



1
00:00:14,470 --> 00:00:12,549
hi and welcome to what's new in

2
00:00:15,669 --> 00:00:14,480
aerospace i'm marty kelsey i host a show

3
00:00:17,830 --> 00:00:15,679
here at the national air and space

4
00:00:19,990 --> 00:00:17,840
museum called stem 30 for middle school

5
00:00:22,310 --> 00:00:20,000
science students and i cannot tell you

6
00:00:24,390 --> 00:00:22,320
guys how excited i am to introduce our

7
00:00:27,109 --> 00:00:24,400
guests today they were crewmates on

8
00:00:29,429 --> 00:00:27,119
expedition 42 and 43. today we have

9
00:00:31,669 --> 00:00:29,439
samantha christopher reddy who spent 200

10
00:00:34,389 --> 00:00:31,679
days in space becoming the longest

11
00:00:36,150 --> 00:00:34,399
single space flight by a female correct

12
00:00:38,069 --> 00:00:36,160
and we have terry verts who is the pilot

13
00:00:40,229 --> 00:00:38,079

of sts-130 and the commander of

14

00:00:41,510 --> 00:00:40,239

expedition 43 on the international space

15

00:00:47,670 --> 00:00:41,520

station let's give them a round of

16

00:00:52,709 --> 00:00:50,229

so i want to start off with one of the

17

00:00:54,470 --> 00:00:52,719

big important questions and that is

18

00:00:56,950 --> 00:00:54,480

samantha how is the espresso on the

19

00:00:59,430 --> 00:00:56,960

international space station

20

00:01:00,950 --> 00:00:59,440

it wasn't bad it wasn't bad at all um it

21

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

was a great improvement over the instant

22

00:01:06,149 --> 00:01:02,640

coffee i had been drinking for for

23

00:01:08,390 --> 00:01:06,159

almost six months um and and it was a

24

00:01:10,149 --> 00:01:08,400

delivery from home so it was uh

25

00:01:11,590 --> 00:01:10,159

very nice and very appreciated i do have

26

00:01:14,390 --> 00:01:11,600

to say that terry was with me as well

27

00:01:18,310 --> 00:01:16,550

one and terry you spent 212 days in

28

00:01:21,510 --> 00:01:18,320

space with the shuttle and the station

29

00:01:23,590 --> 00:01:21,520

correct um now you're a big baseball fan

30

00:01:25,270 --> 00:01:23,600

and i loved the pictures you put on

31

00:01:26,630 --> 00:01:25,280

twitter of all the stadiums on opening

32

00:01:28,230 --> 00:01:26,640

day were you able to catch any of the

33

00:01:30,069 --> 00:01:28,240

games while you're in space

34

00:01:31,830 --> 00:01:30,079

we did uh that was actually a lot of fun

35

00:01:33,030 --> 00:01:31,840

to try and get all the baseball stadiums

36

00:01:34,710 --> 00:01:33,040

throughout the country

37

00:01:35,749 --> 00:01:34,720

the ones on the coast were easy to find

38

00:01:37,429 --> 00:01:35,759

but the ones in the middle of the

39

00:01:39,270 --> 00:01:37,439

country were a little bit tougher

40

00:01:41,030 --> 00:01:39,280

they don't stand out quite as well

41

00:01:42,310 --> 00:01:41,040

but the ground was able to link up

42

00:01:43,670 --> 00:01:42,320

spring training games and once the

43

00:01:45,910 --> 00:01:43,680

season started baseball games and that

44

00:01:47,270 --> 00:01:45,920

was fun to stay connected with earth and

45

00:01:49,670 --> 00:01:47,280

my favorite sport

46

00:01:51,749 --> 00:01:49,680

awesome now you guys were both very

47

00:01:53,030 --> 00:01:51,759

active on social media while you were in

48

00:01:54,950 --> 00:01:53,040

space

49

00:01:57,109 --> 00:01:54,960

how important is it to connect with

50

00:01:59,109 --> 00:01:57,119

people on on earth when you're up in

51

00:02:00,789 --> 00:01:59,119

space

52

00:02:02,630 --> 00:02:00,799

it's super important we can do events

53

00:02:05,510 --> 00:02:02,640

like this which are great to

54

00:02:07,830 --> 00:02:05,520

be live in person talking to folks but

55

00:02:10,469 --> 00:02:07,840

obviously that's limited in social media

56

00:02:12,790 --> 00:02:10,479

goes around the globe and i had lots of

57

00:02:14,309 --> 00:02:12,800

followers in india and the philippines

58

00:02:15,830 --> 00:02:14,319

and turkey was one of the most popular

59

00:02:18,630 --> 00:02:15,840

countries following samantha we've had

60

00:02:20,309 --> 00:02:18,640

many more and so we were able to reach

61

00:02:23,430 --> 00:02:20,319

literally

62

00:02:28,309 --> 00:02:26,630

and so how about you you you enjoy that

63

00:02:29,750 --> 00:02:28,319

conversation back to earth when you're

64

00:02:31,750 --> 00:02:29,760

in space

65

00:02:33,350 --> 00:02:31,760

yeah it wasn't

66

00:02:36,710 --> 00:02:33,360

unfortunately as much as i would have

67

00:02:38,470 --> 00:02:36,720

liked a conversation because uh we do

68

00:02:40,790 --> 00:02:38,480

have access to the internet from space

69

00:02:42,710 --> 00:02:40,800

but it's not so

70

00:02:45,589 --> 00:02:42,720

easy to use it and it's not so fast as

71

00:02:48,150 --> 00:02:45,599

it is from from the ground um and so in

72

00:02:49,750 --> 00:02:48,160

the end i shared a lot i didn't really

73

00:02:51,190 --> 00:02:49,760

have the chance to maybe answer as many

74

00:02:53,190 --> 00:02:51,200

questions as i would have liked and

75

00:02:54,550 --> 00:02:53,200

stuff like that but yes i went into the

76

00:02:56,229 --> 00:02:54,560

spaceflight with that commitment to

77

00:02:58,149 --> 00:02:56,239

share as much as possible in fact i had

78

00:02:59,589 --> 00:02:58,159

started a lot earlier i started writing

79

00:03:01,750 --> 00:02:59,599

a log book

80

00:03:02,949 --> 00:03:01,760

about 500 days before launch so a year

81

00:03:04,949 --> 00:03:02,959

and a half

82

00:03:07,589 --> 00:03:04,959

almost before we launched in which i

83

00:03:09,509 --> 00:03:07,599

detailed all the aspects of of training

84

00:03:11,670 --> 00:03:09,519

and so um and then when i went to space

85

00:03:13,670 --> 00:03:11,680

i continued to do that so it's not only

86

00:03:15,750 --> 00:03:13,680

the pictures out there but actually try

87

00:03:17,270 --> 00:03:15,760

to to tell the story and and it's all

88

00:03:18,869 --> 00:03:17,280

archived some on the internet so if

89

00:03:20,630 --> 00:03:18,879

you're ever curious what it is to train

90

00:03:23,670 --> 00:03:20,640

for the international space station or

91

00:03:25,110 --> 00:03:23,680

what daily activities people do up there

92

00:03:26,470 --> 00:03:25,120

it's it's on the internet you can find

93

00:03:27,910 --> 00:03:26,480

it

94

00:03:29,509 --> 00:03:27,920

now

95

00:03:31,350 --> 00:03:29,519

the international space station is a

96

00:03:32,390 --> 00:03:31,360

huge cooperation from many many

97

00:03:34,470 --> 00:03:32,400

countries

98

00:03:36,550 --> 00:03:34,480

why should the average person on the

99

00:03:39,110 --> 00:03:36,560

street care about what's going on up up

100

00:03:41,030 --> 00:03:39,120

in the state in on the space station

101
00:03:43,350 --> 00:03:41,040
one of the things we say is that we're

102
00:03:45,509 --> 00:03:43,360
off the planet for the planet and the

103
00:03:48,789 --> 00:03:45,519
mission of the space station is

104
00:03:50,470 --> 00:03:48,799
multi-faceted but the most important

105
00:03:52,390 --> 00:03:50,480
aspect of what we do is science and

106
00:03:54,309 --> 00:03:52,400
there's a lot of science experiments

107
00:03:55,830 --> 00:03:54,319
one of the most important and fun ones

108
00:03:56,949 --> 00:03:55,840
that we did was

109
00:03:58,710 --> 00:03:56,959
working on

110
00:04:01,270 --> 00:03:58,720
new medicines with some drug companies

111
00:04:04,470 --> 00:04:01,280
that launched experiments there's also

112
00:04:07,350 --> 00:04:04,480
biology physics material science

113
00:04:09,110 --> 00:04:07,360

astronomy and cosmology so basically any

114

00:04:10,869 --> 00:04:09,120

discipline of science they have an

115

00:04:12,710 --> 00:04:10,879

experiment onboard the space station so

116

00:04:15,030 --> 00:04:12,720

a lot of what we do

117

00:04:17,270 --> 00:04:15,040

is applied science that can be applied

118

00:04:18,150 --> 00:04:17,280

to uh problems that we have here on

119

00:04:20,469 --> 00:04:18,160

earth

120

00:04:22,710 --> 00:04:20,479

okay now i've always wanted to know this

121

00:04:26,070 --> 00:04:22,720

is there a unique smell when you go onto

122

00:04:28,629 --> 00:04:26,080

the space station for the first time

123

00:04:31,350 --> 00:04:28,639

actually the space station has a very

124

00:04:33,670 --> 00:04:31,360

neutral smell um the filters work very

125

00:04:35,430 --> 00:04:33,680

well so um i expected a little bit of a

126

00:04:37,430 --> 00:04:35,440

batsman you know a lot of people living

127

00:04:39,350 --> 00:04:37,440

in front quarters for a long time but

128

00:04:42,950 --> 00:04:39,360

the ventilation system and the filtering

129

00:04:45,030 --> 00:04:42,960

systems are are great um with what we

130

00:04:46,550 --> 00:04:45,040

tend to call the space smell which is

131

00:04:48,950 --> 00:04:46,560

not really the smell of space but when

132

00:04:51,030 --> 00:04:48,960

when a new vehicle comes up and docks

133

00:04:52,790 --> 00:04:51,040

when you open the hatch um i remember

134

00:04:54,070 --> 00:04:52,800

terry calling me over and say hey go and

135

00:04:56,550 --> 00:04:54,080

smell you know

136

00:04:58,230 --> 00:04:56,560

feel the smell of space and it's really

137

00:04:59,830 --> 00:04:58,240

i guess it's the metal that's been

138

00:05:01,110 --> 00:04:59,840

exposed to you know the external

139

00:05:02,710 --> 00:05:01,120

material of that vehicle that's been

140

00:05:03,990 --> 00:05:02,720

exposed to outer space so it's kind of

141

00:05:06,070 --> 00:05:04,000

it's kind of cool because when a vehicle

142

00:05:08,070 --> 00:05:06,080

comes and there's this this part of it

143

00:05:10,550 --> 00:05:08,080

where the hatch is which is in outer

144

00:05:12,550 --> 00:05:10,560

space in vacuum for a long time and then

145

00:05:14,390 --> 00:05:12,560

it's docked or birthed it to the space

146

00:05:16,550 --> 00:05:14,400

station and it makes a solid connection

147

00:05:19,350 --> 00:05:16,560

and then you open both hatches but you

148

00:05:20,870 --> 00:05:19,360

have this part which now it's inside

149

00:05:22,950 --> 00:05:20,880

it's part of your home

150

00:05:26,870 --> 00:05:22,960

but you know a few hours earlier was in

151

00:05:28,629 --> 00:05:26,880

space and so it's uh you know it it's

152

00:05:31,110 --> 00:05:28,639

probably some kind of uh chemical

153

00:05:33,510 --> 00:05:31,120

reaction that goes on and uh um

154

00:05:36,070 --> 00:05:33,520

off-gassing i'm not exactly sure but it

155

00:05:38,870 --> 00:05:36,080

smells it's bad i mean it's a mix of

156

00:05:40,790 --> 00:05:38,880

burnt and foul and then food gone bad

157

00:05:43,029 --> 00:05:40,800

and it's terrible

158

00:05:45,110 --> 00:05:43,039

but anyway it goes away very quickly

159

00:05:48,469 --> 00:05:45,120

so when those resupplies came up what

160

00:05:50,390 --> 00:05:48,479

was the best thing that they sent

161

00:05:51,830 --> 00:05:50,400

i think fresh fruit that's something

162

00:05:53,510 --> 00:05:51,840

that the food there is actually pretty

163

00:05:56,309 --> 00:05:53,520

good but it's all packaged and

164

00:05:58,629 --> 00:05:56,319

freeze-dried and de-dehydrated so

165

00:06:00,710 --> 00:05:58,639

the fresh fruit we got some apples and

166

00:06:02,230 --> 00:06:00,720

carrots and oranges and and that's

167

00:06:03,749 --> 00:06:02,240

always everybody's favorite because we

168

00:06:05,430 --> 00:06:03,759

hadn't had that smell in a long time and

169

00:06:07,510 --> 00:06:05,440

it just tastes good so that was that was

170

00:06:08,870 --> 00:06:07,520

fun was fruit one of the things that you

171

00:06:10,550 --> 00:06:08,880

missed most from earth or was there

172

00:06:13,590 --> 00:06:10,560

something else

173

00:06:14,870 --> 00:06:13,600

a shower a shower yeah

174

00:06:15,909 --> 00:06:14,880

it was weird taking a shower for the

175

00:06:17,189 --> 00:06:15,919

first time

176

00:06:18,390 --> 00:06:17,199

it was kind of painful it felt like

177

00:06:20,870 --> 00:06:18,400

someone was jabbing you with a lot of

178

00:06:23,590 --> 00:06:20,880

little needles to feel the water uh but

179

00:06:26,230 --> 00:06:23,600

yeah the fruit and fresh not only fruit

180

00:06:27,990 --> 00:06:26,240

but just any kind of fresh fruit food or

181

00:06:29,749 --> 00:06:28,000

bread also there's not bread in spain we

182

00:06:31,270 --> 00:06:29,759

don't have bread there we have tortillas

183

00:06:34,469 --> 00:06:31,280

but that's not bread so that was another

184

00:06:36,150 --> 00:06:34,479

thing i missed okay um so is there

185

00:06:38,629 --> 00:06:36,160

anything from the space station that you

186

00:06:40,230 --> 00:06:38,639

miss having here on earth

187

00:06:42,309 --> 00:06:40,240

the view

188

00:06:43,909 --> 00:06:42,319

um and weightlessness there's all this

189

00:06:45,590 --> 00:06:43,919

gravity down here on earth and it was it

190

00:06:47,670 --> 00:06:45,600

was a lot of fun to float

191

00:06:49,830 --> 00:06:47,680

um it's there's nothing like it on earth

192

00:06:51,990 --> 00:06:49,840

and so that's just a really unique

193

00:06:53,189 --> 00:06:52,000

almost alien thing that we do in space

194

00:06:55,110 --> 00:06:53,199

and you have to learn how to do it it

195

00:06:57,270 --> 00:06:55,120

takes a few weeks before you get really

196

00:06:58,870 --> 00:06:57,280

good at it and uh and that's a lot of

197

00:07:00,390 --> 00:06:58,880

fun did you crash into anything the

198

00:07:02,309 --> 00:07:00,400

first couple days

199

00:07:04,230 --> 00:07:02,319

we didn't have any big bruises or

200

00:07:05,189 --> 00:07:04,240

scrapes i don't think so sometimes that

201
00:07:06,230 --> 00:07:05,199
happens

202
00:07:09,589 --> 00:07:06,240
um

203
00:07:11,990 --> 00:07:09,599
we were actually pretty pretty safe

204
00:07:13,430 --> 00:07:12,000
sort of yeah

205
00:07:16,230 --> 00:07:13,440
what was your favorite thing on earth to

206
00:07:17,909 --> 00:07:16,240
look at as you were flying over i don't

207
00:07:19,830 --> 00:07:17,919
think there's one favorite thing

208
00:07:21,510 --> 00:07:19,840
there's too many

209
00:07:23,270 --> 00:07:21,520
yeah yeah i mean

210
00:07:26,629 --> 00:07:23,280
earth is amazing and there's no way that

211
00:07:27,589 --> 00:07:26,639
you can pick like one place it's like

212
00:07:29,029 --> 00:07:27,599
um

213
00:07:31,110 --> 00:07:29,039

you know i guess it depends how you feel

214

00:07:32,710 --> 00:07:31,120

that day but you know there's there's a

215

00:07:34,469 --> 00:07:32,720

lot of amazing places you know the

216

00:07:36,469 --> 00:07:34,479

caribbean and

217

00:07:38,550 --> 00:07:36,479

patagonia is one

218

00:07:41,029 --> 00:07:38,560

place i like to fly over

219

00:07:42,230 --> 00:07:41,039

northern africa with this amazing red

220

00:07:43,589 --> 00:07:42,240

and

221

00:07:45,830 --> 00:07:43,599

australia

222

00:07:47,670 --> 00:07:45,840

of the himalayas and then of course i'm

223

00:07:49,029 --> 00:07:47,680

italian so i love flying over italy and

224

00:07:53,270 --> 00:07:49,039

over europe as a whole i mean europe is

225

00:07:55,430 --> 00:07:53,280

so tiny i mean you know we um

226

00:07:57,270 --> 00:07:55,440

you know you you really realize up there

227

00:07:58,950 --> 00:07:57,280

how smaller countries are over in europe

228

00:08:01,029 --> 00:07:58,960

and so you actually breeze over europe

229

00:08:02,390 --> 00:08:01,039

in like 10 minutes and it's like oh

230

00:08:04,309 --> 00:08:02,400

that's it

231

00:08:05,510 --> 00:08:04,319

were you able to see your hometowns

232

00:08:07,350 --> 00:08:05,520

yes

233

00:08:09,270 --> 00:08:07,360

you're from baltimore correct born in

234

00:08:12,230 --> 00:08:09,280

baltimore and raised in pg in howard

235

00:08:13,830 --> 00:08:12,240

county okay okay awesome well here in a

236

00:08:15,029 --> 00:08:13,840

few minutes we're going to take a few

237

00:08:16,550 --> 00:08:15,039

questions before they get into their

238

00:08:18,070 --> 00:08:16,560

full-on presentation so if you've got a

239

00:08:19,270 --> 00:08:18,080

question you can come on over here to

240

00:08:21,189 --> 00:08:19,280

the microphone and we'll be ready for

241

00:08:23,430 --> 00:08:21,199

those here in just a minute um you can

242

00:08:24,629 --> 00:08:23,440

see meyer in the back and she has some

243

00:08:27,189 --> 00:08:24,639

forms for you to fill out if you want to

244

00:08:29,589 --> 00:08:27,199

ask a question

245

00:08:33,350 --> 00:08:29,599

what was the most surprising thing about

246

00:08:36,149 --> 00:08:34,709

that's a great question there's a lot of

247

00:08:38,389 --> 00:08:36,159

surprising things of course like i

248

00:08:39,430 --> 00:08:38,399

talked about the view of the earth but i

249

00:08:41,430 --> 00:08:39,440

think the

250

00:08:43,110 --> 00:08:41,440

the learning process of how to live in

251
00:08:44,870 --> 00:08:43,120
space because it's not earth there's no

252
00:08:46,230 --> 00:08:44,880
gravity you're floating not only are you

253
00:08:48,630 --> 00:08:46,240
floating but everything like this would

254
00:08:50,070 --> 00:08:48,640
be floating around and and so just the

255
00:08:52,150 --> 00:08:50,080
ability to

256
00:08:53,350 --> 00:08:52,160
um do basic things like get dressed in

257
00:08:55,190 --> 00:08:53,360
the morning you have to organize your

258
00:08:57,030 --> 00:08:55,200
clothes in a certain way everything has

259
00:08:59,350 --> 00:08:57,040
to have velcro stuck to a wall or it's

260
00:09:01,829 --> 00:08:59,360
going to float away and so the process

261
00:09:03,910 --> 00:09:01,839
of learning how to live in space

262
00:09:06,310 --> 00:09:03,920
and not being earthling anymore you know

263
00:09:09,430 --> 00:09:06,320

be a space man it was that was really

264

00:09:12,070 --> 00:09:09,440

interesting for me how about you

265

00:09:13,990 --> 00:09:12,080

yeah very much that i have to say um

266

00:09:15,990 --> 00:09:14,000

and also

267

00:09:18,710 --> 00:09:16,000

i guess how much i enjoyed little things

268

00:09:20,550 --> 00:09:18,720

that i knew would be fun but um like you

269

00:09:21,990 --> 00:09:20,560

know flying

270

00:09:24,949 --> 00:09:22,000

it's not so much floating but it's

271

00:09:27,030 --> 00:09:24,959

really flying i mean you're uh

272

00:09:29,190 --> 00:09:27,040

you're flying for 200 days all day and

273

00:09:30,790 --> 00:09:29,200

uh i don't know i used to dream a lot

274

00:09:32,790 --> 00:09:30,800

about flying

275

00:09:34,150 --> 00:09:32,800

when i was especially growing up but i

276

00:09:35,590 --> 00:09:34,160

had those dreams when i was actually

277

00:09:37,990 --> 00:09:35,600

flying not flying on an airplane but

278

00:09:39,990 --> 00:09:38,000

really flying like in space and and all

279

00:09:42,070 --> 00:09:40,000

of a sudden i could do this for real and

280

00:09:43,990 --> 00:09:42,080

how much i enjoyed that and kind of

281

00:09:45,750 --> 00:09:44,000

surprised me i mean it's

282

00:09:49,110 --> 00:09:45,760

such an enjoyable feeling do you dream

283

00:09:51,110 --> 00:09:49,120

in weightlessness when you're in space

284

00:09:52,870 --> 00:09:51,120

i think i dreamt less in space than i do

285

00:09:54,310 --> 00:09:52,880

now yeah it was interesting people asked

286

00:09:56,150 --> 00:09:54,320

that all the time and i think we were so

287

00:09:57,030 --> 00:09:56,160

tired the work there was a pretty busy

288

00:09:58,070 --> 00:09:57,040

place

289

00:10:00,470 --> 00:09:58,080

um

290

00:10:02,470 --> 00:10:00,480

i had some but not that many and it was

291

00:10:03,670 --> 00:10:02,480

usually of earth and like weather

292

00:10:05,110 --> 00:10:03,680

rain or

293

00:10:07,110 --> 00:10:05,120

wind things like that you don't have in

294

00:10:09,110 --> 00:10:07,120

space and so just we're trying to

295

00:10:10,710 --> 00:10:09,120

remember earth i got to a point where i

296

00:10:11,910 --> 00:10:10,720

couldn't remember what it was like to be

297

00:10:13,670 --> 00:10:11,920

in gravity

298

00:10:15,829 --> 00:10:13,680

like i was trying to think what is it

299

00:10:17,750 --> 00:10:15,839

like to stand or to sit or you know i

300

00:10:20,949 --> 00:10:17,760

had forgotten what that felt like

301
00:10:30,230 --> 00:10:20,959
wow yeah all right we've got a question

302
00:10:33,430 --> 00:10:31,110
you know

303
00:10:35,190 --> 00:10:33,440
i i don't think we did i i didn't

304
00:10:36,790 --> 00:10:35,200
feel that the place to be claustrophobic

305
00:10:38,710 --> 00:10:36,800
would have been in the soyuz capsule the

306
00:10:40,230 --> 00:10:38,720
launch and landing that that is really

307
00:10:42,870 --> 00:10:40,240
small because there's a seat over here

308
00:10:45,910 --> 00:10:42,880
you can kind of see how cramped that is

309
00:10:47,030 --> 00:10:45,920
and um so the claustrophobic that would

310
00:10:48,150 --> 00:10:47,040
be the time that you would feel that

311
00:10:49,430 --> 00:10:48,160
would be

312
00:10:51,509 --> 00:10:49,440
when you're in the spacesuit for launch

313
00:10:53,190 --> 00:10:51,519

and landing uh thankfully we're only

314

00:10:55,350 --> 00:10:53,200

there for a few hours but you kind of do

315

00:10:56,310 --> 00:10:55,360

need to use your mind over matter and go

316

00:10:57,430 --> 00:10:56,320

all right i'm going to sit here

317

00:10:59,350 --> 00:10:57,440

everything's fine and i'll be out of

318

00:11:01,590 --> 00:10:59,360

this in not too long

319

00:11:03,030 --> 00:11:01,600

but it's more cabin fever i think that

320

00:11:05,110 --> 00:11:03,040

some astronauts have talked about

321

00:11:08,949 --> 00:11:05,120

because the station is big you're not

322

00:11:10,790 --> 00:11:08,959

cramped at all but it's like a 747 so

323

00:11:12,069 --> 00:11:10,800

it's a big area but you can never leave

324

00:11:13,750 --> 00:11:12,079

you know and even if you do a spacewalk

325

00:11:15,110 --> 00:11:13,760

you're still holding on to the station

326

00:11:16,470 --> 00:11:15,120

and that's only a few hours out of the

327

00:11:18,870 --> 00:11:16,480

six months so

328

00:11:21,350 --> 00:11:18,880

um i think the cabin fever is a bigger

329

00:11:22,870 --> 00:11:21,360

issue than claustrophobia thankfully i

330

00:11:25,190 --> 00:11:22,880

never really felt that way i was i was

331

00:11:27,509 --> 00:11:25,200

always happy but i could see that how

332

00:11:29,509 --> 00:11:27,519

that could happen though as a student i

333

00:11:32,150 --> 00:11:29,519

have lived in a lot more crunch quarters

334

00:11:34,150 --> 00:11:32,160

on the space station

335

00:11:35,509 --> 00:11:34,160

but they let you out before 200 days

336

00:11:36,630 --> 00:11:35,519

elapsed though that was the difference

337

00:11:38,710 --> 00:11:36,640

yeah

338

00:11:41,269 --> 00:11:38,720

my second question is

339

00:11:43,509 --> 00:11:41,279

going up in space is kind of like a

340

00:11:45,990 --> 00:11:43,519

lifetime achievement pinnacle did you

341

00:11:47,670 --> 00:11:46,000

feel a letdown when you come back down i

342

00:11:49,430 --> 00:11:47,680

mean you're both pretty young do you

343

00:11:51,430 --> 00:11:49,440

feel like oh i achieved this big thing

344

00:11:53,030 --> 00:11:51,440

like what do you do now

345

00:11:54,470 --> 00:11:53,040

every astronauts favorite mission is

346

00:11:57,430 --> 00:11:54,480

their next one

347

00:11:58,710 --> 00:11:57,440

so um and you know the old veterans that

348

00:12:00,470 --> 00:11:58,720

have five space flights they would

349

00:12:02,069 --> 00:12:00,480

rather have be a rookie with one in

350

00:12:03,350 --> 00:12:02,079

front of them than with five behind them

351

00:12:04,870 --> 00:12:03,360

so i think samantha and i would both

352

00:12:06,949 --> 00:12:04,880

like to fly again and

353

00:12:08,310 --> 00:12:06,959

and uh we're gonna enjoy earth i haven't

354

00:12:10,470 --> 00:12:08,320

really had time to be let down yet we've

355

00:12:11,430 --> 00:12:10,480

had a pretty busy few months

356

00:12:12,629 --> 00:12:11,440

um

357

00:12:14,230 --> 00:12:12,639

but

358

00:12:16,550 --> 00:12:14,240

there's nothing like flying in space and

359

00:12:18,069 --> 00:12:16,560

so you kind of have to mentally prepare

360

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

yourself that there's lots of wonderful

361

00:12:22,230 --> 00:12:19,680

things on earth and that your people and

362

00:12:23,670 --> 00:12:22,240

family and friends are here um but you

363

00:12:25,030 --> 00:12:23,680

know space is just unique it's like

364

00:12:26,389 --> 00:12:25,040

winning the world series you know cal

365

00:12:28,550 --> 00:12:26,399

ripken i'm a baseball fan from the

366

00:12:30,389 --> 00:12:28,560

orioles won the world series and when he

367

00:12:32,310 --> 00:12:30,399

was a rookie and played baseball for

368

00:12:34,069 --> 00:12:32,320

another 20 years and never went back

369

00:12:35,190 --> 00:12:34,079

again so there's just some things in

370

00:12:37,030 --> 00:12:35,200

life that are awesome and when they

371

00:12:38,389 --> 00:12:37,040

happen you need to enjoy them and

372

00:12:40,790 --> 00:12:38,399

realize you may never have a chance to

373

00:12:44,389 --> 00:12:40,800

do it again hopefully we will but um

374

00:12:47,509 --> 00:12:45,509

and

375

00:12:50,310 --> 00:12:47,519

i mean being on the space station for

376

00:12:52,069 --> 00:12:50,320

200 days is a is a good teacher i think

377

00:12:54,069 --> 00:12:52,079

for for the times to come when you come

378

00:12:56,150 --> 00:12:54,079

back because you start out with an

379

00:12:58,550 --> 00:12:56,160

incredible peak experience which is the

380

00:13:00,710 --> 00:12:58,560

launch and arriving to the space station

381

00:13:02,230 --> 00:13:00,720

and the first few days where it's

382

00:13:05,190 --> 00:13:02,240

an amazing experience everything is

383

00:13:07,269 --> 00:13:05,200

exactly exhilarating um but then you are

384

00:13:09,030 --> 00:13:07,279

up there for 200 days so there are some

385

00:13:10,790 --> 00:13:09,040

things that become routine i mean we're

386

00:13:12,710 --> 00:13:10,800

human beings everything becomes routine

387

00:13:14,790 --> 00:13:12,720

after a while but you still enjoy it so

388

00:13:17,430 --> 00:13:14,800

it's not about the peak experience

389

00:13:19,590 --> 00:13:17,440

anymore it's just about

390

00:13:21,590 --> 00:13:19,600

being happy every day and and like what

391

00:13:24,470 --> 00:13:21,600

you do every day you know not as a peak

392

00:13:27,030 --> 00:13:24,480

but just as a baseline of of being

393

00:13:29,670 --> 00:13:27,040

content with with what you do and

394

00:13:32,069 --> 00:13:29,680

i think we tend nowadays to select

395

00:13:33,910 --> 00:13:32,079

astronauts that have a personality that

396

00:13:36,870 --> 00:13:33,920

can live with that you know we're not

397

00:13:38,389 --> 00:13:36,880

necessarily people who want to um race

398

00:13:40,629 --> 00:13:38,399

to the top of a mountain every single

399

00:13:41,750 --> 00:13:40,639

day you know it's really about

400

00:13:43,670 --> 00:13:41,760

um

401
00:13:45,910 --> 00:13:43,680
enjoying what comes every day whether

402
00:13:47,590 --> 00:13:45,920
it's a peak experience or whether it's a

403
00:13:48,629 --> 00:13:47,600
routine

404
00:13:56,550 --> 00:13:48,639
thank you

405
00:14:00,230 --> 00:13:58,550
so going up into space and leaving an

406
00:14:02,710 --> 00:14:00,240
environment in gravity i know there are

407
00:14:05,829 --> 00:14:02,720
lots of concerns with like bone density

408
00:14:08,069 --> 00:14:05,839
muscle strength all that stuff um what

409
00:14:10,310 --> 00:14:08,079
types of things do you guys do up there

410
00:14:12,310 --> 00:14:10,320
like is there a certain exercise regimen

411
00:14:14,230 --> 00:14:12,320
you follow what type

412
00:14:15,350 --> 00:14:14,240
is there certain things that you eat to

413
00:14:17,509 --> 00:14:15,360

keep up

414

00:14:18,949 --> 00:14:17,519
or anything like that and then

415

00:14:22,310 --> 00:14:18,959
um

416

00:14:23,910 --> 00:14:22,320
sorry asking a lot of things but uh also

417

00:14:25,829 --> 00:14:23,920
is there some kind of

418

00:14:27,670 --> 00:14:25,839
gravity compensation like inertial

419

00:14:30,629 --> 00:14:27,680
spinning or something like that on the

420

00:14:33,269 --> 00:14:30,639
space station and then yeah

421

00:14:35,189 --> 00:14:33,279
well that's a good question a big effect

422

00:14:36,790 --> 00:14:35,199
of weightlessness is that you don't use

423

00:14:38,629 --> 00:14:36,800
your bones and your muscles like right

424

00:14:40,150 --> 00:14:38,639
now everybody in here is using muscles

425

00:14:42,230 --> 00:14:40,160
and their bones are getting exercised

426
00:14:44,550 --> 00:14:42,240
just by fighting against gravity and you

427
00:14:46,069 --> 00:14:44,560
don't get that when you're in space and

428
00:14:47,670 --> 00:14:46,079
that's a big concern of ours and so

429
00:14:49,829 --> 00:14:47,680
they've developed a very good protocol

430
00:14:51,350 --> 00:14:49,839
of exercise we have basically a

431
00:14:54,150 --> 00:14:51,360
weightlifting machine that allows you to

432
00:14:56,389 --> 00:14:54,160
do bench press and squats and deadlifts

433
00:14:58,389 --> 00:14:56,399
and a treadmill and a

434
00:15:00,790 --> 00:14:58,399
bicycle and in combination

435
00:15:02,230 --> 00:15:00,800
um we come back in pretty good shape

436
00:15:03,910 --> 00:15:02,240
there is a little bit of bone loss here

437
00:15:08,069 --> 00:15:03,920
and there but overall i didn't lose any

438
00:15:11,110 --> 00:15:08,079

bone density as a entire body um

439

00:15:12,550 --> 00:15:11,120

uh goes and so the space station i think

440

00:15:14,710 --> 00:15:12,560

one of the biggest success stories that

441

00:15:16,310 --> 00:15:14,720

it's had is that we've proven and shown

442

00:15:17,670 --> 00:15:16,320

that people can go into space for a long

443

00:15:19,829 --> 00:15:17,680

period of time

444

00:15:21,509 --> 00:15:19,839

and thrive and work and then come back

445

00:15:23,189 --> 00:15:21,519

to earth in pretty good shape it's not

446

00:15:25,990 --> 00:15:23,199

perfect there's other there's ways we

447

00:15:27,350 --> 00:15:26,000

can improve that but that's a big um

448

00:15:29,189 --> 00:15:27,360

question that's been answered i think

449

00:15:30,790 --> 00:15:29,199

for to go further in places like mars

450

00:15:33,509 --> 00:15:30,800

and beyond in the solar system the

451
00:15:35,350 --> 00:15:33,519
station has shown that that's possible

452
00:15:37,030 --> 00:15:35,360
and there is no centrifuge the second

453
00:15:39,590 --> 00:15:37,040
part of your question like in the movie

454
00:15:41,590 --> 00:15:39,600
2001 so many parts of that movie have

455
00:15:43,030 --> 00:15:41,600
come true and it's amazing how visionary

456
00:15:44,629 --> 00:15:43,040
arthur clark was

457
00:15:46,870 --> 00:15:44,639
but the one thing the space station was

458
00:15:48,710 --> 00:15:46,880
rotating and so there was gravity and in

459
00:15:50,790 --> 00:15:48,720
a lot of hollywood movies it's expensive

460
00:15:52,389 --> 00:15:50,800
to film a movie where they have to float

461
00:15:54,389 --> 00:15:52,399
all the time so there's always grav they

462
00:15:56,550 --> 00:15:54,399
just make gravity happen it saves on the

463
00:15:58,790 --> 00:15:56,560

production costs and um

464

00:16:00,949 --> 00:15:58,800

the uh so we don't have an anti-gra or

465

00:16:02,790 --> 00:16:00,959

gravity machine and there's no real

466

00:16:05,670 --> 00:16:02,800

centrifuge for people we have small

467

00:16:06,829 --> 00:16:05,680

centrifuges for science experiments

468

00:16:14,949 --> 00:16:06,839

but not for

469

00:16:22,069 --> 00:16:16,310

hello

470

00:16:24,710 --> 00:16:22,079

so like the hardest part in training

471

00:16:26,389 --> 00:16:24,720

the hardest part of training

472

00:16:27,749 --> 00:16:26,399

so that's a great question because

473

00:16:29,590 --> 00:16:27,759

there's lots of different things you

474

00:16:31,110 --> 00:16:29,600

need to do and i'll let samantha asked

475

00:16:32,949 --> 00:16:31,120

us i'll say for me it was learning

476

00:16:34,629 --> 00:16:32,959

russian russian language is tough i love

477

00:16:35,990 --> 00:16:34,639

languages i've learned french and german

478

00:16:37,829 --> 00:16:36,000

and other languages but russian was

479

00:16:39,350 --> 00:16:37,839

tough

480

00:16:41,110 --> 00:16:39,360

for me i'd say it was

481

00:16:43,189 --> 00:16:41,120

space walking training we do that

482

00:16:45,350 --> 00:16:43,199

underwater and we prepare to go outside

483

00:16:47,509 --> 00:16:45,360

by simulating that we can work

484

00:16:50,230 --> 00:16:47,519

weightlessly in the three dimensions by

485

00:16:52,629 --> 00:16:50,240

being underwater and we have a wonderful

486

00:16:55,350 --> 00:16:52,639

suit that allows us to do that but it

487

00:16:57,350 --> 00:16:55,360

doesn't come my size and not in yours

488

00:16:58,550 --> 00:16:57,360

too quite yet

489

00:17:00,310 --> 00:16:58,560

either

490

00:17:02,310 --> 00:17:00,320

and so it's you know when you're a small

491

00:17:03,509 --> 00:17:02,320

person like me it's a little bit more

492

00:17:05,110 --> 00:17:03,519

challenging because you have to deal

493

00:17:06,470 --> 00:17:05,120

with a suit that's a little bit bigger

494

00:17:08,069 --> 00:17:06,480

than it should be

495

00:17:09,750 --> 00:17:08,079

and so that that was definitely

496

00:17:12,949 --> 00:17:09,760

challenging but it was also a lot of fun

497

00:17:14,710 --> 00:17:12,959

and i enjoy it good question all right

498

00:17:16,390 --> 00:17:14,720

we've got a video now of you guys

499

00:17:18,549 --> 00:17:16,400

actually up in space should we check

500

00:17:19,990 --> 00:17:18,559

that out yeah let's do it

501
00:18:11,750 --> 00:17:20,000
and then we'll do more questions after

502
00:18:11,760 --> 00:18:21,830
sorry about that

503
00:18:25,990 --> 00:18:23,750
it's the long one okay i think we're on

504
00:18:28,630 --> 00:18:26,000
right now real quick uh samantha and i

505
00:18:30,470 --> 00:18:28,640
started out as expedition 42 we launched

506
00:18:32,230 --> 00:18:30,480
as a three-person crew along with our

507
00:18:34,230 --> 00:18:32,240
russian cosmonaut

508
00:18:37,190 --> 00:18:34,240
anton shkaplerov

509
00:18:39,750 --> 00:18:37,200
we met butch wilmore sasha samokutyaev

510
00:18:40,870 --> 00:18:39,760
and elena sarova in space

511
00:18:42,390 --> 00:18:40,880
and

512
00:18:44,630 --> 00:18:42,400
halfway through the mission

513
00:18:46,549 --> 00:18:44,640

those three came back to earth and scott

514

00:18:47,590 --> 00:18:46,559

kelly misha korenyenko and gennady

515

00:18:50,390 --> 00:18:47,600

padalka

516

00:18:54,390 --> 00:18:50,400

met us in space during expedition 43 and

517

00:18:56,390 --> 00:18:54,400

this is how space station missions go

518

00:18:59,110 --> 00:18:56,400

yeah this was our launch on the soyuz

519

00:19:01,029 --> 00:18:59,120

spacecraft from kazakhstan a wonderful

520

00:19:02,870 --> 00:19:01,039

wonderful night launch as you as you can

521

00:19:05,110 --> 00:19:02,880

see it was the three of us in this

522

00:19:06,789 --> 00:19:05,120

little cramped uh little spaceship which

523

00:19:08,390 --> 00:19:06,799

is a tiny little piece on top of the

524

00:19:10,230 --> 00:19:08,400

rocket the rest of the rocket is just

525

00:19:12,470 --> 00:19:10,240

fewer it's basically the the different

526

00:19:14,789 --> 00:19:12,480

stages the different engine stages and a

527

00:19:15,909 --> 00:19:14,799

lot of fuel and once we've used it

528

00:19:18,070 --> 00:19:15,919

they're just

529

00:19:20,470 --> 00:19:18,080

detached from the rest and we keep on

530

00:19:22,310 --> 00:19:20,480

going until after eight minutes we

531

00:19:24,789 --> 00:19:22,320

finally get to space and it's only us in

532

00:19:26,230 --> 00:19:24,799

our tiny little little capsule

533

00:19:28,549 --> 00:19:26,240

and as i said it takes only eight

534

00:19:30,230 --> 00:19:28,559

minutes to actually get to orbit um

535

00:19:32,390 --> 00:19:30,240

eight minutes in which uh you are

536

00:19:34,390 --> 00:19:32,400

subjected to some acceleration so

537

00:19:35,830 --> 00:19:34,400

basically you you feel a lot of weight

538

00:19:37,590 --> 00:19:35,840

on your chest it's like you all of a

539

00:19:39,510 --> 00:19:37,600

sudden you weigh up to like four four

540

00:19:40,950 --> 00:19:39,520

and a half times your normal weight and

541

00:19:43,029 --> 00:19:40,960

it's all kind of pressing on your on

542

00:19:44,950 --> 00:19:43,039

your chest and then after eight minutes

543

00:19:46,870 --> 00:19:44,960

you get into in weightlessness so you

544

00:19:48,710 --> 00:19:46,880

you move from that feeling of pressure

545

00:19:49,590 --> 00:19:48,720

on your chest to being floating and

546

00:19:52,070 --> 00:19:49,600

light

547

00:19:54,150 --> 00:19:52,080

and after six hours four times around

548

00:19:55,750 --> 00:19:54,160

the earth we went and then finally we

549

00:19:57,430 --> 00:19:55,760

got to our destination which is the

550

00:19:58,390 --> 00:19:57,440

international space station which you

551
00:19:59,669 --> 00:19:58,400
just saw

552
00:20:03,830 --> 00:19:59,679
and

553
00:20:05,350 --> 00:20:03,840
it's our you can see me coming through

554
00:20:07,029 --> 00:20:05,360
and this is my

555
00:20:09,270 --> 00:20:07,039
probably the happiest moment of my life

556
00:20:11,190 --> 00:20:09,280
when i got into the space station and i

557
00:20:14,230 --> 00:20:11,200
got to hug our colleagues were already

558
00:20:16,549 --> 00:20:14,240
up there sasha elena and uh and butch

559
00:20:19,590 --> 00:20:16,559
and here you can see terry coming in

560
00:20:23,270 --> 00:20:21,350
the soyuz vehicle that we launched in

561
00:20:24,870 --> 00:20:23,280
there's a soyuz right here in the air

562
00:20:27,190 --> 00:20:24,880
and space museum and next

563
00:20:28,789 --> 00:20:27,200

room over it's docked with apollo and we

564

00:20:31,029 --> 00:20:28,799

just had the 40th anniversary of apollo

565

00:20:32,390 --> 00:20:31,039

soyuz so you can see the the size of the

566

00:20:33,669 --> 00:20:32,400

capsule and the part that we live in is

567

00:20:35,430 --> 00:20:33,679

just the middle part so when you look at

568

00:20:37,909 --> 00:20:35,440

that it's not quite that big we're just

569

00:20:39,430 --> 00:20:37,919

in a very small middle part science as i

570

00:20:41,350 --> 00:20:39,440

mentioned is a big part of what we do on

571

00:20:43,750 --> 00:20:41,360

the station there's lots of different

572

00:20:45,350 --> 00:20:43,760

types of science that we do

573

00:20:48,950 --> 00:20:45,360

like i talked about material science

574

00:20:50,549 --> 00:20:48,960

combustion science biology

575

00:20:52,230 --> 00:20:50,559

we worked with some pharmaceutical

576

00:20:54,310 --> 00:20:52,240

companies on medicines

577

00:20:57,270 --> 00:20:54,320

and this is very interesting this is a

578

00:20:59,669 --> 00:20:57,280

minus 95 degree celsius freezer that we

579

00:21:00,950 --> 00:20:59,679

put a lot of our biology samples in and

580

00:21:02,870 --> 00:21:00,960

you can see all the smoke coming out

581

00:21:05,590 --> 00:21:02,880

because it's so cold

582

00:21:07,029 --> 00:21:05,600

we work really fast yeah

583

00:21:10,630 --> 00:21:07,039

we're very busy we have to work fast in

584

00:21:14,549 --> 00:21:12,789

yeah this is the microgravity science

585

00:21:16,230 --> 00:21:14,559

glove box so we do all kinds of things

586

00:21:18,390 --> 00:21:16,240

in there terry was actually a resident

587

00:21:19,909 --> 00:21:18,400

expert for this facility but i did get a

588

00:21:22,390 --> 00:21:19,919

chance to work in it a little bit for

589

00:21:25,510 --> 00:21:22,400

the 3d printer this was the first time

590

00:21:27,510 --> 00:21:25,520

we tested the 3d printing for additive

591

00:21:29,669 --> 00:21:27,520

manufacturing in space and it's very

592

00:21:31,830 --> 00:21:29,679

exciting because it seems like it worked

593

00:21:34,630 --> 00:21:31,840

very well we we printed

594

00:21:36,310 --> 00:21:34,640

things that were printed uh identically

595

00:21:37,350 --> 00:21:36,320

on the ground and then they compare them

596

00:21:39,430 --> 00:21:37,360

and uh

597

00:21:41,430 --> 00:21:39,440

and we even got a little wrench it

598

00:21:42,710 --> 00:21:41,440

wasn't the most complex output that we

599

00:21:44,549 --> 00:21:42,720

printed

600

00:21:46,870 --> 00:21:44,559

and this is a little italian facility

601
00:21:49,350 --> 00:21:46,880
called cubic it's a centrifuge and

602
00:21:51,029 --> 00:21:49,360
incubator and it's uh used to to do life

603
00:21:55,029 --> 00:21:51,039
science so cell cultures and tissue

604
00:21:58,549 --> 00:21:56,789
we talked about centrifuges before this

605
00:22:00,710 --> 00:21:58,559
is a small centrifuge in the japanese

606
00:22:02,630 --> 00:22:00,720
library where we were growing plants and

607
00:22:04,230 --> 00:22:02,640
weightlessness and then

608
00:22:06,310 --> 00:22:04,240
for science sometimes you need control

609
00:22:08,549 --> 00:22:06,320
groups so they would compare what the

610
00:22:10,630 --> 00:22:08,559
plant was doing in 1g and the centrifuge

611
00:22:12,149 --> 00:22:10,640
with what it was doing in weightlessness

612
00:22:14,310 --> 00:22:12,159
one of the most fun things that we did

613
00:22:16,230 --> 00:22:14,320

was deploy satellites and there's an

614

00:22:18,149 --> 00:22:16,240

airlock a small airlock and a japanese

615

00:22:20,230 --> 00:22:18,159

module that you can put things in the

616

00:22:21,990 --> 00:22:20,240

airlock the robotic arm comes in and

617

00:22:23,350 --> 00:22:22,000

takes it out so you can go right from

618

00:22:25,190 --> 00:22:23,360

inside the space station outside the

619

00:22:27,190 --> 00:22:25,200

space station and this is a satellite

620

00:22:29,190 --> 00:22:27,200

that we deployed back in december

621

00:22:30,630 --> 00:22:29,200

um

622

00:22:31,830 --> 00:22:30,640

called spin sat and there are several

623

00:22:32,870 --> 00:22:31,840

different types of satellites that we

624

00:22:33,669 --> 00:22:32,880

deployed

625

00:22:36,230 --> 00:22:33,679

um

626

00:22:37,990 --> 00:22:36,240

nanoracks cubesats is another one uh

627

00:22:39,510 --> 00:22:38,000

this is a mission that samantha did a

628

00:22:40,950 --> 00:22:39,520

lot of work on that was run right out of

629

00:22:42,230 --> 00:22:40,960

goddard here if any of you guys are

630

00:22:44,230 --> 00:22:42,240

familiar with governor's basically a

631

00:22:45,830 --> 00:22:44,240

robotic refueling mission so they were

632

00:22:47,590 --> 00:22:45,840

testing different technology for

633

00:22:49,909 --> 00:22:47,600

potentially when they refueled

634

00:22:52,149 --> 00:22:49,919

satellites robotically

635

00:22:53,909 --> 00:22:52,159

so you can see this is the slide table

636

00:22:55,909 --> 00:22:53,919

that you know this little air look we

637

00:22:58,230 --> 00:22:55,919

make a vacuum we take away all the air

638

00:22:59,110 --> 00:22:58,240

and then the slide table goes out and

639

00:23:00,950 --> 00:22:59,120

then

640

00:23:02,390 --> 00:23:00,960

the robotic arm comes and grabs it and

641

00:23:04,230 --> 00:23:02,400

this is the deployment actually of

642

00:23:06,549 --> 00:23:04,240

cubesats those are really exciting these

643

00:23:07,990 --> 00:23:06,559

are tiny little satellites

644

00:23:10,149 --> 00:23:08,000

they're typically developed by

645

00:23:12,549 --> 00:23:10,159

universities sometimes even high schools

646

00:23:14,470 --> 00:23:12,559

so it's something that maybe you guys

647

00:23:15,590 --> 00:23:14,480

will be involved with one day you know

648

00:23:17,510 --> 00:23:15,600

they're cheap but they still have

649

00:23:18,390 --> 00:23:17,520

significant capabilities and we launched

650

00:23:22,630 --> 00:23:18,400

them

651
00:23:24,789 --> 00:23:22,640
among other things on the space station

652
00:23:26,630 --> 00:23:24,799
this is uh i'm doing some maintenance

653
00:23:28,789 --> 00:23:26,640
work on our bone densitometer one of the

654
00:23:31,270 --> 00:23:28,799
research types we do up there is rodent

655
00:23:33,590 --> 00:23:31,280
research and uh we actually get to do a

656
00:23:35,270 --> 00:23:33,600
density method to check the bone density

657
00:23:42,230 --> 00:23:35,280
of rodents directly up there on the

658
00:23:45,750 --> 00:23:43,990
space walking

659
00:23:47,990 --> 00:23:45,760
is was a pretty important part of this

660
00:23:49,909 --> 00:23:48,000
mission the space station was assembled

661
00:23:51,190 --> 00:23:49,919
over a period of almost a decade but

662
00:23:52,789 --> 00:23:51,200
we're going through a period of

663
00:23:54,710 --> 00:23:52,799

reconfiguration i call it right now

664

00:23:57,029 --> 00:23:54,720

where we're getting it ready for future

665

00:23:59,830 --> 00:23:57,039

american capsules to show up and also

666

00:24:01,510 --> 00:23:59,840

for more cargo vehicles to show up so

667

00:24:02,870 --> 00:24:01,520

we did three space walks these are some

668

00:24:04,710 --> 00:24:02,880

of the tethers that we use to keep

669

00:24:06,230 --> 00:24:04,720

equipment from floating away

670

00:24:07,909 --> 00:24:06,240

and uh

671

00:24:09,269 --> 00:24:07,919

butch walmart and i went outside after

672

00:24:10,870 --> 00:24:09,279

samantha was our

673

00:24:11,990 --> 00:24:10,880

inside person getting us suited up in

674

00:24:13,909 --> 00:24:12,000

the suits

675

00:24:15,590 --> 00:24:13,919

and this is our first spacewalk going

676

00:24:17,029 --> 00:24:15,600

out the hatch for the first time and

677

00:24:19,430 --> 00:24:17,039

that was quite an experience to get

678

00:24:20,710 --> 00:24:19,440

outside and and see the earth while

679

00:24:22,870 --> 00:24:20,720

you're just hanging on with your hands

680

00:24:24,470 --> 00:24:22,880

there out in space

681

00:24:25,510 --> 00:24:24,480

it was pretty amazing

682

00:24:28,149 --> 00:24:25,520

the uh

683

00:24:30,070 --> 00:24:28,159

the spacewalks that we did was mostly

684

00:24:32,549 --> 00:24:30,080

laying cable there's a lot of wiring and

685

00:24:33,669 --> 00:24:32,559

so on that had to go on in order to

686

00:24:36,149 --> 00:24:33,679

prepare

687

00:24:38,070 --> 00:24:36,159

the capsules to be able to dock and so

688

00:24:39,990 --> 00:24:38,080

uh butch and i put down about 400 feet

689

00:24:41,909 --> 00:24:40,000

of cable on

690

00:24:43,190 --> 00:24:41,919

the first two spacewalks

691

00:24:44,549 --> 00:24:43,200

and you can see how big the space

692

00:24:45,909 --> 00:24:44,559

station is and how small we are out

693

00:24:47,909 --> 00:24:45,919

there that gives you an idea of the size

694

00:24:49,830 --> 00:24:47,919

and scope of the space station but we

695

00:24:50,870 --> 00:24:49,840

were running cables down that area to

696

00:24:52,710 --> 00:24:50,880

the front

697

00:24:54,390 --> 00:24:52,720

where the capsule will dock

698

00:24:56,070 --> 00:24:54,400

and then on the third spacewalk we laid

699

00:24:57,350 --> 00:24:56,080

a different set of about 400 feet of

700

00:25:00,310 --> 00:24:57,360

cables

701
00:25:02,470 --> 00:25:00,320
to some antennas and mirrors that the

702
00:25:05,110 --> 00:25:02,480
capsules can use as they

703
00:25:06,310 --> 00:25:05,120
um come up and dock this is a space

704
00:25:09,669 --> 00:25:06,320
selfie

705
00:25:10,789 --> 00:25:09,679
was me upside down and butch's advisor

706
00:25:12,830 --> 00:25:10,799
taking a picture of him but it looks

707
00:25:14,470 --> 00:25:12,840
like a selfie it was one of our favorite

708
00:25:15,830 --> 00:25:14,480
pictures

709
00:25:17,590 --> 00:25:15,840
you can see there's lots of equipment

710
00:25:18,870 --> 00:25:17,600
tethered to you and as samantha was

711
00:25:19,750 --> 00:25:18,880
talking about

712
00:25:21,110 --> 00:25:19,760
um

713
00:25:23,269 --> 00:25:21,120

it's just hard to do a spacewalk it

714

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

doesn't matter how big you are even for

715

00:25:27,750 --> 00:25:25,600

big guys it's um it's a lot of work the

716

00:25:30,230 --> 00:25:27,760

suit weighs about 400 pounds and it's

717

00:25:32,310 --> 00:25:30,240

pressurized and you are really worn out

718

00:25:33,269 --> 00:25:32,320

after a training run in the pool or in

719

00:25:34,950 --> 00:25:33,279

space

720

00:25:36,710 --> 00:25:34,960

and we had the opportunity to take out

721

00:25:38,950 --> 00:25:36,720

actually it was a russian gopro camera

722

00:25:41,510 --> 00:25:38,960

and this is some of the footage

723

00:25:43,029 --> 00:25:41,520

this is a gopro selfie and

724

00:25:44,470 --> 00:25:43,039

it captures a little bit and you can

725

00:25:46,149 --> 00:25:44,480

hear the sound if you watch the video on

726

00:25:47,190 --> 00:25:46,159

youtube you can hear the sound of space

727

00:25:49,190 --> 00:25:47,200

which is

728

00:25:51,590 --> 00:25:49,200

uh but here's butch and i showing off

729

00:25:57,750 --> 00:25:51,600

our air force and navy colors there we

730

00:26:01,269 --> 00:25:59,110

and the other thing about the space

731

00:26:03,350 --> 00:26:01,279

station of course is is that it's this

732

00:26:05,350 --> 00:26:03,360

uh the outpost this outpost out there

733

00:26:07,830 --> 00:26:05,360

and we can't like go to the supermarket

734

00:26:10,070 --> 00:26:07,840

and and shop for food when we need it or

735

00:26:12,630 --> 00:26:10,080

you know go to the shop and buy repair

736

00:26:15,190 --> 00:26:12,640

parts so we have to rely on on home

737

00:26:17,510 --> 00:26:15,200

delivery from from planet earth and uh

738

00:26:19,190 --> 00:26:17,520

this home deliveries come up with uh

739

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

vehicles that are different ones we have

740

00:26:24,549 --> 00:26:21,360

a russian vehicle called progress and uh

741

00:26:26,310 --> 00:26:24,559

during a stage twice we received a u.s

742

00:26:27,669 --> 00:26:26,320

dragon vehicle that is the one that you

743

00:26:29,669 --> 00:26:27,679

saw in the pictures

744

00:26:31,269 --> 00:26:29,679

and what we do we

745

00:26:32,870 --> 00:26:31,279

you know it comes up and it starts to

746

00:26:34,470 --> 00:26:32,880

fly formation with the space station and

747

00:26:35,909 --> 00:26:34,480

then we go and grab it with a robotic

748

00:26:38,310 --> 00:26:35,919

arm and we attach it to the space

749

00:26:41,669 --> 00:26:38,320

station and then we have five to six

750

00:26:43,110 --> 00:26:41,679

crazy weeks of signs and cargo ups until

751

00:26:44,710 --> 00:26:43,120

we are ready to

752

00:26:46,390 --> 00:26:44,720

um you know at the end of this period

753

00:26:49,029 --> 00:26:46,400

signing to sign it on its way like you

754

00:26:51,510 --> 00:26:49,039

you can see here this was uh one of uh

755

00:26:53,590 --> 00:26:51,520

dragons departing and going home

756

00:26:55,110 --> 00:26:53,600

and this is a

757

00:26:56,950 --> 00:26:55,120

the russian cargo vehicle that i

758

00:26:59,350 --> 00:26:56,960

mentioned the progress

759

00:27:01,430 --> 00:26:59,360

we received we successfully had one dock

760

00:27:05,510 --> 00:27:01,440

during our our mission

761

00:27:10,070 --> 00:27:07,669

and uh and one unfortunately didn't make

762

00:27:11,830 --> 00:27:10,080

it so we uh that was lost it was towards

763

00:27:14,870 --> 00:27:11,840

the end of our mission and this is the

764

00:27:17,190 --> 00:27:14,880

european because that's the atv and uh

765

00:27:18,870 --> 00:27:17,200

it's the very last atv atv five

766

00:27:20,389 --> 00:27:18,880

departing and it's a really cool shot

767

00:27:22,230 --> 00:27:20,399

you can see it like spitting fire and

768

00:27:24,070 --> 00:27:22,240

that's how it holds altitude as it goes

769

00:27:25,990 --> 00:27:24,080

away and this is another really cool

770

00:27:28,710 --> 00:27:26,000

shot the little plume you see up there

771

00:27:33,990 --> 00:27:28,720

is the atv5 burning up in in the

772

00:27:37,830 --> 00:27:36,070

a big part of what we do in space is not

773

00:27:39,830 --> 00:27:37,840

only science but it's a million pound

774

00:27:42,070 --> 00:27:39,840

vehicle and it needs to be maintained

775

00:27:44,070 --> 00:27:42,080

and so we spent quite a bit of effort uh

776

00:27:46,149 --> 00:27:44,080

repairing equipment and keeping things

777

00:27:47,990 --> 00:27:46,159

running this is the bathroom right here

778

00:27:49,190 --> 00:27:48,000

this is the american technique of how to

779

00:27:51,029 --> 00:27:49,200

solve a

780

00:27:52,630 --> 00:27:51,039

uh piece of metal that we had to do our

781

00:27:54,070 --> 00:27:52,640

russian colleagues saw samantha and i

782

00:27:56,070 --> 00:27:54,080

struggling with this thing and he ran

783

00:27:57,830 --> 00:27:56,080

down and got a power saw and came back

784

00:28:00,310 --> 00:27:57,840

and after he came back it took about 20

785

00:28:01,909 --> 00:28:00,320

seconds in the in the pieces sawed off

786

00:28:03,510 --> 00:28:01,919

a fun thing about working in space if

787

00:28:05,669 --> 00:28:03,520

you ever do work on your car you can

788

00:28:07,029 --> 00:28:05,679

just get on the wall and put yourself in

789

00:28:09,590 --> 00:28:07,039

the right attitude or put yourself

790

00:28:12,070 --> 00:28:09,600

upside down um and it's not a problem at

791

00:28:13,430 --> 00:28:12,080

all to get into the hard to reach places

792

00:28:15,510 --> 00:28:13,440

um

793

00:28:18,630 --> 00:28:15,520

here scott kelly and i are working on

794

00:28:20,070 --> 00:28:18,640

some more of the life support equipment

795

00:28:21,990 --> 00:28:20,080

one of the most fun things that we did

796

00:28:23,990 --> 00:28:22,000

was film an imax movie that's coming out

797

00:28:25,750 --> 00:28:24,000

in the spring but there's the imax

798

00:28:27,750 --> 00:28:25,760

camera much easier to handle in space

799

00:28:29,430 --> 00:28:27,760

than it is on earth um that thing

800

00:28:31,510 --> 00:28:29,440

probably weighs 20 or 30 pounds on the

801
00:28:33,510 --> 00:28:31,520
ground and we were up there for so long

802
00:28:35,190 --> 00:28:33,520
we celebrated a lot of holidays this is

803
00:28:37,510 --> 00:28:35,200
christmas we had christmas morning in

804
00:28:39,190 --> 00:28:37,520
space and presents and stockings

805
00:28:41,190 --> 00:28:39,200
and we had thanksgiving this is

806
00:28:43,350 --> 00:28:41,200
samantha's birthday we had some little

807
00:28:45,830 --> 00:28:43,360
candle candles and a lemon curd cake and

808
00:28:51,430 --> 00:28:45,840
a green pouch therefore yeah that was my

809
00:28:55,510 --> 00:28:53,430
talk about water balls waterbolt water

810
00:28:56,830 --> 00:28:55,520
is pretty amazing in space to see

811
00:28:59,350 --> 00:28:56,840
how it

812
00:29:01,669 --> 00:28:59,360
behaves and this is the world famous

813
00:29:02,630 --> 00:29:01,679

espresso machine

814

00:29:03,990 --> 00:29:02,640

and

815

00:29:05,190 --> 00:29:04,000

you can see it basically works with

816

00:29:06,470 --> 00:29:05,200

pouches

817

00:29:08,070 --> 00:29:06,480

you know you have to attach a water

818

00:29:10,070 --> 00:29:08,080

pouch and then the coffee comes out on

819

00:29:14,230 --> 00:29:10,080

the other side and

820

00:29:17,350 --> 00:29:15,510

as i mentioned before we don't have

821

00:29:18,389 --> 00:29:17,360

bread in space but we do have tortillas

822

00:29:19,830 --> 00:29:18,399

and so

823

00:29:21,190 --> 00:29:19,840

uh a lot of astronauts like to put

824

00:29:24,149 --> 00:29:21,200

whatever they have this is scott have it

825

00:29:26,470 --> 00:29:24,159

showing some fish on a tortilla

826

00:29:27,990 --> 00:29:26,480

but uh it's a way to spice up the food

827

00:29:29,750 --> 00:29:28,000

spice is very important to our crewmate

828

00:29:31,909 --> 00:29:29,760

butch he used mustard on i think

829

00:29:34,070 --> 00:29:31,919

everything and he really enjoyed that

830

00:29:35,350 --> 00:29:34,080

this is me making a hamburger here

831

00:29:37,590 --> 00:29:35,360

um

832

00:29:40,310 --> 00:29:37,600

ketchup mustard mayonnaise

833

00:29:42,789 --> 00:29:40,320

a bag of cheese and a rehydrated beef

834

00:29:44,870 --> 00:29:42,799

patty and uh it was pretty good

835

00:29:47,669 --> 00:29:44,880

not

836

00:29:49,830 --> 00:29:47,679

pretty good

837

00:29:51,029 --> 00:29:49,840

and uh yeah it was fun to do that every

838

00:29:55,750 --> 00:29:51,039

once in a while i didn't eat this every

839

00:29:59,350 --> 00:29:57,750

and this is an example of the challenges

840

00:30:01,430 --> 00:29:59,360

you face in zero g right if you have to

841

00:30:03,669 --> 00:30:01,440

move uh in this case mmms from one

842

00:30:05,269 --> 00:30:03,679

ziploc to another on the ground you just

843

00:30:07,269 --> 00:30:05,279

flip one upside down and you're done

844

00:30:09,350 --> 00:30:07,279

right when space doesn't work that way

845

00:30:11,669 --> 00:30:09,360

and so one

846

00:30:12,789 --> 00:30:11,679

get around is to centrifuge and it takes

847

00:30:14,070 --> 00:30:12,799

a little bit of scale i mean that was

848

00:30:15,430 --> 00:30:14,080

towards the end of the mission but you

849

00:30:17,510 --> 00:30:15,440

can you know to spin around and you can

850

00:30:19,029 --> 00:30:17,520

make them go out one ziplock and into

851
00:30:20,470 --> 00:30:19,039
the next one

852
00:30:22,470 --> 00:30:20,480
i prefer to move the m ms from the

853
00:30:23,830 --> 00:30:22,480
ziploc to my mouth usually

854
00:30:25,029 --> 00:30:23,840
after we eat all this food we have to go

855
00:30:27,190 --> 00:30:25,039
weigh ourselves and this is how you

856
00:30:28,870 --> 00:30:27,200
weigh yourself in space it's basically a

857
00:30:30,870 --> 00:30:28,880
spring and it measures how long it takes

858
00:30:32,470 --> 00:30:30,880
you to go up and down in the spring and

859
00:30:34,789 --> 00:30:32,480
based on your mass

860
00:30:36,149 --> 00:30:34,799
is how long that spring takes and then

861
00:30:38,070 --> 00:30:36,159
when you realize you gain too much

862
00:30:39,990 --> 00:30:38,080
weight you get on the treadmill and it's

863
00:30:41,990 --> 00:30:40,000

on the wall and here's the exercise

864

00:30:43,110 --> 00:30:42,000

machine i was talking about earlier

865

00:30:44,630 --> 00:30:43,120

um

866

00:30:46,070 --> 00:30:44,640

exercise is a big part of it and they

867

00:30:47,350 --> 00:30:46,080

schedule us usually for two and a half

868

00:30:48,950 --> 00:30:47,360

hours a day

869

00:30:50,789 --> 00:30:48,960

occasionally the station has to maneuver

870

00:30:53,350 --> 00:30:50,799

itself if there's debris and space that

871

00:30:55,590 --> 00:30:53,360

we have to avoid it will uh climb or

872

00:30:56,870 --> 00:30:55,600

descend and this is what it's like to be

873

00:30:59,029 --> 00:30:56,880

on board the space station when the

874

00:31:01,029 --> 00:30:59,039

rocket engines are firing as you can see

875

00:31:04,389 --> 00:31:01,039

it doesn't move that fast it's a million

876

00:31:06,549 --> 00:31:04,399

pound vehicle and it's a very slow um

877

00:31:07,669 --> 00:31:06,559

climb another part of being a human is

878

00:31:10,070 --> 00:31:07,679

you have to get your hair cut and i'll

879

00:31:11,430 --> 00:31:10,080

tell you as a i'm a combat pilot and

880

00:31:13,350 --> 00:31:11,440

i've done space walks and launched on

881

00:31:15,909 --> 00:31:13,360

the space shuttle the most stressful

882

00:31:17,269 --> 00:31:15,919

thing by far that i've done in space is

883

00:31:19,269 --> 00:31:17,279

this right here

884

00:31:20,230 --> 00:31:19,279

um giving samantha a haircut in space

885

00:31:22,389 --> 00:31:20,240

was very

886

00:31:24,630 --> 00:31:22,399

was uh was a big deal we we had a train

887

00:31:25,909 --> 00:31:24,640

for here on earth the pressure was on i

888

00:31:27,350 --> 00:31:25,919

would have had the wrath of every

889

00:31:28,870 --> 00:31:27,360

italian woman on earth that i messed

890

00:31:30,950 --> 00:31:28,880

that up so that was a

891

00:31:35,990 --> 00:31:30,960

that was a very stressful moment

892

00:31:36,000 --> 00:31:44,149

the final product

893

00:31:47,430 --> 00:31:45,830

we got we ended up getting extended by

894

00:31:49,430 --> 00:31:47,440

month samantha mentioned one of the well

895

00:31:51,430 --> 00:31:49,440

several vehicles did not make it in the

896

00:31:52,870 --> 00:31:51,440

last year but uh when one of the russian

897

00:31:54,470 --> 00:31:52,880

vehicles did not make it to space

898

00:31:56,389 --> 00:31:54,480

station they ended up extending us a

899

00:31:58,310 --> 00:31:56,399

month and during that time we got to

900

00:32:00,789 --> 00:31:58,320

move this module from the bottom of the

901
00:32:01,830 --> 00:32:00,799
station to the side and this is a time

902
00:32:03,350 --> 00:32:01,840
lapse

903
00:32:04,950 --> 00:32:03,360
it looks like it's moving very fast but

904
00:32:06,710 --> 00:32:04,960
this actually takes about two orbits so

905
00:32:07,830 --> 00:32:06,720
it's about a three hour long process to

906
00:32:10,470 --> 00:32:07,840
move this

907
00:32:11,830 --> 00:32:10,480
big probably 10 or 15 000 pound module

908
00:32:13,110 --> 00:32:11,840
from one part of the station to the

909
00:32:15,430 --> 00:32:13,120
other

910
00:32:18,310 --> 00:32:15,440
and while we were in space mr leonard

911
00:32:19,430 --> 00:32:18,320
nimoy passed away and

912
00:32:29,750 --> 00:32:19,440
we

913
00:32:34,870 --> 00:32:31,509

returning to earth

914

00:32:36,470 --> 00:32:34,880

yeah so after 200 days they said that we

915

00:32:37,909 --> 00:32:36,480

really had come home there's no way to

916

00:32:40,310 --> 00:32:37,919

stay longer

917

00:32:41,990 --> 00:32:40,320

so this is us saying goodbye to our

918

00:32:43,909 --> 00:32:42,000

friends we're staying behind canada

919

00:32:45,190 --> 00:32:43,919

scott and nisha two of them by the way

920

00:32:47,269 --> 00:32:45,200

are still up there on the space station

921

00:32:49,590 --> 00:32:47,279

they're staying for a whole year

922

00:32:52,470 --> 00:32:49,600

and this is our uh our soyuz

923

00:32:54,230 --> 00:32:52,480

uh departing so that was it

924

00:32:56,389 --> 00:32:54,240

it's time to go home

925

00:32:58,310 --> 00:32:56,399

a few hours of uh not much happening

926
00:32:59,830 --> 00:32:58,320
until we went around the

927
00:33:02,070 --> 00:32:59,840
world a couple of times waiting for the

928
00:33:03,590 --> 00:33:02,080
right moment for the engines to burn so

929
00:33:06,149 --> 00:33:03,600
that we would actually get back to

930
00:33:08,149 --> 00:33:06,159
kazakhstan and not to some unknown place

931
00:33:09,750 --> 00:33:08,159
on the planet and in kazakhstan that's

932
00:33:11,350 --> 00:33:09,760
of course why they were waiting for us

933
00:33:12,789 --> 00:33:11,360
and then a pretty wild ride towards the

934
00:33:15,029 --> 00:33:12,799
end i mean you can see this this was the

935
00:33:16,389 --> 00:33:15,039
view out of our window uh at some point

936
00:33:18,389 --> 00:33:16,399
for a few minutes we were going through

937
00:33:20,470 --> 00:33:18,399
plasma so basically we were in a ball of

938
00:33:22,310 --> 00:33:20,480

fire slowing down

939

00:33:23,990 --> 00:33:22,320

before eventually the parachute opened

940

00:33:25,909 --> 00:33:24,000

which is a pretty violent shock when the

941

00:33:29,269 --> 00:33:25,919

parachute opens and then you're like you

942

00:33:31,190 --> 00:33:29,279

know shaken for for a for a minute or so

943

00:33:32,549 --> 00:33:31,200

and then eventually you hit the ground

944

00:33:34,389 --> 00:33:32,559

like that and that's pretty cool shot

945

00:33:36,470 --> 00:33:34,399

that's just a fraction of a second

946

00:33:39,669 --> 00:33:36,480

before you hit the ground the retro

947

00:33:42,149 --> 00:33:39,679

rockets fire to dampen that impact and

948

00:33:43,590 --> 00:33:42,159

then after about 10-15 minutes the the

949

00:33:45,669 --> 00:33:43,600

guys and girls are there they're ready

950

00:33:49,110 --> 00:33:45,679

to take you out and they they they help

951
00:33:50,230 --> 00:33:49,120
you out of the capsules one by one

952
00:33:53,350 --> 00:33:50,240
you're a little bit dizzy at the

953
00:33:55,750 --> 00:33:53,360
beginning you also feel like you're 500

954
00:33:57,350 --> 00:33:55,760
tons all of a sudden because of course

955
00:34:00,470 --> 00:33:57,360
you know we had been weightless for so

956
00:34:01,669 --> 00:34:00,480
long that our brain was just not used to

957
00:34:03,190 --> 00:34:01,679
handle

958
00:34:05,110 --> 00:34:03,200
weight at all

959
00:34:06,470 --> 00:34:05,120
so we took it easy in those chairs for

960
00:34:08,790 --> 00:34:06,480
for a little while and then they put us

961
00:34:10,790 --> 00:34:08,800
on a helicopter first to the karaganda

962
00:34:12,550 --> 00:34:10,800
airport and then on a plane back to

963
00:34:14,550 --> 00:34:12,560

houston and as soon as we landed in

964

00:34:16,230 --> 00:34:14,560

houston the scientists got hold of us

965

00:34:18,310 --> 00:34:16,240

and they started taking blood and taking

966

00:34:20,629 --> 00:34:18,320

newton and make us do tests and all

967

00:34:23,510 --> 00:34:20,639

kinds of stuff and they haven't stopped

968

00:34:25,990 --> 00:34:25,190

one of the best things to do in space is

969

00:34:29,270 --> 00:34:26,000

to

970

00:34:30,470 --> 00:34:29,280

look at look back on earth and

971

00:34:32,790 --> 00:34:30,480

there's just an

972

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

endless

973

00:34:35,909 --> 00:34:34,480

stream of amazing views that we have

974

00:34:38,629 --> 00:34:35,919

this is in the middle east and the

975

00:34:42,470 --> 00:34:38,639

persian gulf the palm islands

976
00:34:43,750 --> 00:34:42,480
um these rivers and indonesia and and uh

977
00:34:45,750 --> 00:34:43,760
are

978
00:34:49,109 --> 00:34:45,760
amazing to see the bahamas there's

979
00:34:51,030 --> 00:34:49,119
definitely on my to-do list now a lot of

980
00:34:52,950 --> 00:34:51,040
shallow beautiful green blue waters

981
00:34:55,109 --> 00:34:52,960
around earth but the bahamas caribbean

982
00:34:56,230 --> 00:34:55,119
and florida that area really stands out

983
00:34:58,230 --> 00:34:56,240
it's unique

984
00:35:00,630 --> 00:34:58,240
we had a chance to see a lot of tropical

985
00:35:02,790 --> 00:35:00,640
storms and hurricanes and cyclones

986
00:35:05,990 --> 00:35:02,800
this one here in particular my sack was

987
00:35:07,510 --> 00:35:06,000
was unbelievable this the eye was so big

988
00:35:09,030 --> 00:35:07,520

i've certainly never seen anything like

989

00:35:10,950 --> 00:35:09,040

that before

990

00:35:12,870 --> 00:35:10,960

this is the cupola module where we do

991

00:35:14,310 --> 00:35:12,880

most of our looking out and it's just

992

00:35:16,710 --> 00:35:14,320

incredible it's a

993

00:35:18,870 --> 00:35:16,720

cool reflection there night times are

994

00:35:21,430 --> 00:35:18,880

amazing especially over africa and

995

00:35:23,589 --> 00:35:21,440

indonesia and south america where the

996

00:35:28,310 --> 00:35:23,599

lightning storms are

997

00:35:33,829 --> 00:35:29,589

view of the middle east going from the

998

00:35:35,510 --> 00:35:33,839

mediterranean over the arabian peninsula

999

00:35:37,030 --> 00:35:35,520

a lot of beautiful places on earth and

1000

00:35:41,109 --> 00:35:37,040

samantha mentioned this earlier today

1001

00:35:43,109 --> 00:35:41,119

that the um you get used to seeing

1002

00:35:44,710 --> 00:35:43,119

earth by colors and you kind of know

1003

00:35:46,069 --> 00:35:44,720

countries by what they look like from

1004

00:35:48,230 --> 00:35:46,079

space now you know countries that i

1005

00:35:50,390 --> 00:35:48,240

really had no idea about before now i

1006

00:35:52,870 --> 00:35:50,400

know what they look like this is an

1007

00:35:54,630 --> 00:35:52,880

example of some african thunderstorms

1008

00:35:57,349 --> 00:35:54,640

and the southern lights

1009

00:35:59,349 --> 00:35:57,359

aurora australis is

1010

00:36:01,109 --> 00:35:59,359

it's kind of unreal i mean it really and

1011

00:36:03,349 --> 00:36:01,119

you can see the

1012

00:36:06,390 --> 00:36:03,359

aurora dancing around this is moon glen

1013

00:36:08,150 --> 00:36:06,400

on the gulf of mexico

1014

00:36:15,750 --> 00:36:08,160

here's a fish eye view through the

1015

00:36:18,790 --> 00:36:16,870

it's hard to say what my favorite

1016

00:36:19,829 --> 00:36:18,800

picture is but i think this was my

1017

00:36:21,510 --> 00:36:19,839

favorite

1018

00:36:24,069 --> 00:36:21,520

um early in the mission seeing the

1019

00:36:26,230 --> 00:36:24,079

northern lights that was the uk

1020

00:36:27,990 --> 00:36:26,240

this is scandinavia norway and sweden

1021

00:36:30,470 --> 00:36:28,000

and denmark and finland

1022

00:36:33,589 --> 00:36:30,480

and then we move on um

1023

00:36:35,349 --> 00:36:33,599

past st petersburg on the moscow you see

1024

00:36:36,950 --> 00:36:35,359

st petersburg there

1025

00:36:38,630 --> 00:36:36,960

moscow really stands out at night it's

1026

00:36:47,750 --> 00:36:38,640

this bright star

1027

00:36:51,270 --> 00:36:49,190

and at nighttime and during the day you

1028

00:36:52,829 --> 00:36:51,280

see a very thin blue atmosphere at night

1029

00:36:55,030 --> 00:36:52,839

time you see this

1030

00:36:57,910 --> 00:36:55,040

upper portion of our atmosphere that

1031

00:37:00,550 --> 00:36:57,920

goes up maybe 100 kilometers or more and

1032

00:37:02,950 --> 00:37:00,560

that brown haze color is real at

1033

00:37:05,589 --> 00:37:02,960

nighttime you see that with your eye and

1034

00:37:08,069 --> 00:37:05,599

it's amazing here's the Nile river

1035

00:37:10,230 --> 00:37:08,079

into Cairo and Alexandria and you can

1036

00:37:11,910 --> 00:37:10,240

see Israel is a really small couple

1037

00:37:12,950 --> 00:37:11,920

bright lights there and a lot of the

1038

00:37:18,710 --> 00:37:12,960

middle east

1039

00:37:23,349 --> 00:37:21,750

new zealand on one of the very few

1040

00:37:25,750 --> 00:37:23,359

days there's samantha's favorite it's

1041

00:37:34,310 --> 00:37:25,760

italy

1042

00:37:39,430 --> 00:37:37,510

this is a neat starscape um

1043

00:37:41,030 --> 00:37:39,440

the time lapse makes it move really fast

1044

00:37:42,710 --> 00:37:41,040

of course when you're flying it's not

1045

00:37:45,270 --> 00:37:42,720

moving quite that fast

1046

00:37:46,710 --> 00:37:45,280

but uh you can see the

1047

00:37:48,550 --> 00:37:46,720

one of the magellanic clouds they're

1048

00:37:51,990 --> 00:37:48,560

really small galaxies near our galaxy

1049

00:37:52,710 --> 00:37:52,000

and then the main milky way here

1050

00:37:54,550 --> 00:37:52,720

but

1051
00:37:56,230 --> 00:37:54,560
if you turn all the lights off inside

1052
00:38:08,230 --> 00:37:56,240
you can actually see this with your eyes

1053
00:38:08,240 --> 00:38:18,710
so that's 200 days in 20 minutes

1054
00:38:21,349 --> 00:38:19,670
all right we're going to take some more

1055
00:38:23,190 --> 00:38:21,359
questions but first we've got an online

1056
00:38:24,950 --> 00:38:23,200
question we're going to start with have

1057
00:38:26,950 --> 00:38:24,960
you had the opportunity to follow up on

1058
00:38:30,710 --> 00:38:26,960
science experiments conducted by you on

1059
00:38:35,990 --> 00:38:33,270
some of it yeah uh i i've been in

1060
00:38:38,630 --> 00:38:36,000
contact a lot with the uh

1061
00:38:40,870 --> 00:38:38,640
italian principal investigators um for

1062
00:38:42,550 --> 00:38:40,880
my mission to space because it was a

1063
00:38:44,550 --> 00:38:42,560

ticket let's say of the italian space

1064

00:38:46,550 --> 00:38:44,560

agency then the italian species just

1065

00:38:49,270 --> 00:38:46,560

selected a number of experiments that

1066

00:38:50,870 --> 00:38:49,280

were really tied to this mission um a

1067

00:38:52,150 --> 00:38:50,880

lot of other experiments you know they

1068

00:38:54,230 --> 00:38:52,160

start earlier

1069

00:38:55,510 --> 00:38:54,240

you just just keep on going and so maybe

1070

00:38:56,790 --> 00:38:55,520

you don't have that strong relationship

1071

00:38:58,550 --> 00:38:56,800

with scientists

1072

00:39:00,390 --> 00:38:58,560

plus i was involved from the very

1073

00:39:02,710 --> 00:39:00,400

beginning since the selection in some

1074

00:39:04,870 --> 00:39:02,720

cases i helped out figure out a few a

1075

00:39:07,109 --> 00:39:04,880

few details of the protocol we would do

1076

00:39:09,510 --> 00:39:07,119

and so i've definitely talked to them um

1077

00:39:11,510 --> 00:39:09,520

and of course they they caution and uh

1078

00:39:13,190 --> 00:39:11,520

and and tell you that you know you have

1079

00:39:14,470 --> 00:39:13,200

to be patient with science i mean they

1080

00:39:17,589 --> 00:39:14,480

you know some of them just got their

1081

00:39:19,589 --> 00:39:17,599

samples back uh some of them got data

1082

00:39:23,109 --> 00:39:19,599

but to do a proper analysis of the data

1083

00:39:24,950 --> 00:39:23,119

requires time but um what i can say and

1084

00:39:26,470 --> 00:39:24,960

i'm really happy about that is that we

1085

00:39:28,390 --> 00:39:26,480

were successful in the sense that they

1086

00:39:29,910 --> 00:39:28,400

all got the data that they wanted they

1087

00:39:31,589 --> 00:39:29,920

all got the samples back that they

1088

00:39:33,349 --> 00:39:31,599

wanted so we were very successful

1089

00:39:35,430 --> 00:39:33,359

operationally and then i'm curious

1090

00:39:36,950 --> 00:39:35,440

myself to see maybe in a year time or so

1091

00:39:38,790 --> 00:39:36,960

when they're ready with their analysis

1092

00:39:40,950 --> 00:39:38,800

and they maybe publish something i'm

1093

00:39:42,550 --> 00:39:40,960

very curious to see what will come out

1094

00:39:47,349 --> 00:39:42,560

awesome all right we've got another

1095

00:39:54,150 --> 00:39:51,510

so if we all have emergencies

1096

00:39:55,349 --> 00:39:54,160

like what do you all do how do you like

1097

00:40:00,310 --> 00:39:55,359

that

1098

00:40:02,710 --> 00:40:00,320

we had lots and lots of emergency alarms

1099

00:40:04,230 --> 00:40:02,720

go off i started a scoreboard on the on

1100

00:40:05,750 --> 00:40:04,240

the space station we would make a tick

1101

00:40:08,550 --> 00:40:05,760

mark every day a warning or caution

1102

00:40:09,990 --> 00:40:08,560

would go off luckily and thankfully um

1103

00:40:11,990 --> 00:40:10,000

most of them are false alarms and it

1104

00:40:13,750 --> 00:40:12,000

just gave us some practice but the big

1105

00:40:14,790 --> 00:40:13,760

emergencies that we trained for are

1106

00:40:17,829 --> 00:40:14,800

fires

1107

00:40:20,309 --> 00:40:17,839

and depressurizations and also we call

1108

00:40:21,910 --> 00:40:20,319

it an ammonia leak or toxic atmosphere

1109

00:40:23,430 --> 00:40:21,920

ammonia is a very dangerous chemical and

1110

00:40:24,790 --> 00:40:23,440

it's the coolant that we use on the

1111

00:40:25,910 --> 00:40:24,800

outside of the station so if that leaked

1112

00:40:27,270 --> 00:40:25,920

inside

1113

00:40:28,630 --> 00:40:27,280

that would be a bad day so we spent a

1114

00:40:30,630 --> 00:40:28,640

lot of time training before we launched

1115

00:40:32,470 --> 00:40:30,640

for those emergencies good question fire

1116

00:40:35,030 --> 00:40:32,480

behaves a lot differently in space right

1117

00:40:36,829 --> 00:40:35,040

it does the good news is

1118

00:40:39,430 --> 00:40:36,839

it burns itself out because there's no

1119

00:40:42,069 --> 00:40:39,440

convection so unless you have a fan to

1120

00:40:43,829 --> 00:40:42,079

move the air around if there's a fire it

1121

00:40:45,910 --> 00:40:43,839

should you know burn and then be gone

1122

00:40:48,069 --> 00:40:45,920

shortly so we haven't really had any

1123

00:40:49,430 --> 00:40:48,079

problems with fires thankfully so far on

1124

00:40:51,030 --> 00:40:49,440

the space station

1125

00:40:53,030 --> 00:40:51,040

and the first thing that the vehicle

1126

00:40:55,430 --> 00:40:53,040

does is automatic response if there's a

1127

00:40:57,270 --> 00:40:55,440

fire it turns off all the fans

1128

00:40:58,790 --> 00:40:57,280

so in theory all the airflow should be

1129

00:41:00,550 --> 00:40:58,800

gone and whatever caught on fire should

1130

00:41:01,510 --> 00:41:00,560

put itself out very quickly awesome all

1131

00:41:02,390 --> 00:41:01,520

right we've got another audience

1132

00:41:04,829 --> 00:41:02,400

question

1133

00:41:08,790 --> 00:41:04,839

hi my name

1134

00:41:11,270 --> 00:41:08,800

is what courses do you have to take in

1135

00:41:12,550 --> 00:41:11,280

college to become an astronaut well that

1136

00:41:15,270 --> 00:41:12,560

is a really good question i'll answer it

1137

00:41:17,270 --> 00:41:15,280

real quickly from to be a nasa astronaut

1138

00:41:19,750 --> 00:41:17,280

there's not one set of things that you

1139

00:41:21,750 --> 00:41:19,760

have to do my path was to be a pilot so

1140

00:41:24,470 --> 00:41:21,760

i went to the air force academy and i

1141

00:41:25,829 --> 00:41:24,480

was a math major

1142

00:41:27,670 --> 00:41:25,839

all astronauts have some type of

1143

00:41:29,910 --> 00:41:27,680

technical math or science or engineering

1144

00:41:32,150 --> 00:41:29,920

degree but other astronauts were

1145

00:41:34,950 --> 00:41:32,160

engineers before they became astronauts

1146

00:41:37,270 --> 00:41:34,960

some were medical doctors or pilots like

1147

00:41:38,550 --> 00:41:37,280

i said but

1148

00:41:40,470 --> 00:41:38,560

as long as you have some type of

1149

00:41:43,109 --> 00:41:40,480

technical degree there's lots of

1150

00:41:44,230 --> 00:41:43,119

different paths to the astronaut

1151

00:41:46,550 --> 00:41:44,240

good luck

1152

00:41:48,230 --> 00:41:46,560

all right we've got an online question

1153

00:41:49,829 --> 00:41:48,240

being an astronaut is it

1154

00:41:52,550 --> 00:41:49,839

is it more challenging on the

1155

00:41:56,390 --> 00:41:52,560

physiological side or the physical side

1156

00:42:00,790 --> 00:41:59,030

oh interesting um

1157

00:42:02,550 --> 00:42:00,800

yeah i'm not sure i think there's

1158

00:42:05,349 --> 00:42:02,560

there's different aspects

1159

00:42:09,190 --> 00:42:07,589

yeah i'm not sure that there is a

1160

00:42:10,870 --> 00:42:09,200

psychological challenge that sends out

1161

00:42:12,230 --> 00:42:10,880

as opposed to a physical challenge that

1162

00:42:14,309 --> 00:42:12,240

stands out

1163

00:42:17,030 --> 00:42:14,319

you know the the thing about

1164

00:42:19,270 --> 00:42:17,040

being an astronaut i think that that's

1165

00:42:20,870 --> 00:42:19,280

the biggest challenge and that's how we

1166

00:42:23,829 --> 00:42:20,880

kind of select people to make sure that

1167

00:42:25,589 --> 00:42:23,839

they can face this challenge is that um

1168

00:42:27,510 --> 00:42:25,599

you have to learn a lot of different

1169

00:42:29,910 --> 00:42:27,520

things and be able to switch gears from

1170

00:42:31,990 --> 00:42:29,920

one thing to the next real quick so we

1171

00:42:34,230 --> 00:42:32,000

don't really look for people who are

1172

00:42:36,069 --> 00:42:34,240

really super high achievers in one field

1173

00:42:39,190 --> 00:42:36,079

we're not really looking for like the

1174

00:42:41,990 --> 00:42:39,200

the nobel laureate scientist or the

1175

00:42:43,670 --> 00:42:42,000

olympic athlete or the we we really look

1176

00:42:46,470 --> 00:42:43,680

for people who are not that bad in

1177

00:42:51,430 --> 00:42:48,470

so you know you need to be able to learn

1178

00:42:52,790 --> 00:42:51,440

languages to fly a space vehicle to um

1179

00:42:55,030 --> 00:42:52,800

practice underwater and that's

1180

00:42:57,990 --> 00:42:55,040

definitely physically charged

1181

00:42:58,710 --> 00:42:58,000

to yeah yeah to somehow perform little

1182

00:43:01,109 --> 00:42:58,720

um

1183

00:43:03,030 --> 00:43:01,119

medical procedures on your colleagues to

1184

00:43:06,309 --> 00:43:03,040

to talk to people i hope you i hope you

1185

00:43:07,589 --> 00:43:06,319

enjoy us talking but i mean

1186

00:43:09,589 --> 00:43:07,599

you might think oh my god you guys are

1187

00:43:12,950 --> 00:43:09,599

so bad at it

1188

00:43:14,550 --> 00:43:12,960

um but so um you know i guess that

1189

00:43:17,109 --> 00:43:14,560

that's really the the challenge to be

1190

00:43:19,349 --> 00:43:17,119

able to learn many things quickly

1191

00:43:22,390 --> 00:43:19,359

all right we've got an audience question

1192

00:43:24,630 --> 00:43:22,400

uh my question is how long do it takes

1193

00:43:26,069 --> 00:43:24,640

for you to get out of space

1194

00:43:29,349 --> 00:43:26,079

how long does it take to get to outer

1195

00:43:31,190 --> 00:43:29,359

space right to get to outer space uh

1196

00:43:33,270 --> 00:43:31,200

that launch that we did take took eight

1197

00:43:35,589 --> 00:43:33,280

and a half minutes and then the engine

1198

00:43:37,190 --> 00:43:35,599

shut down and we were floating in space

1199

00:43:39,270 --> 00:43:37,200

for 200 days

1200

00:43:41,430 --> 00:43:39,280

to get back from space

1201

00:43:43,109 --> 00:43:41,440

it takes closer to maybe 30 or 40

1202

00:43:44,790 --> 00:43:43,119

minutes

1203

00:43:46,950 --> 00:43:44,800

your spaceship is undocked from the

1204

00:43:48,630 --> 00:43:46,960

station it turns around backwards and

1205

00:43:50,630 --> 00:43:48,640

fires the engine so instead of

1206

00:43:52,390 --> 00:43:50,640

accelerating and climbing it decelerates

1207

00:43:54,630 --> 00:43:52,400

and slows down

1208

00:43:56,550 --> 00:43:54,640

and then you start coming down and

1209

00:43:58,150 --> 00:43:56,560

that's a slower process if you came back

1210

00:44:00,150 --> 00:43:58,160

in eight minutes

1211

00:44:01,430 --> 00:44:00,160

you the forces would be so strong the

1212

00:44:03,030 --> 00:44:01,440

the capsule would melt and we'd be

1213

00:44:04,950 --> 00:44:03,040

squashed into little pancakes so we we

1214

00:44:06,470 --> 00:44:04,960

come back a little bit slower which i'm

1215

00:44:08,790 --> 00:44:06,480

really happy about because we don't end

1216

00:44:10,710 --> 00:44:08,800

up as pancakes and so coming back takes

1217

00:44:12,790 --> 00:44:10,720

about 30 or 40 minutes

1218

00:44:14,390 --> 00:44:12,800

we've got an online question next

1219

00:44:19,349 --> 00:44:14,400

does the caffeine and coffee have a

1220

00:44:22,790 --> 00:44:20,710

maybe

1221

00:44:23,829 --> 00:44:22,800

i don't think that has been studied so

1222

00:44:26,630 --> 00:44:23,839

um

1223

00:44:28,550 --> 00:44:26,640

just from our perception i guess

1224

00:44:30,150 --> 00:44:28,560

probably not but it's really hard to say

1225

00:44:32,470 --> 00:44:30,160

i mean i don't know how much coffee was

1226

00:44:35,270 --> 00:44:32,480

in the in the coffee we drank and i

1227

00:44:38,550 --> 00:44:35,280

didn't really monitor it specifically um

1228

00:44:40,870 --> 00:44:38,560

so i guess the answer is i don't know

1229

00:44:43,589 --> 00:44:40,880

all right we've got an audience question

1230

00:44:46,150 --> 00:44:43,599

hi my name is courtney and what was the

1231

00:44:47,670 --> 00:44:46,160

hardest thing about being in outer space

1232

00:44:48,630 --> 00:44:47,680

the hardest thing about being in outer

1233

00:44:51,589 --> 00:44:48,640

space

1234

00:44:53,829 --> 00:44:51,599

hi courtney

1235

00:44:55,109 --> 00:44:53,839

it may be when you're there for 200 when

1236

00:44:56,550 --> 00:44:55,119

i was there on a space shuttle mission

1237

00:44:59,349 --> 00:44:56,560

it was such a quick mission it was the

1238

00:45:01,349 --> 00:44:59,359

work and it really was tiring um for 200

1239

00:45:02,550 --> 00:45:01,359

days it's probably just missing home a

1240

00:45:03,589 --> 00:45:02,560

little bit missing your friends and

1241

00:45:06,309 --> 00:45:03,599

family

1242

00:45:08,309 --> 00:45:06,319

and things like that luckily

1243

00:45:09,589 --> 00:45:08,319

we were we had a contact with people on

1244

00:45:10,470 --> 00:45:09,599

earth so we were able to stay in touch

1245

00:45:12,309 --> 00:45:10,480

with them

1246

00:45:13,829 --> 00:45:12,319

and when you're flying in space you

1247

00:45:15,430 --> 00:45:13,839

treat it as such a unique and great

1248

00:45:16,870 --> 00:45:15,440

opportunity and you know you have the

1249

00:45:18,390 --> 00:45:16,880

rest of your life to be on earth so you

1250

00:45:21,190 --> 00:45:18,400

try and enjoy it as much as you can so

1251
00:45:23,990 --> 00:45:21,200
it wasn't too bad but uh that that you

1252
00:45:29,349 --> 00:45:27,270
you got another audience question

1253
00:45:30,870 --> 00:45:29,359
i wonder do you like do your muscles

1254
00:45:32,550 --> 00:45:30,880
ever you know like when you're out of

1255
00:45:35,270 --> 00:45:32,560
space

1256
00:45:36,950 --> 00:45:35,280
muscles hurt and have problems yeah

1257
00:45:39,589 --> 00:45:36,960
you want to talk about that

1258
00:45:41,270 --> 00:45:39,599
um you know i i it kind of it's very

1259
00:45:43,270 --> 00:45:41,280
individual some people have a little bit

1260
00:45:45,190 --> 00:45:43,280
of back pain at the beginning as their

1261
00:45:46,390 --> 00:45:45,200
you know your spine kind of elongates

1262
00:45:48,870 --> 00:45:46,400
and so you might have a little bit of

1263
00:45:52,069 --> 00:45:48,880

muscle pain in your back as your muscles

1264

00:45:54,470 --> 00:45:52,079

kind of adapt and stretch um i i

1265

00:45:56,150 --> 00:45:54,480

personally didn't have that

1266

00:45:57,510 --> 00:45:56,160

you might just injure yourself while you

1267

00:45:59,349 --> 00:45:57,520

work out and that's kind of like the

1268

00:46:01,270 --> 00:45:59,359

same as happens occasionally on earth

1269

00:46:02,950 --> 00:46:01,280

and that actually happened to me so for

1270

00:46:05,670 --> 00:46:02,960

first few days i couldn't work out

1271

00:46:07,510 --> 00:46:05,680

because i had injured a muscle um that

1272

00:46:09,670 --> 00:46:07,520

that's very similar to what happens on

1273

00:46:11,349 --> 00:46:09,680

the ground my muscles really hurt when i

1274

00:46:12,950 --> 00:46:11,359

came back

1275

00:46:15,589 --> 00:46:12,960

i mean you know the

1276

00:46:17,670 --> 00:46:15,599

my my cuffs just from walking because

1277

00:46:19,670 --> 00:46:17,680

you haven't walked for 200 days and all

1278

00:46:21,510 --> 00:46:19,680

of a sudden guess what you have to walk

1279

00:46:23,670 --> 00:46:21,520

and uh and that was really hard so i had

1280

00:46:25,430 --> 00:46:23,680

a really really sore muscles for for

1281

00:46:27,670 --> 00:46:25,440

several days after i came back and that

1282

00:46:29,109 --> 00:46:27,680

was just purely from

1283

00:46:31,270 --> 00:46:29,119

did it take a long time to adjust to

1284

00:46:32,630 --> 00:46:31,280

being back on earth

1285

00:46:34,230 --> 00:46:32,640

yeah everybody's different you know

1286

00:46:36,230 --> 00:46:34,240

there's some guys that it's months later

1287

00:46:38,790 --> 00:46:36,240

they're still having adjustment issues

1288

00:46:40,710 --> 00:46:38,800

and i i personally i really lucked out i

1289

00:46:42,630 --> 00:46:40,720

it took i mean the first day i was

1290

00:46:45,109 --> 00:46:42,640

really dizzy

1291

00:46:46,390 --> 00:46:45,119

but very quickly i was the first day i

1292

00:46:48,309 --> 00:46:46,400

was at the gym for an hour and a half

1293

00:46:49,829 --> 00:46:48,319

and and for me personally the adjustment

1294

00:46:51,670 --> 00:46:49,839

happened a lot faster than i thought it

1295

00:46:54,630 --> 00:46:51,680

would i was kind of surprised

1296

00:46:59,190 --> 00:46:54,640

got another audience question

1297

00:47:00,790 --> 00:46:59,200

excuse me what college did you go to

1298

00:47:02,390 --> 00:47:00,800

that's you got to say college is from

1299

00:47:05,750 --> 00:47:02,400

samantha's case i went to the air force

1300

00:47:07,430 --> 00:47:05,760

academy in colorado springs um

1301
00:47:09,270 --> 00:47:07,440
it's like the naval academy here in

1302
00:47:10,870 --> 00:47:09,280
annapolis it's a little bit better and

1303
00:47:12,470 --> 00:47:10,880
and uh but it's like

1304
00:47:15,190 --> 00:47:12,480
but samantha went to a lot of colleges

1305
00:47:17,430 --> 00:47:15,200
so i'll let her talk about that

1306
00:47:19,510 --> 00:47:17,440
yeah well i i'm european of course so i

1307
00:47:21,670 --> 00:47:19,520
went to the university of munich

1308
00:47:23,270 --> 00:47:21,680
and then as as part of my studies there

1309
00:47:25,510 --> 00:47:23,280
i also studied a little bit in toulouse

1310
00:47:26,870 --> 00:47:25,520
france and a little bit in moscow and

1311
00:47:28,950 --> 00:47:26,880
after that i joined the italian air

1312
00:47:32,390 --> 00:47:28,960
force and so i started again in the

1313
00:47:35,829 --> 00:47:34,069

another audience question

1314

00:47:38,150 --> 00:47:35,839

excuse me what was your favorite

1315

00:47:40,309 --> 00:47:38,160

activity to do in space favorite

1316

00:47:42,549 --> 00:47:40,319

activity in space

1317

00:47:44,470 --> 00:47:42,559

well for me i'll say

1318

00:47:46,549 --> 00:47:44,480

taking pictures i love taking pictures

1319

00:47:48,230 --> 00:47:46,559

of inside of outside of the earth of

1320

00:47:50,150 --> 00:47:48,240

stars i just like taking pictures and

1321

00:47:52,309 --> 00:47:50,160

video of anything

1322

00:47:54,870 --> 00:47:52,319

yeah i i enjoy taking pictures too but

1323

00:47:56,549 --> 00:47:54,880

but really i liked the variety of the

1324

00:47:58,790 --> 00:47:56,559

work you do up there i mean i'm somebody

1325

00:48:00,630 --> 00:47:58,800

who uh and that's not a good thing but

1326

00:48:03,270 --> 00:48:00,640

uh you know i can get bored pretty

1327

00:48:05,430 --> 00:48:03,280

easily and so the fact that up there we

1328

00:48:06,630 --> 00:48:05,440

could do such a big variety of things

1329

00:48:08,230 --> 00:48:06,640

you know one moment you're doing a

1330

00:48:09,589 --> 00:48:08,240

science experiment and then a different

1331

00:48:10,549 --> 00:48:09,599

one and then you're doing maintenance

1332

00:48:12,230 --> 00:48:10,559

and you're really doing something

1333

00:48:13,670 --> 00:48:12,240

hands-on and then you're

1334

00:48:15,510 --> 00:48:13,680

you know maybe talking to students on

1335

00:48:17,510 --> 00:48:15,520

the ground and

1336

00:48:19,589 --> 00:48:17,520

you know it's a big variety of things

1337

00:48:22,069 --> 00:48:19,599

and so it just kept me

1338

00:48:23,750 --> 00:48:22,079

interested and in a way entertained

1339

00:48:25,829 --> 00:48:23,760

although it was a lot of work really

1340

00:48:29,109 --> 00:48:25,839

that we were doing

1341

00:48:31,109 --> 00:48:29,119

we've got an online question next

1342

00:48:33,430 --> 00:48:31,119

for terry how is a space shuttle mission

1343

00:48:35,990 --> 00:48:33,440

different from a soyuz mission

1344

00:48:38,309 --> 00:48:36,000

so the space shuttle uh mission lasted

1345

00:48:41,270 --> 00:48:38,319

about two weeks and it was very scripted

1346

00:48:43,510 --> 00:48:41,280

we i knew every day what i was doing

1347

00:48:45,510 --> 00:48:43,520

uh well in advance i knew they had in

1348

00:48:47,589 --> 00:48:45,520

five minute blocks every minute of your

1349

00:48:49,750 --> 00:48:47,599

of your time was was scripted

1350

00:48:51,510 --> 00:48:49,760

and it was frankly exhausting when i got

1351

00:48:53,109 --> 00:48:51,520

back i slept for 13 and a half hours

1352

00:48:54,390 --> 00:48:53,119

uninterrupted which was

1353

00:48:56,630 --> 00:48:54,400

i hadn't been since i was probably one

1354

00:48:59,030 --> 00:48:56,640

year one years old

1355

00:49:00,549 --> 00:48:59,040

this the soyuz mission if you talk about

1356

00:49:02,309 --> 00:49:00,559

just getting there and back is very

1357

00:49:03,670 --> 00:49:02,319

different because it's really cramped

1358

00:49:05,829 --> 00:49:03,680

and small

1359

00:49:07,430 --> 00:49:05,839

and we got to the station very quickly

1360

00:49:08,710 --> 00:49:07,440

in only six hours the shuttle took two

1361

00:49:10,630 --> 00:49:08,720

days to get there

1362

00:49:12,630 --> 00:49:10,640

and uh coming back was landing in a

1363

00:49:13,750 --> 00:49:12,640

capsule was like kind of like driving

1364

00:49:15,349 --> 00:49:13,760

your car through your neighborhood and

1365

00:49:17,510 --> 00:49:15,359

running into a telephone pole this the

1366

00:49:18,870 --> 00:49:17,520

soyuz landing whereas a shuttle landed

1367

00:49:20,390 --> 00:49:18,880

like an airplane so the soyuz and

1368

00:49:22,150 --> 00:49:20,400

shuttle were different in that way but

1369

00:49:23,910 --> 00:49:22,160

the bigger difference was the soyuz

1370

00:49:25,510 --> 00:49:23,920

mission was

1371

00:49:27,990 --> 00:49:25,520

in conjunction with a station mission so

1372

00:49:29,510 --> 00:49:28,000

it was 200 days and so it was really

1373

00:49:31,270 --> 00:49:29,520

moving to space

1374

00:49:32,470 --> 00:49:31,280

rather than just going on vacation this

1375

00:49:35,270 --> 00:49:32,480

space

1376

00:49:36,470 --> 00:49:35,280

awesome we've got an audience question

1377

00:49:38,069 --> 00:49:36,480

i don't really have a question but i

1378

00:49:39,270 --> 00:49:38,079

just want to say thank you both so much

1379

00:49:40,630 --> 00:49:39,280

for all the work that you've done and

1380

00:49:41,589 --> 00:49:40,640

all the social media engagement you guys

1381

00:49:42,790 --> 00:49:41,599

will do

1382

00:49:44,069 --> 00:49:42,800

i follow you both on twitter and i think

1383

00:49:45,510 --> 00:49:44,079

it's just a really great thing to come

1384

00:49:47,349 --> 00:49:45,520

out to things like this and

1385

00:49:48,069 --> 00:49:47,359

it's it's inspiring so thank you very

1386

00:49:54,230 --> 00:49:48,079

much

1387

00:49:58,230 --> 00:49:55,510

go ahead

1388

00:49:59,670 --> 00:49:58,240

when you came back from space like could

1389

00:50:04,790 --> 00:49:59,680

you walk

1390

00:50:07,670 --> 00:50:04,800

well um i took i think we we took our

1391

00:50:08,950 --> 00:50:07,680

first steps so what happened is like you

1392

00:50:10,630 --> 00:50:08,960

know you sign the movie they they kind

1393

00:50:12,230 --> 00:50:10,640

of take you in this chairs and then

1394

00:50:14,470 --> 00:50:12,240

we'll probably spend about half an hour

1395

00:50:16,790 --> 00:50:14,480

in the chair and then about probably a

1396

00:50:18,710 --> 00:50:16,800

half an hour more in like a field tent

1397

00:50:20,630 --> 00:50:18,720

that they built like a little medical

1398

00:50:22,309 --> 00:50:20,640

tent probably half an hour more so i

1399

00:50:24,549 --> 00:50:22,319

guess between an hour and an hour and a

1400

00:50:27,510 --> 00:50:24,559

half after landing we we took our first

1401
00:50:29,030 --> 00:50:27,520
steps and i guess i could walk but i had

1402
00:50:30,630 --> 00:50:29,040
people on both sides of me like making

1403
00:50:33,030 --> 00:50:30,640
sure that i wouldn't fall over and it

1404
00:50:35,910 --> 00:50:33,040
really felt weird it felt like my body

1405
00:50:37,750 --> 00:50:35,920
was like this giant rock weighing 100

1406
00:50:40,470 --> 00:50:37,760
tons and i was trying to balance this

1407
00:50:43,829 --> 00:50:40,480
rock on tiny little toothpicks that felt

1408
00:50:48,309 --> 00:50:45,750
audience questions hi i have two

1409
00:50:51,270 --> 00:50:48,319
questions um first of all is it

1410
00:50:52,829 --> 00:50:51,280
disappointing when you you are expecting

1411
00:50:55,510 --> 00:50:52,839
the

1412
00:50:57,670 --> 00:50:55,520
resupply ship to come and it doesn't

1413
00:51:00,950 --> 00:50:57,680

come like are you very disappointed by

1414

00:51:02,150 --> 00:51:00,960

that or you just say oh well no big deal

1415

00:51:04,470 --> 00:51:02,160

well i

1416

00:51:05,670 --> 00:51:04,480

of course it was disappointing um

1417

00:51:07,270 --> 00:51:05,680

there's equipment and science

1418

00:51:08,790 --> 00:51:07,280

experiments but samantha and i lucked

1419

00:51:10,309 --> 00:51:08,800

out because our personal life we don't

1420

00:51:12,150 --> 00:51:10,319

take much personal items there's a small

1421

00:51:13,270 --> 00:51:12,160

thing but our personal items were not on

1422

00:51:15,349 --> 00:51:13,280

there that would have really been

1423

00:51:16,950 --> 00:51:15,359

disappointing had we you know little

1424

00:51:19,190 --> 00:51:16,960

jewelry and things we'd had for our

1425

00:51:20,390 --> 00:51:19,200

families so we lucked out and that

1426

00:51:22,630 --> 00:51:20,400

everything that was on there was

1427

00:51:23,990 --> 00:51:22,640

replaceable from our personal point of

1428

00:51:25,910 --> 00:51:24,000

view

1429

00:51:28,230 --> 00:51:25,920

the bigger issue when the russian

1430

00:51:30,710 --> 00:51:28,240

vehicle didn't make it it was a similar

1431

00:51:32,870 --> 00:51:30,720

rocket to what we want the soyuz humans

1432

00:51:34,069 --> 00:51:32,880

launch on and so they had to take some

1433

00:51:35,829 --> 00:51:34,079

time to make sure they were ready for

1434

00:51:37,190 --> 00:51:35,839

the next human launch and therefore

1435

00:51:38,870 --> 00:51:37,200

there was some uncertainty if we were

1436

00:51:41,030 --> 00:51:38,880

going to stay in space for longer or not

1437

00:51:42,710 --> 00:51:41,040

so we had a a period of uncertainty are

1438

00:51:44,230 --> 00:51:42,720

we staying in space or are we going back

1439

00:51:45,670 --> 00:51:44,240

to earth and

1440

00:51:47,910 --> 00:51:45,680

it wasn't so much disappointing as it

1441

00:51:49,430 --> 00:51:47,920

was unknown and we didn't know what what

1442

00:51:51,030 --> 00:51:49,440

the schedule was going gonna you know we

1443

00:51:52,230 --> 00:51:51,040

didn't we couldn't make summer plans yet

1444

00:51:53,829 --> 00:51:52,240

because we don't know if we're gonna be

1445

00:51:56,069 --> 00:51:53,839

in space or not

1446

00:51:59,109 --> 00:51:56,079

my last question i i was just wondering

1447

00:52:02,390 --> 00:51:59,119

how hard is it to get used to sleeping

1448

00:52:04,630 --> 00:52:02,400

in a bag on a wall like

1449

00:52:06,230 --> 00:52:04,640

there's not really on the wall it's once

1450

00:52:07,510 --> 00:52:06,240

you close your eyes you're floating you

1451
00:52:09,349 --> 00:52:07,520
have no idea where you're at and i

1452
00:52:11,910 --> 00:52:09,359
didn't sleep on i didn't velcro or

1453
00:52:14,150 --> 00:52:11,920
bungee myself to the wall i just floated

1454
00:52:16,150 --> 00:52:14,160
in my cabin which was wonderful it i

1455
00:52:17,910 --> 00:52:16,160
mean i think samantha too talks about

1456
00:52:20,309 --> 00:52:17,920
how she just fell asleep instantly and

1457
00:52:23,349 --> 00:52:21,670
all right we've got an online question

1458
00:52:25,270 --> 00:52:23,359
next

1459
00:52:27,109 --> 00:52:25,280
has there been any confirmation as to

1460
00:52:30,549 --> 00:52:27,119
the length of the iss mission will it

1461
00:52:32,470 --> 00:52:30,559
continue beyond 2020

1462
00:52:34,069 --> 00:52:32,480
that's a great question and we're really

1463
00:52:36,150 --> 00:52:34,079

planning on and looking forward to

1464

00:52:37,670 --> 00:52:36,160

extending it uh through at least 2024

1465

00:52:38,870 --> 00:52:37,680

hopefully longer

1466

00:52:40,630 --> 00:52:38,880

um

1467

00:52:42,150 --> 00:52:40,640

it's an international effort and a lot

1468

00:52:43,589 --> 00:52:42,160

of the

1469

00:52:45,510 --> 00:52:43,599

international governments still have to

1470

00:52:46,790 --> 00:52:45,520

decide that for sure but it looks very

1471

00:52:49,670 --> 00:52:46,800

positive that it'll go through at least

1472

00:52:51,510 --> 00:52:49,680

2024. okay got an audience question uh

1473

00:52:52,790 --> 00:52:51,520

yeah so were you guys able to see solar

1474

00:52:54,069 --> 00:52:52,800

and linear eclipses from space and

1475

00:52:56,069 --> 00:52:54,079

hopefully what were they like seeing

1476
00:52:58,150 --> 00:52:56,079
them for the iss what were the eclipses

1477
00:53:03,430 --> 00:52:58,160
like were you able to see

1478
00:53:06,390 --> 00:53:04,870
unfortunately

1479
00:53:09,190 --> 00:53:06,400
we don't really have any equipment on

1480
00:53:12,230 --> 00:53:09,200
the space station to observe safely a

1481
00:53:14,470 --> 00:53:12,240
solar eclipse so what we did see was the

1482
00:53:15,750 --> 00:53:14,480
shadow that was kind of cool actually we

1483
00:53:18,150 --> 00:53:15,760
actually could see the shadow that the

1484
00:53:20,069 --> 00:53:18,160
moon was was casting on on the earth's

1485
00:53:23,190 --> 00:53:20,079
surface i think i took a picture it's

1486
00:53:24,950 --> 00:53:23,200
online somewhere and uh and then when he

1487
00:53:27,190 --> 00:53:24,960
yeah it was over northern planning and

1488
00:53:29,589 --> 00:53:27,200

uh and then when he kind of

1489

00:53:31,109 --> 00:53:29,599

the sun set you know we actually saw

1490

00:53:32,870 --> 00:53:31,119

sunset when the sun was partially

1491

00:53:35,829 --> 00:53:32,880

covered and that's where the point where

1492

00:53:37,349 --> 00:53:35,839

you can actually safely watch and uh and

1493

00:53:40,069 --> 00:53:37,359

that was kind of cool to see you know

1494

00:53:41,829 --> 00:53:40,079

you could see a little bit of it missing

1495

00:53:43,270 --> 00:53:41,839

but i took pictures but i took pictures

1496

00:53:45,589 --> 00:53:43,280

like blind because i couldn't really

1497

00:53:47,430 --> 00:53:45,599

watch it

1498

00:53:49,270 --> 00:53:47,440

well awesome thank you guys so much for

1499

00:53:50,870 --> 00:53:49,280

talking with us today we'd like to thank

1500

00:53:52,549 --> 00:53:50,880

boeing for sponsoring the what's new in

1501

00:53:54,950 --> 00:53:52,559

aerospace we're getting ready to wrap

1502

00:53:56,950 --> 00:53:54,960

this up if you're on uh twitter you can

1503

00:53:58,630 --> 00:53:56,960

go to the air and space twitter feed

1504

00:54:00,150 --> 00:53:58,640

we're getting ready to do a periscope

1505

00:54:02,150 --> 00:54:00,160

interview with terry here in just a few

1506

00:54:03,190 --> 00:54:02,160

minutes afterwards so be sure to tune in

1507

00:54:04,870 --> 00:54:03,200

to that with the link that we're going