



1
00:00:13,249 --> 00:00:03,379
station Houston are you ready for the

2
00:00:15,379 --> 00:00:13,259
event we are ready for the event KGW TV

3
00:00:18,920 --> 00:00:15,389
this is Mission Control Houston please

4
00:00:27,380 --> 00:00:18,930
call stations or a voice check this is

5
00:00:35,959 --> 00:00:27,390
KGW TV Portland we hear you great KGW TV

6
00:00:38,350 --> 00:00:35,969
we hear you loud and clear fantastic guy

7
00:00:42,020 --> 00:00:38,360
said way soon we can go ahead and go

8
00:00:50,990 --> 00:00:42,030
we're doing this on tape so we're

9
00:00:52,250 --> 00:00:51,000
concave so we're ready to roll we have

10
00:00:54,500 --> 00:00:52,260
commander dan burbank and flight

11
00:00:56,600 --> 00:00:54,510
engineer Don Pettit with us so we

12
00:00:58,040 --> 00:00:56,610
appreciate you guys taking some time I

13
00:00:59,660 --> 00:00:58,050

think this is very cool that we're able

14

00:01:02,270 --> 00:00:59,670

to sit down here and talk to you guys up

15

00:01:03,319 --> 00:01:02,280

at the ISS just briefly let's get

16

00:01:04,609 --> 00:01:03,329

started by just telling us how the

17

00:01:10,580 --> 00:01:04,619

mission is going and what you've been up

18

00:01:16,219 --> 00:01:10,590

to the last few days we've been doing a

19

00:01:18,380 --> 00:01:16,229

mix of stowage and transfer for progress

20

00:01:19,940 --> 00:01:18,390

which are getting ready to undock so it

21

00:01:21,469 --> 00:01:19,950

basically that's a fancy way of saying

22

00:01:23,450 --> 00:01:21,479

we're gathering trash and getting ready

23

00:01:25,670 --> 00:01:23,460

to get rid of it we've been doing a

24

00:01:28,010 --> 00:01:25,680

number of science experiments I just

25

00:01:32,660 --> 00:01:28,020

spent all morning doing ultrasounds on

26
00:01:35,690 --> 00:01:32,670
on myself for exercise dealing with how

27
00:01:38,450 --> 00:01:35,700
your muscles change shape under

28
00:01:40,510 --> 00:01:38,460
microgravity conditions and what happens

29
00:01:46,069 --> 00:01:40,520
to your heart and what happens to your

30
00:01:47,569 --> 00:01:46,079
your liver and gallbladder area and rest

31
00:01:49,399 --> 00:01:47,579
one other thing that's been occupying us

32
00:01:51,530 --> 00:01:49,409
for the last really week and a half I

33
00:01:52,880 --> 00:01:51,540
guess now has been a major upgrade to

34
00:01:55,460 --> 00:01:52,890
the avionics onboard the space station

35
00:01:57,289 --> 00:01:55,470
so we have basically been doing brain

36
00:01:59,810 --> 00:01:57,299
surgery and all the important computers

37
00:02:01,160 --> 00:01:59,820
that run the guidance navigation control

38
00:02:03,800 --> 00:02:01,170

on Space Station and the overall

39

00:02:06,139 --> 00:02:03,810

commanding so it involves rotating racks

40

00:02:07,910 --> 00:02:06,149

pulling some of these what we call well

41

00:02:10,490 --> 00:02:07,920

mDM's their computers that control the

42

00:02:11,720 --> 00:02:10,500

systems and swapping out cards the

43

00:02:13,430 --> 00:02:11,730

grounds been doing a lot of work

44

00:02:15,530 --> 00:02:13,440

upgrading the software on board

45

00:02:17,330 --> 00:02:15,540

all this to essentially pave the way for

46

00:02:20,570 --> 00:02:17,340

the upcoming vehicle traffic that will

47

00:02:23,000 --> 00:02:20,580

be in the next couple of months here I'm

48

00:02:25,970 --> 00:02:23,010

curious about microgravity on your body

49

00:02:28,130 --> 00:02:25,980

you've done the ultrasounds tell me what

50

00:02:33,800 --> 00:02:28,140

effect it had on you what have you been

51
00:02:37,880 --> 00:02:33,810
able to notice well initially when you

52
00:02:41,930 --> 00:02:37,890
come here you you notice the fluid shift

53
00:02:44,840 --> 00:02:41,940
you're the gravity tends to keep your

54
00:02:46,670 --> 00:02:44,850
fluid down where it normally is supposed

55
00:02:48,800 --> 00:02:46,680
to be but when you're in a weightless

56
00:02:50,870 --> 00:02:48,810
environment all tends to come up into

57
00:02:54,520 --> 00:02:50,880
your head and and you have these big

58
00:02:57,590 --> 00:02:54,530
swollen chipmunk cheeks and and and

59
00:02:59,510 --> 00:02:57,600
you're all red faced and puffy and it

60
00:03:01,430 --> 00:02:59,520
takes a couple of weeks for your body to

61
00:03:03,560 --> 00:03:01,440
sort out where it wants to push all the

62
00:03:05,600 --> 00:03:03,570
fluid and have that go away so that's

63
00:03:07,280 --> 00:03:05,610

one of the major effects and and

64

00:03:09,740 --> 00:03:07,290

something that comes along with that is

65

00:03:12,350 --> 00:03:09,750

you your sinuses get a little stuffy as

66

00:03:14,660 --> 00:03:12,360

well so so that's one of the first major

67

00:03:18,229 --> 00:03:14,670

effects the second effect that you

68

00:03:21,140 --> 00:03:18,239

notice right away is your body's kind of

69

00:03:23,300 --> 00:03:21,150

lazy and it uses gravity a lot to push

70

00:03:24,800 --> 00:03:23,310

food through your gut and when there's

71

00:03:27,500 --> 00:03:24,810

no gravity to help you push the food

72

00:03:29,270 --> 00:03:27,510

through your gut it it takes it a while

73

00:03:31,310 --> 00:03:29,280

before it figures out that it has to

74

00:03:34,460 --> 00:03:31,320

push food through the gut to on its own

75

00:03:36,590 --> 00:03:34,470

and and so that's something again that

76
00:03:41,000 --> 00:03:36,600
takes a week or two to get straightened

77
00:03:43,670 --> 00:03:41,010
out how important is it to work out why

78
00:03:46,160 --> 00:03:43,680
you're up there in that environment to

79
00:03:51,890 --> 00:03:46,170
keep your muscles from deteriorating

80
00:03:53,540 --> 00:03:51,900
quickly in the microgravity res I'd say

81
00:03:54,860 --> 00:03:53,550
it's pretty much critical for us and

82
00:03:56,810 --> 00:03:54,870
it's actually one of the most important

83
00:03:59,390 --> 00:03:56,820
things that we're we're doing on board

84
00:04:01,190 --> 00:03:59,400
space and space station right now to to

85
00:04:03,320 --> 00:04:01,200
figure out just how much we need to do

86
00:04:05,870 --> 00:04:03,330
it to protect your bones that's a that's

87
00:04:07,490 --> 00:04:05,880
certainly a key to protect your muscles

88
00:04:09,740 --> 00:04:07,500

to keep those as strong as possible and

89

00:04:11,210 --> 00:04:09,750

also your cardiovascular endurance you

90

00:04:13,490 --> 00:04:11,220

know our bodies are just as strong as

91

00:04:15,500 --> 00:04:13,500

they need to be to operate in a 1g

92

00:04:17,690 --> 00:04:15,510

earth-like environment and up here we

93

00:04:19,400 --> 00:04:17,700

quickly adapt to become creatures of

94

00:04:21,110 --> 00:04:19,410

space if you will and if you're going to

95

00:04:22,430 --> 00:04:21,120

come back to earth or if you want to go

96

00:04:23,779 --> 00:04:22,440

to Mars it's really important to

97

00:04:25,629 --> 00:04:23,789

understand how to keep yourself healthy

98

00:04:28,959 --> 00:04:25,639

in those environments

99

00:04:32,749 --> 00:04:28,969

and I've got a follow-up comment on that

100

00:04:35,149 --> 00:04:32,759

this exercise is sort of an empirical

101
00:04:37,640 --> 00:04:35,159
solution to the problem it seems to work

102
00:04:39,050 --> 00:04:37,650
well to help our bodies adapt and get

103
00:04:41,360 --> 00:04:39,060
them prepared for coming back to earth

104
00:04:44,360 --> 00:04:41,370
but we really don't understand exactly

105
00:04:47,629 --> 00:04:44,370
why all of this stuff works and I like

106
00:04:50,779 --> 00:04:47,639
to use the analogy it's like the Brits

107
00:04:52,969 --> 00:04:50,789
learning around 1750 that if you suck on

108
00:04:55,700 --> 00:04:52,979
citrus you won't get scurvy anymore and

109
00:04:57,740 --> 00:04:55,710
they hadn't a clue as to about vitamins

110
00:05:00,320 --> 00:04:57,750
& diet which took about another 150

111
00:05:02,179 --> 00:05:00,330
years to discover but they knew if they

112
00:05:04,850 --> 00:05:02,189
sucked on citrus they want to get scurvy

113
00:05:07,070 --> 00:05:04,860

and and so we're in the same kind of

114

00:05:09,200 --> 00:05:07,080

situation where we don't really know why

115

00:05:11,179 --> 00:05:09,210

all of this works but we just know that

116

00:05:15,230 --> 00:05:11,189

if we exercise for about two and a half

117

00:05:17,390 --> 00:05:15,240

hours a day a lot of the maladies

118

00:05:20,240 --> 00:05:17,400

associated with living long term in a

119

00:05:23,540 --> 00:05:20,250

weightless environment are tractable

120

00:05:26,029 --> 00:05:23,550

then on a personal level guys what's it

121

00:05:29,929 --> 00:05:26,039

like to spend Christmas and New Year's

122

00:05:35,329 --> 00:05:29,939

on the ISS and away from your family's

123

00:05:36,890 --> 00:05:35,339

here on earth well I think that's

124

00:05:38,570 --> 00:05:36,900

probably one of the toughest aspects of

125

00:05:40,760 --> 00:05:38,580

long-duration spaceflight right now and

126

00:05:43,999 --> 00:05:40,770

I think it was a lot tougher though in

127

00:05:45,320 --> 00:05:44,009

the years gone by nowadays we actually

128

00:05:47,209 --> 00:05:45,330

can feel very connected with our

129

00:05:49,189 --> 00:05:47,219

families so we can talk to them we can

130

00:05:51,950 --> 00:05:49,199

talk to our spouses and our kids and

131

00:05:54,139 --> 00:05:51,960

parents almost on a daily basis if we

132

00:05:55,879 --> 00:05:54,149

like we can actually see them when we're

133

00:05:57,439 --> 00:05:55,889

talking to them at least once a week so

134

00:05:59,240 --> 00:05:57,449

during the holidays we actually had some

135

00:06:02,269 --> 00:05:59,250

bonus opportunity to spend time with the

136

00:06:04,129 --> 00:06:02,279

family and that connectedness goes a

137

00:06:06,559 --> 00:06:04,139

long way towards easing what otherwise

138

00:06:10,879 --> 00:06:06,569

would be you know of a tough aspect of

139

00:06:12,170 --> 00:06:10,889

spending six months in space and as

140

00:06:13,760 --> 00:06:12,180

importantly you're missing a lot of

141

00:06:15,110 --> 00:06:13,770

football games guys while you're up

142

00:06:16,820 --> 00:06:15,120

there I have some assuming I don't can

143

00:06:19,369 --> 00:06:16,830

you get it can you get a hook up on that

144

00:06:21,769 --> 00:06:19,379

duck game dawn on the Rose Bowl I know

145

00:06:26,749 --> 00:06:21,779

you're a beaver but you know games are

146

00:06:30,829 --> 00:06:26,759

games you got to see that right games

147

00:06:34,759 --> 00:06:30,839

are games I'm one of these folks that

148

00:06:38,970 --> 00:06:34,769

can sort of pass on on watching games on

149

00:06:42,780 --> 00:06:38,980

TV and so so I'm up here with my head

150

00:06:46,230 --> 00:06:42,790

stuck in the science and the games go on

151
00:06:48,540 --> 00:06:46,240
and and I just lose track of what's

152
00:06:49,890 --> 00:06:48,550
happening from that point of view and I

153
00:06:52,440 --> 00:06:49,900
know that's going to be disappointing

154
00:06:55,350 --> 00:06:52,450
pointing to a lot of folks but gosh it

155
00:06:57,570 --> 00:06:55,360
sure helps me get done the work that we

156
00:07:00,600 --> 00:06:57,580
have here on station and focus in on the

157
00:07:02,190 --> 00:07:00,610
science and the utilization well they

158
00:07:03,510 --> 00:07:02,200
understand your beaver they don't expect

159
00:07:04,830 --> 00:07:03,520
you to be rooting for the Ducks anyway

160
00:07:06,570 --> 00:07:04,840
so if you missed the game they're not

161
00:07:09,030 --> 00:07:06,580
going to i think be too heartbroken

162
00:07:11,580 --> 00:07:09,040
about that what we hear sometimes about

163
00:07:13,290 --> 00:07:11,590

the loneliness up in space you're there

164

00:07:15,930 --> 00:07:13,300

with other people obviously and now with

165

00:07:17,070 --> 00:07:15,940

that connection that you have you know

166

00:07:18,990 --> 00:07:17,080

hooking up with family and friends

167

00:07:21,180 --> 00:07:19,000

really whenever you want to does that

168

00:07:22,590 --> 00:07:21,190

really alleviate a lot of that is it

169

00:07:24,660 --> 00:07:22,600

just really a different experience you

170

00:07:30,420 --> 00:07:24,670

think in space these days than it used

171

00:07:33,390 --> 00:07:30,430

to be you know this is my third time to

172

00:07:35,430 --> 00:07:33,400

station second time long duration and

173

00:07:40,170 --> 00:07:35,440

we've always had good com and i've never

174

00:07:44,220 --> 00:07:40,180

felt like i've been alone or lonely and

175

00:07:46,830 --> 00:07:44,230

i've never felt isolated and in part

176

00:07:49,430 --> 00:07:46,840

it's due to the communication that we

177

00:07:53,130 --> 00:07:49,440

have and the fact that we've got

178

00:07:56,010 --> 00:07:53,140

spacecraft here the Soyuz that anytime

179

00:07:59,100 --> 00:07:56,020

we need to we could jump in that

180

00:08:00,840 --> 00:07:59,110

spacecraft to come back home so the

181

00:08:04,410 --> 00:08:00,850

feeling of loneliness a feeling of

182

00:08:07,350 --> 00:08:04,420

isolation I don't think exists on the

183

00:08:08,730 --> 00:08:07,360

space station at this point just

184

00:08:11,820 --> 00:08:08,740

visually guys what's the most

185

00:08:15,690 --> 00:08:11,830

interesting thing that each of you has

186

00:08:17,700 --> 00:08:15,700

seen from up there above earth as you

187

00:08:19,560 --> 00:08:17,710

look down or look out into space there's

188

00:08:20,580 --> 00:08:19,570

something really cool that we wouldn't

189

00:08:27,030 --> 00:08:20,590

see from down here that you've

190

00:08:28,560 --> 00:08:27,040

experienced up there well it's kind of

191

00:08:30,030 --> 00:08:28,570

hard to pick the things because every

192

00:08:31,380 --> 00:08:30,040

day is just full filled with amazing

193

00:08:33,870 --> 00:08:31,390

things you know looking out these

194

00:08:36,870 --> 00:08:33,880

windows planet Earth is just spectacular

195

00:08:39,300 --> 00:08:36,880

a couple of weeks back I had the

196

00:08:41,730 --> 00:08:39,310

opportunity to see a comet that wasn't

197

00:08:44,130 --> 00:08:41,740

expected to actually survive a close

198

00:08:45,930 --> 00:08:44,140

grazing approach around the Sun and and

199

00:08:47,580 --> 00:08:45,940

I didn't even know it was coming and it

200

00:08:49,410 --> 00:08:47,590

was a night pass over the Philippines

201
00:08:51,870 --> 00:08:49,420
and I was just getting ready to button

202
00:08:52,820 --> 00:08:51,880
up the cupola shutters to to get ready

203
00:08:54,880 --> 00:08:52,830
to turn in for the

204
00:08:58,190 --> 00:08:54,890
and just watching some spectacular

205
00:09:00,410 --> 00:08:58,200
storms so to associated with the typhoon

206
00:09:02,990 --> 00:09:00,420
that was net area when the Sun was about

207
00:09:05,660 --> 00:09:03,000
to rise and I saw this vivid green

208
00:09:08,330 --> 00:09:05,670
greenish white streak extending from

209
00:09:10,130 --> 00:09:08,340
just where the Sun would be down from my

210
00:09:11,840 --> 00:09:10,140
perspective down disappearing behind the

211
00:09:13,850 --> 00:09:11,850
gym and it turned out to be the comet

212
00:09:16,610 --> 00:09:13,860
lovejoy and I seen some pretty amazing

213
00:09:22,790 --> 00:09:16,620

things in space nothing to rival that so

214

00:09:27,320 --> 00:09:22,800

far for me looking out the window at

215

00:09:29,750 --> 00:09:27,330

Earth Aurora is just an amazing sight to

216

00:09:31,970 --> 00:09:29,760

see and you could see Aurora on the

217

00:09:33,800 --> 00:09:31,980

length scale of half a continent which

218

00:09:37,070 --> 00:09:33,810

gives it a different perspective than if

219

00:09:40,760 --> 00:09:37,080

your feet planted on the ground and I

220

00:09:44,810 --> 00:09:40,770

like to think that if the god of the

221

00:09:49,930 --> 00:09:44,820

rainbow Cyrus had a twin sister she

222

00:09:54,170 --> 00:09:51,860

gentlemen were out of time it was

223

00:09:55,880 --> 00:09:54,180

fantastic talking to you both from the

224

00:09:57,950 --> 00:09:55,890

ISS again thank you very much have a

225

00:10:02,420 --> 00:09:57,960

safe trip home and we hope to talk to

226

00:10:03,410 --> 00:10:02,430

you again sometime soon take care Russ

227

00:10:06,650 --> 00:10:03,420

thank you so much it was great having

228

00:10:09,620 --> 00:10:06,660

you aboard all the best the station this

229

00:10:11,750 --> 00:10:09,630

is Houston ACR that concludes the KGW TV

230

00:10:14,440 --> 00:10:11,760

portion of event please stand by for a

231

00:10:16,730 --> 00:10:14,450

voice check from the huffington post

232

00:10:21,770 --> 00:10:16,740

station this is the huffington post how

233

00:10:25,790 --> 00:10:21,780

do you hear me Huffington Post station

234

00:10:27,530 --> 00:10:25,800

we've got you loud and clear great

235

00:10:29,030 --> 00:10:27,540

thanks so much for being here guys I

236

00:10:31,820 --> 00:10:29,040

just want to go ahead and jump into some

237

00:10:34,940 --> 00:10:31,830

of these user questions I've got from

238

00:10:37,550 --> 00:10:34,950

HuffPost commenter Sergio uphill he

239

00:10:39,920 --> 00:10:37,560

asked commercial space travel is about

240

00:10:49,650 --> 00:10:39,930

to take off what advice would you give

241

00:10:56,630 --> 00:10:53,010

I I guess I I guess one of the things i

242

00:10:59,100 --> 00:10:56,640

would say is it's really important to

243

00:11:01,230 --> 00:10:59,110

look at the things that you see up there

244

00:11:03,630 --> 00:11:01,240

and commit them write them to your hard

245

00:11:04,560 --> 00:11:03,640

drive commit them to memory having the

246

00:11:06,150 --> 00:11:04,570

opportunity to do a long-duration

247

00:11:08,120 --> 00:11:06,160

mission after two short duration

248

00:11:10,320 --> 00:11:08,130

missions I now have that opportunity

249

00:11:12,300 --> 00:11:10,330

people that get a chance to fly in space

250

00:11:14,430 --> 00:11:12,310

and maybe only spend a couple of weeks

251
00:11:16,350 --> 00:11:14,440
at a time or maybe even a couple of days

252
00:11:18,360 --> 00:11:16,360
or in some cases if it's suborbital a

253
00:11:20,010 --> 00:11:18,370
couple of minutes I think it's really

254
00:11:23,340 --> 00:11:20,020
really important to just pay attention

255
00:11:24,870 --> 00:11:23,350
absorb and internalize the things you

256
00:11:27,360 --> 00:11:24,880
see because it's spectacular and it's

257
00:11:30,510 --> 00:11:27,370
very easy to let all that go by in a

258
00:11:32,130 --> 00:11:30,520
word and and not even really be able to

259
00:11:34,140 --> 00:11:32,140
remember afterwards what it just

260
00:11:38,760 --> 00:11:34,150
happened into into really remembered

261
00:11:42,750 --> 00:11:38,770
accurately great and HuffPost commenter

262
00:11:45,000 --> 00:11:42,760
Mike Keeley asks what does space smell

263
00:11:51,240 --> 00:11:45,010

like especially in the airlock after a

264

00:11:53,390 --> 00:11:51,250

spacewalk what is the smell of space i

265

00:11:57,270 --> 00:11:53,400

wrote a little essay on that from

266

00:11:59,520 --> 00:11:57,280

expedition six and of course you can't

267

00:12:03,390 --> 00:11:59,530

really smell space because it's a vacuum

268

00:12:05,490 --> 00:12:03,400

but particles in space could get

269

00:12:07,800 --> 00:12:05,500

transferred onto solid surfaces and then

270

00:12:11,220 --> 00:12:07,810

when you bring them inside they candy

271

00:12:12,930 --> 00:12:11,230

gas and give off an odor that is

272

00:12:15,780 --> 00:12:12,940

characteristic of something being

273

00:12:19,230 --> 00:12:15,790

outside and that's what I experienced on

274

00:12:22,590 --> 00:12:19,240

sts-1 13 when I was helping run the

275

00:12:24,930 --> 00:12:22,600

airlock and my crewmates came in from

276

00:12:29,130 --> 00:12:24,940

their first spacewalk I noticed there

277

00:12:31,910 --> 00:12:29,140

was a peculiar smell about their their

278

00:12:35,550 --> 00:12:31,920

spacesuits and to me it smelled like

279

00:12:41,840 --> 00:12:35,560

welding fumes it smelled like metal hot

280

00:12:45,690 --> 00:12:41,850

metal uh-huh that's so interesting and

281

00:12:48,780 --> 00:12:45,700

hospice commenter John Caldwell asks

282

00:12:55,319 --> 00:12:48,790

what is your biggest oh wow moment since

283

00:13:01,699 --> 00:12:58,049

one of my big oh wow moments this was a

284

00:13:04,530 --> 00:13:01,709

jaw-dropping moment and that was when

285

00:13:06,809 --> 00:13:04,540

for no particular reason other than I've

286

00:13:09,509 --> 00:13:06,819

never seen it done before I made a big

287

00:13:11,699 --> 00:13:09,519

sphere of water it was a free sphere of

288

00:13:13,229 --> 00:13:11,709

water about the size of my head and I

289

00:13:14,939 --> 00:13:13,239

had it attached to a little wire frame

290

00:13:16,710 --> 00:13:14,949

so it sit in front of the video camera

291

00:13:18,989 --> 00:13:16,720

and then I did a number of experiments

292

00:13:20,970 --> 00:13:18,999

where I would make small perturbations

293

00:13:23,489 --> 00:13:20,980

to this fear and watch the resulting

294

00:13:26,189 --> 00:13:23,499

oscillations and what happened was just

295

00:13:30,059 --> 00:13:26,199

totally mind-boggling to me it was a

296

00:13:32,609 --> 00:13:30,069

jaw-dropping moment and and it has to do

297

00:13:35,699 --> 00:13:32,619

with the ratio a surface tension force

298

00:13:39,239 --> 00:13:35,709

to inertial force and as a sphere gets

299

00:13:40,829 --> 00:13:39,249

larger and larger the effect of surface

300

00:13:42,780 --> 00:13:40,839

tension force becomes smaller and

301
00:13:45,269 --> 00:13:42,790
smaller and a different kind of behavior

302
00:13:49,559 --> 00:13:45,279
will occur then say a sphere of water

303
00:13:56,239 --> 00:13:49,569
that's only an inch in diameter did you

304
00:13:58,979 --> 00:13:56,249
get that on video yes that's on video

305
00:14:03,569 --> 00:13:58,989
that was done during expedition six and

306
00:14:05,989 --> 00:14:03,579
if you go to youtube and type in large

307
00:14:08,369 --> 00:14:05,999
water sphere or something like that

308
00:14:12,780 --> 00:14:08,379
along with my name you'll go right to

309
00:14:16,289 --> 00:14:12,790
the video very cool all right so Twitter

310
00:14:17,999 --> 00:14:16,299
user Matt Howard asks did you see the

311
00:14:23,179 --> 00:14:18,009
quad ranted meteor shower the other

312
00:14:27,960 --> 00:14:25,289
great great question we had actually

313
00:14:30,960 --> 00:14:27,970

talked about it beforehand and and heard

314

00:14:33,629 --> 00:14:30,970

it was a maybe even a couple of meteors

315

00:14:35,639 --> 00:14:33,639

per minute at its peak and and it's not

316

00:14:37,889 --> 00:14:35,649

typically one of the biggest meteor one

317

00:14:40,049 --> 00:14:37,899

of the bigger meteor storms we had meant

318

00:14:45,619 --> 00:14:40,059

to do it if we had some opportunity we

319

00:14:49,439 --> 00:14:45,629

ended up being too busy but yeah and the

320

00:14:53,549 --> 00:14:49,449

the peak of that particular meteorite

321

00:14:55,590 --> 00:14:53,559

storm occurred when we were on a date

322

00:14:58,319 --> 00:14:55,600

time pass so we would have been able to

323

00:15:00,299 --> 00:14:58,329

see the absolute peak we would have been

324

00:15:05,549 --> 00:15:00,309

able to see it maybe an hour after the

325

00:15:08,700 --> 00:15:05,559

Pete IC and Twitter user Marita guti

326

00:15:11,850 --> 00:15:08,710

asks do the subjects within your dream

327

00:15:18,450 --> 00:15:11,860

change when in space versus the dreams

328

00:15:21,450 --> 00:15:18,460

you have on earth yeah I don't really

329

00:15:22,830 --> 00:15:21,460

notice any any difference on the sleep

330

00:15:25,350 --> 00:15:22,840

you know how you sleep how well you

331

00:15:28,380 --> 00:15:25,360

sleep or dreams between being in space

332

00:15:29,940 --> 00:15:28,390

or being on planet earth and I know that

333

00:15:31,890 --> 00:15:29,950

question has come up before but I'm not

334

00:15:37,140 --> 00:15:31,900

sure what the other folks experience has

335

00:15:39,540 --> 00:15:37,150

been but for me it's been identical all

336

00:15:42,270 --> 00:15:39,550

right and Google employee Daniel Bay

337

00:15:43,980 --> 00:15:42,280

asks what personal items do you have

338

00:15:50,970 --> 00:15:43,990

with you if you're allowed to have any

339

00:15:54,570 --> 00:15:50,980

oh I brought one item that's really near

340

00:15:56,190 --> 00:15:54,580

and dear domain I brought my spoon and

341

00:15:59,700 --> 00:15:56,200

this is I call it my spoon of

342

00:16:02,100 --> 00:15:59,710

exploration this this is a spoon it's a

343

00:16:04,680 --> 00:16:02,110

russian-made spoon it's a long-handled

344

00:16:06,300 --> 00:16:04,690

spoon so that you can dig into the food

345

00:16:08,670 --> 00:16:06,310

pouches and not get your fingers all

346

00:16:11,040 --> 00:16:08,680

gooey and I had that during expedition

347

00:16:14,460 --> 00:16:11,050

six and it was one of the few things

348

00:16:18,660 --> 00:16:14,470

that I brought back with me when we did

349

00:16:21,930 --> 00:16:18,670

our extended mission and came back on so

350

00:16:23,580 --> 00:16:21,940

use and and I've taken that on a lot of

351

00:16:26,280 --> 00:16:23,590

NASA expeditions i'm taking it to

352

00:16:29,460 --> 00:16:26,290

Antarctica I've taken on Noel's trips I

353

00:16:31,170 --> 00:16:29,470

took it on sts-1 26 and each time I take

354

00:16:33,390 --> 00:16:31,180

it on one of these missions I engrave on

355

00:16:35,700 --> 00:16:33,400

it a little bit about about that mission

356

00:16:39,750 --> 00:16:35,710

and so I've got my spoon of exploration

357

00:16:42,120 --> 00:16:39,760

back here with me one more time so I can

358

00:16:43,710 --> 00:16:42,130

chow down with the same spewed that I've

359

00:16:48,240 --> 00:16:43,720

been chowing down for the last 10 years

360

00:16:50,720 --> 00:16:48,250

I love it all right we've got another

361

00:16:54,630 --> 00:16:50,730

question here from Twitter user Tom

362

00:17:00,780 --> 00:16:54,640

Marcinko space sickness is it still a

363

00:17:02,250 --> 00:17:00,790

problem and if so how common I don't

364

00:17:03,810 --> 00:17:02,260

know I would say it's probably effects

365

00:17:06,060 --> 00:17:03,820

to some degree or another about half of

366

00:17:08,490 --> 00:17:06,070

the folks at fly in space and and it's

367

00:17:10,920 --> 00:17:08,500

not a very big problem because even the

368

00:17:12,870 --> 00:17:10,930

folks that are that that really you know

369

00:17:15,570 --> 00:17:12,880

feel nauseas for the first couple of

370

00:17:19,740 --> 00:17:15,580

days after those couple of days it's it

371

00:17:21,799 --> 00:17:19,750

all goes away entirely and and I could

372

00:17:24,350 --> 00:17:21,809

say from experience that

373

00:17:26,299 --> 00:17:24,360

that you're sitting there working and

374

00:17:29,629 --> 00:17:26,309

all of a sudden you start to feel real

375

00:17:33,499 --> 00:17:29,639

real green and you go take care of the

376

00:17:35,600 --> 00:17:33,509

urge and then you just kind of wipe

377

00:17:38,269 --> 00:17:35,610

yourself down and get right back to work

378

00:17:40,399 --> 00:17:38,279

again and that's the best thing to do

379

00:17:42,470 --> 00:17:40,409

when we do not feelin very good with

380

00:17:45,619 --> 00:17:42,480

spacek this is just get your head back

381

00:17:47,509 --> 00:17:45,629

in the game and start working I see all

382

00:17:51,350 --> 00:17:47,519

right we've got a question here from

383

00:17:53,299 --> 00:17:51,360

stanford graduate student alex g what

384

00:18:01,970 --> 00:17:53,309

sort of encounters have you guys had

385

00:18:03,909 --> 00:18:01,980

with space debris if any we try we try

386

00:18:05,810 --> 00:18:03,919

our very best to avoid that the ground

387

00:18:07,909 --> 00:18:05,820

actually helps an awful lot in that

388

00:18:10,009 --> 00:18:07,919

respect and so all the items are about 4

389

00:18:12,619 --> 00:18:10,019

centimeters and larger are tracked as an

390

00:18:13,730 --> 00:18:12,629

individually catalogued and so if

391

00:18:15,499 --> 00:18:13,740

there's going to be what we call the

392

00:18:17,330 --> 00:18:15,509

conjunction or a close approach to one

393

00:18:19,609 --> 00:18:17,340

of these items and we've got adequate

394

00:18:21,919 --> 00:18:19,619

time then what we'll do is do a do

395

00:18:23,180 --> 00:18:21,929

really dance maneuver but the thing is

396

00:18:25,369 --> 00:18:23,190

that all the things that are smaller

397

00:18:27,080 --> 00:18:25,379

than that we really can't track they

398

00:18:28,970 --> 00:18:27,090

fall below the threshold of what you can

399

00:18:31,039 --> 00:18:28,980

detect and track from the ground so

400

00:18:33,680 --> 00:18:31,049

there's a certain bit of probability and

401
00:18:35,450 --> 00:18:33,690
statistics that dictate how we operate

402
00:18:38,090 --> 00:18:35,460
station there's always a chance we could

403
00:18:40,700 --> 00:18:38,100
have have a strike with what we call an

404
00:18:42,950 --> 00:18:40,710
mm OD micrometeoroid orbital debris if

405
00:18:44,450 --> 00:18:42,960
you're in on planet earth if you're any

406
00:18:47,239 --> 00:18:44,460
kind if you're an heir or any kind of

407
00:18:48,739 --> 00:18:47,249
fluid things that travel in that fluid

408
00:18:50,960 --> 00:18:48,749
tend to all roughly have the same

409
00:18:52,999 --> 00:18:50,970
velocity and the vacuum of space things

410
00:18:54,619 --> 00:18:53,009
can have you know delta velocities or

411
00:18:57,379 --> 00:18:54,629
difference in velocities that are in the

412
00:18:59,720 --> 00:18:57,389
tens of thousands of miles per hour and

413
00:19:02,389 --> 00:18:59,730

translate to a tremendous amount of of

414

00:19:05,090 --> 00:19:02,399

energy that can be transferred so we

415

00:19:07,070 --> 00:19:05,100

basically we got a big station with a

416

00:19:09,649 --> 00:19:07,080

lot of volume it's got micrometeoroid

417

00:19:12,169 --> 00:19:09,659

shielding on the outside of it but to a

418

00:19:14,090 --> 00:19:12,179

certain degree we are all a little bit

419

00:19:18,799 --> 00:19:14,100

at risk by the environment in low Earth

420

00:19:22,489 --> 00:19:18,809

orbit and when you do happen to go for a

421

00:19:24,499 --> 00:19:22,499

walk outside in a spacesuit you can see

422

00:19:26,149 --> 00:19:24,509

the effect of these micrometeorite

423

00:19:27,739 --> 00:19:26,159

impacts on the outside the station you

424

00:19:30,169 --> 00:19:27,749

can see handrails and things at on

425

00:19:32,359 --> 00:19:30,179

occasion have a little crater a little

426

00:19:34,100 --> 00:19:32,369

pit it looks looks kind of like meteor

427

00:19:35,180 --> 00:19:34,110

crater a miniature version of meteor

428

00:19:37,300 --> 00:19:35,190

crater from Arizona

429

00:19:40,460 --> 00:19:37,310

no and it's right on a handrail and

430

00:19:43,100 --> 00:19:40,470

we're cautioned to be careful when we

431

00:19:45,530 --> 00:19:43,110

see those because you could cut a glove

432

00:19:48,890 --> 00:19:45,540

which you wouldn't really want to do in

433

00:19:51,980 --> 00:19:48,900

that situation on some of the sharp

434

00:19:54,230 --> 00:19:51,990

edges from these micro meteorites Wow

435

00:19:55,550 --> 00:19:54,240

all right well thanks guys so much we've

436

00:19:57,200 --> 00:19:55,560

run out of time but I just want to thank

437

00:20:01,760 --> 00:19:57,210

you so much for having this chat with me

438

00:20:03,800 --> 00:20:01,770

today Kara's great having you aboard

439

00:20:05,960 --> 00:20:03,810

thanks thanks for the talk as well and

440

00:20:09,830 --> 00:20:05,970

from expedition 30 all the best to you

441

00:20:11,930 --> 00:20:09,840

and to your readers station this is

442

00:20:16,070 --> 00:20:11,940

Houston ACR that concludes the event

443

00:20:18,140 --> 00:20:16,080

thank you UK GW TV and The Huffington