05,029 --> 00:27:03,279

swelling in my head at times your

674

00:27:07,269 --> 00:27:05,039

digestive system

675

00:27:09,350 --> 00:27:07,279

you know some days it feels okay and

676
00:27:12,149 --> 00:27:09,360
other days not you know gravity is very

677
00:27:15,510 --> 00:27:12,159
important for how it not only

678
00:27:18,070 --> 00:27:15,520
you know allows us to to keep things

679
00:27:21,269 --> 00:27:18,080
where where they need to stay but also

680
00:27:22,149 --> 00:27:21,279
push things where they don't need to be

681
00:27:23,029 --> 00:27:22,159
so

682
00:27:24,230 --> 00:27:23,039
um

683
00:27:25,830 --> 00:27:24,240
and

684
00:27:27,590 --> 00:27:25,840
could you live like that for a long

685
00:27:30,470 --> 00:27:27,600
period of time yes would you like to

686
00:27:32,789 --> 00:27:30,480
live like that for a long period of time

687
00:27:34,470 --> 00:27:32,799
um like years

688
00:27:35,990 --> 00:27:34,480

you know maybe not it's probably

689

00:27:46,950 --> 00:27:36,000

somewhat

690

00:27:52,149 --> 00:27:49,830

uh why is it so complex to uh to spin

691

00:27:53,350 --> 00:27:52,159

the capsule in space because you know

692

00:27:54,950 --> 00:27:53,360

my understanding is that you know if

693

00:27:56,470 --> 00:27:54,960

there's no friction in space and if you

694

00:27:59,190 --> 00:27:56,480

just kind of give it that initial push

695

00:28:01,269 --> 00:27:59,200

it'll just keep spinning

696

00:28:03,110 --> 00:28:01,279

right

697

00:28:04,789 --> 00:28:03,120

well it would yeah that's true but it

698

00:28:07,110 --> 00:28:04,799

would definitely it would definitely

699

00:28:08,549 --> 00:28:07,120

affect the uh you know the usable volume

700

00:28:10,630 --> 00:28:08,559

of the spacecraft i think you'd need a

701
00:28:13,029 --> 00:28:10,640
really big moment arm or you're going to

702
00:28:15,669 --> 00:28:13,039
have a pretty big gravity gradient like

703
00:28:18,310 --> 00:28:15,679
if i you know if i spin my body i might

704
00:28:20,230 --> 00:28:18,320
have you know a lot more gravity at my

705
00:28:22,149 --> 00:28:20,240
head than i will right right in the

706
00:28:24,710 --> 00:28:22,159
middle so

707
00:28:27,669 --> 00:28:24,720
i think for that to be

708
00:28:30,950 --> 00:28:27,679
to be a usable uh

709
00:28:34,149 --> 00:28:30,960
solution it would take a very large uh

710
00:28:36,710 --> 00:28:34,159
spacecraft to then you know have that

711
00:28:38,149 --> 00:28:36,720
usable volume um

712
00:28:40,630 --> 00:28:38,159
but you know this is just me thinking

713
00:28:42,230 --> 00:28:40,640

off the top of my head to answer your

714

00:28:43,590 --> 00:28:42,240

question maybe

715

00:28:46,149 --> 00:28:43,600

you know maybe my answer is wrong and

716

00:28:48,470 --> 00:28:46,159

maybe you could spin this space station

717

00:28:49,830 --> 00:28:48,480

and uh you know at this end let's say

718

00:28:51,990 --> 00:28:49,840

you know this would this is the

719

00:28:52,710 --> 00:28:52,000

longitudinal axis of the space station

720

00:28:54,789 --> 00:28:52,720

so

721

00:28:56,789 --> 00:28:54,799

you know about uh

722

00:28:59,909 --> 00:28:56,799

you know 100 uh

723

00:29:01,830 --> 00:28:59,919

probably about 150 feet down this

724

00:29:03,909 --> 00:29:01,840

in this direction is the russian segment

725

00:29:05,909 --> 00:29:03,919

so if we spun it around the space

726

00:29:07,830 --> 00:29:05,919

station around the center of gravity i

727

00:29:09,669 --> 00:29:07,840

could you know be walking

728

00:29:12,070 --> 00:29:09,679

you know on this wall with a little bit

729

00:29:13,750 --> 00:29:12,080

of gravity but uh you know halfway

730

00:29:16,710 --> 00:29:13,760

towards the russian segment we'd be

731

00:29:19,110 --> 00:29:16,720

completely floating

732

00:29:21,350 --> 00:29:19,120

maybe that's a practical

733

00:29:22,950 --> 00:29:21,360

thing to do it's uh

734

00:29:25,590 --> 00:29:22,960

i think something that

735

00:29:27,430 --> 00:29:25,600

nasa hasn't really

736

00:29:30,470 --> 00:29:27,440

considered because

737

00:29:32,549 --> 00:29:30,480

it hasn't hasn't been required for us to

738

00:29:34,310 --> 00:29:32,559

do our mission

739

00:29:36,230 --> 00:29:34,320

but it's you know it's definitely a good

740

00:29:37,590 --> 00:29:36,240

good idea and

741

00:29:39,990 --> 00:29:37,600

you know i think if people lived in

742

00:29:42,310 --> 00:29:40,000

space for a really long period of time

743

00:29:44,549 --> 00:29:42,320

it's uh definitely is something that

744

00:29:46,230 --> 00:29:44,559

would be more than just a nice to have i

745

00:29:48,149 --> 00:29:46,240

think it'd be almost be you know a

746

00:29:51,430 --> 00:29:48,159

requirement if you were gonna

747

00:29:53,990 --> 00:29:51,440

you know go on a a mission for you know

748

00:29:56,789 --> 00:29:54,000

a number of years or you know live in

749

00:29:58,070 --> 00:29:56,799

space permanently

750

00:30:00,310 --> 00:29:58,080

hey scott we're going to lose you in

751

00:30:02,630 --> 00:30:00,320

about 10 seconds i want to thank you for

752

00:30:12,870 --> 00:30:02,640

your time i know you got a lot to do but

753

00:30:15,669 --> 00:30:14,870

well it's my pleasure and uh hope you

754

00:30:17,269 --> 00:30:15,679

guys

755

00:30:18,710 --> 00:30:17,279

everyone continues to enjoy the

756

00:30:19,909 --> 00:30:18,720

conference there

757

00:30:22,710 --> 00:30:19,919

thanks for joining me on the space