



1
00:00:05,349 --> 00:00:03,590
hello mission control

2
00:00:07,269 --> 00:00:05,359
hey ryan this is mission control houston

3
00:00:08,870 --> 00:00:07,279
how do you guys hear me

4
00:00:10,709 --> 00:00:08,880
we hear you very well we do have

5
00:00:12,390 --> 00:00:10,719
northeast elementary or northeast

6
00:00:15,350 --> 00:00:12,400
nottaway elementary from ravenwood

7
00:00:16,710 --> 00:00:15,360
missouri with with us today and uh you

8
00:00:18,150 --> 00:00:16,720
are welcome to

9
00:00:20,150 --> 00:00:18,160
to take it from here they have some

10
00:00:22,230 --> 00:00:20,160
really cool questions for you okay

11
00:00:23,750 --> 00:00:22,240
thanks ryan and uh

12
00:00:25,910 --> 00:00:23,760
guys and girls welcome to you know

13
00:00:28,150 --> 00:00:25,920

mission control houston this is where we

14

00:00:29,830 --> 00:00:28,160

actually you control all the systems and

15

00:00:32,229 --> 00:00:29,840

monitor everything on board the

16

00:00:34,709 --> 00:00:32,239

international space station uh joining

17

00:00:37,030 --> 00:00:34,719

me right now is todd kwasny he's one of

18

00:00:38,310 --> 00:00:37,040

our odin flight controllers uh todd what

19

00:00:39,750 --> 00:00:38,320

what are some of the systems you're

20

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

responsible for

21

00:00:43,350 --> 00:00:41,440

so as a as a odin flight controller

22

00:00:45,110 --> 00:00:43,360

we're in charge of most of the

23

00:00:47,430 --> 00:00:45,120

the core computer systems on the space

24

00:00:49,270 --> 00:00:47,440

station so when i say corcoran's core

25

00:00:50,709 --> 00:00:49,280

system i mean something that actually

26
00:00:52,950 --> 00:00:50,719
flies the space station so something

27
00:00:55,189 --> 00:00:52,960
that you know talks to the the

28
00:00:56,549 --> 00:00:55,199
communication systems and make sure that

29
00:00:58,709 --> 00:00:56,559
we're pointing the right direction and

30
00:01:00,389 --> 00:00:58,719
we're tracking this on things like that

31
00:01:03,510 --> 00:01:00,399
it's kind of like your outer space it

32
00:01:07,109 --> 00:01:03,520
guy too you got it i'm kind of like the

33
00:01:08,469 --> 00:01:07,119
it uh fix it guy okay well uh we're real

34
00:01:09,750 --> 00:01:08,479
excited to take some of your questions

35
00:01:23,990 --> 00:01:09,760
today why don't you give us the first

36
00:01:28,149 --> 00:01:25,590
i think the question was one day could

37
00:01:30,630 --> 00:01:28,159
mars be inhabitable

38
00:01:33,109 --> 00:01:30,640

well you know uh i i'm not sure we have

39

00:01:34,710 --> 00:01:33,119

a lot of people looking into that and uh

40

00:01:36,310 --> 00:01:34,720

i uh

41

00:01:37,510 --> 00:01:36,320

unfortunately i

42

00:01:40,469 --> 00:01:37,520

something that i don't work with

43

00:01:42,149 --> 00:01:40,479

directly so uh i i certainly hope so it

44

00:01:43,270 --> 00:01:42,159

seems like it'd be a great great thing

45

00:01:45,350 --> 00:01:43,280

to do if

46

00:01:46,630 --> 00:01:45,360

we could get there and inhabit mars we

47

00:01:48,389 --> 00:01:46,640

certainly yeah we certainly hope so i

48

00:01:50,069 --> 00:01:48,399

mean there are there are signs kind of

49

00:01:51,590 --> 00:01:50,079

that mars may have had a climate like

50

00:01:53,190 --> 00:01:51,600

ours i you know many millions and

51
00:01:56,230 --> 00:01:53,200
millions and millions of years ago even

52
00:01:57,670 --> 00:01:56,240
billions uh so if some future

53
00:01:59,910 --> 00:01:57,680
civilization gets something like

54
00:02:00,950 --> 00:01:59,920
terraforming which any of you sci-fi

55
00:02:02,630 --> 00:02:00,960
people

56
00:02:05,109 --> 00:02:02,640
know is kind of like making a planet's

57
00:02:06,550 --> 00:02:05,119
atmosphere more like ours i know some of

58
00:02:08,229 --> 00:02:06,560
the methods that are you know

59
00:02:09,910 --> 00:02:08,239
everything's very hypothetical right now

60
00:02:12,150 --> 00:02:09,920
because that kind of technology just

61
00:02:13,910 --> 00:02:12,160
does not exist but who knows maybe a

62
00:02:15,910 --> 00:02:13,920
human civilization a million years from

63
00:02:17,589 --> 00:02:15,920

now will have the ability to

64

00:02:19,510 --> 00:02:17,599

make an atmosphere and turn mars

65

00:02:21,350 --> 00:02:19,520

habitable but i mean right now it's it's

66

00:02:23,350 --> 00:02:21,360

way too cold

67

00:02:25,510 --> 00:02:23,360

doesn't have you know earth's protective

68

00:02:27,350 --> 00:02:25,520

magnetosphere which protects us from all

69

00:02:29,190 --> 00:02:27,360

that dangerous radiation

70

00:02:30,710 --> 00:02:29,200

so i mean it would it would be a huge

71

00:02:32,550 --> 00:02:30,720

project and it's something we as a

72

00:02:34,229 --> 00:02:32,560

civilization couldn't tackle right now

73

00:02:35,589 --> 00:02:34,239

but maybe sometime in the future we

74

00:02:40,550 --> 00:02:35,599

could

75

00:02:45,589 --> 00:02:43,270

um did you guys have anything to do with

76

00:02:47,910 --> 00:02:45,599

the angry birds thing the angry birds

77

00:02:50,790 --> 00:02:47,920

space

78

00:02:52,150 --> 00:02:50,800

wow well i i can tell you that uh i i've

79

00:02:54,630 --> 00:02:52,160

played a lot of angry birds space and

80

00:02:57,430 --> 00:02:54,640

i'm a big fan that's uh that's for sure

81

00:02:59,830 --> 00:02:57,440

it's always fun to uh to see um you know

82

00:03:01,750 --> 00:02:59,840

space applications like that and

83

00:03:03,509 --> 00:03:01,760

get to see uh something that's something

84

00:03:05,589 --> 00:03:03,519

you're not used to used to you know

85

00:03:07,270 --> 00:03:05,599

playing the original angry birds uh you

86

00:03:09,350 --> 00:03:07,280

know watching the birds fall just like

87

00:03:10,869 --> 00:03:09,360

they would here on earth but uh seeing

88

00:03:11,750 --> 00:03:10,879

what they were doing in spaces is a lot

89

00:03:13,830 --> 00:03:11,760

of fun

90

00:03:15,430 --> 00:03:13,840

and i i do know they talk to a few of

91

00:03:17,030 --> 00:03:15,440

our scientists you know help them get

92

00:03:18,790 --> 00:03:17,040

down things like

93

00:03:20,229 --> 00:03:18,800

the mechanics of actually moving through

94

00:03:21,589 --> 00:03:20,239

gravity like if

95

00:03:24,470 --> 00:03:21,599

i'm sure a bunch of you guys have been

96

00:03:26,229 --> 00:03:24,480

playing angry bird space uh when you're

97

00:03:28,550 --> 00:03:26,239

actually shooting into an atmosphere

98

00:03:30,229 --> 00:03:28,560

you'll you'll go into an orbit and

99

00:03:32,550 --> 00:03:30,239

uh that's they're actually pretty

100

00:03:34,309 --> 00:03:32,560

spot-on i've heard with the mechanics of

101
00:03:37,030 --> 00:03:34,319
doing that and also just moving through

102
00:03:38,630 --> 00:03:37,040
the vacuum in angry bird space so we we

103
00:03:40,149 --> 00:03:38,640
did have a little bit to do with it but

104
00:03:41,589 --> 00:03:40,159
i mean we didn't we didn't create the

105
00:03:45,190 --> 00:03:41,599
game

106
00:03:48,229 --> 00:03:46,470
um

107
00:03:49,910 --> 00:03:48,239
whenever you're up in the international

108
00:03:52,789 --> 00:03:49,920
space station can you call from your

109
00:03:55,190 --> 00:03:52,799
cell phone if you have it

110
00:03:57,030 --> 00:03:55,200
that is a really good question so

111
00:03:58,390 --> 00:03:57,040
um that you know that that's a common

112
00:03:59,830 --> 00:03:58,400
thing that the astronauts want to do

113
00:04:02,070 --> 00:03:59,840

they're up there for a really long time

114

00:04:03,589 --> 00:04:02,080

and they uh they really like to keep in

115

00:04:05,830 --> 00:04:03,599

touch with what's going on

116

00:04:07,750 --> 00:04:05,840

on earth as much as possible so

117

00:04:09,830 --> 00:04:07,760

one of the things that we we give to

118

00:04:11,589 --> 00:04:09,840

them you know the ability is is a phone

119

00:04:13,190 --> 00:04:11,599

it's called the ip phone and it's it's

120

00:04:14,949 --> 00:04:13,200

very similar to the phone that you would

121

00:04:16,870 --> 00:04:14,959

have at your house where you can pick up

122

00:04:18,550 --> 00:04:16,880

the phone and and dial just about any

123

00:04:20,789 --> 00:04:18,560

number you want we can't call up to them

124

00:04:22,950 --> 00:04:20,799

that way but uh they're able to on their

125

00:04:24,469 --> 00:04:22,960

own time call call just about any any

126

00:04:26,629 --> 00:04:24,479

number they want they talk to a lot of

127

00:04:28,469 --> 00:04:26,639

their friends and family that way and it

128

00:04:30,950 --> 00:04:28,479

really helps them keep in touch with uh

129

00:04:32,550 --> 00:04:30,960

with what's going on um you know the

130

00:04:33,909 --> 00:04:32,560

outside of just what they can read in in

131

00:04:35,749 --> 00:04:33,919

news or email

132

00:04:37,270 --> 00:04:35,759

but no no cell phones on space so

133

00:04:38,550 --> 00:04:37,280

they're not texting back and forth all

134

00:04:41,189 --> 00:04:38,560

day while they're supposed to be working

135

00:04:42,710 --> 00:04:41,199

no no no no cell phones they um they we

136

00:04:44,230 --> 00:04:42,720

we keep them on a strict schedule during

137

00:04:45,909 --> 00:04:44,240

the day so uh

138

00:04:48,710 --> 00:04:45,919

they're not they get distracted too much

139

00:04:51,590 --> 00:04:48,720

by uh by text messages or phone calls or

140

00:05:00,950 --> 00:04:51,600

even playing angry birds

141

00:05:06,710 --> 00:05:04,469

um what time is it up there right now

142

00:05:08,710 --> 00:05:06,720

oh that is a great question

143

00:05:10,469 --> 00:05:08,720

so so time is something that we we kind

144

00:05:12,469 --> 00:05:10,479

of take for granted you know you you

145

00:05:14,070 --> 00:05:12,479

look at a clock on the wall or or at

146

00:05:15,909 --> 00:05:14,080

your watch and you see what time it is

147

00:05:17,430 --> 00:05:15,919

but but the problem with uh time and

148

00:05:19,830 --> 00:05:17,440

space is the fact that the space station

149

00:05:20,870 --> 00:05:19,840

goes uh around the earth every 90

150

00:05:23,670 --> 00:05:20,880

minutes

151
00:05:24,710 --> 00:05:23,680
so uh so you know at any given point you

152
00:05:26,230 --> 00:05:24,720
know it could be

153
00:05:28,390 --> 00:05:26,240
you know a number of different different

154
00:05:29,510 --> 00:05:28,400
times on on the ground whereas whereas

155
00:05:31,510 --> 00:05:29,520
in space they're they're going around

156
00:05:35,110 --> 00:05:31,520
really fast so what we do is we we

157
00:05:36,710 --> 00:05:35,120
adopted uh greenwich mean time so gmt

158
00:05:38,629 --> 00:05:36,720
so it's it's the the time that's

159
00:05:39,909 --> 00:05:38,639
actually in greenwich greenwich uh

160
00:05:42,150 --> 00:05:39,919
england right now

161
00:05:43,990 --> 00:05:42,160
and uh all the control centers from from

162
00:05:45,830 --> 00:05:44,000
around the country that uh that interact

163
00:05:47,749 --> 00:05:45,840

with the space station uh that we all

164

00:05:50,870 --> 00:05:47,759

use the same time to make sure that uh

165

00:05:52,390 --> 00:05:50,880

that we're all in sync and the the crew

166

00:05:54,390 --> 00:05:52,400

uses that on board as well

167

00:05:57,830 --> 00:05:54,400

i think according to our clock right now

168

00:05:59,590 --> 00:05:57,840

it's 16 11 and 23 seconds greenwich mean

169

00:06:01,270 --> 00:05:59,600

time so it's that's what time it is up

170

00:06:12,390 --> 00:06:01,280

on station right now

171

00:06:16,950 --> 00:06:14,469

hey dan this is ryan shafer at the dln i

172

00:06:19,029 --> 00:06:16,960

think we may have lost the

173

00:06:20,950 --> 00:06:19,039

school if we are patient we may be able

174

00:06:22,550 --> 00:06:20,960

to re-establish a connection okay ryan

175

00:06:41,670 --> 00:06:22,560

we'll be standing by

176

00:06:41,680 --> 00:08:22,550

okay cool she switched

177

00:08:22,560 --> 00:08:33,029

hmm

178

00:08:37,190 --> 00:08:34,949

okay i'm glad to hear that mission

179

00:08:39,990 --> 00:08:37,200

control we do have northeast not away

180

00:08:41,909 --> 00:08:40,000

with us again

181

00:08:43,829 --> 00:08:41,919

welcome back i apologize all right i

182

00:08:46,710 --> 00:08:43,839

hope uh everything is still okay on your

183

00:08:48,630 --> 00:08:46,720

end but i i i'm hoping that uh dan and

184

00:08:50,630 --> 00:08:48,640

our guests today are still able to

185

00:08:53,030 --> 00:08:50,640

answer some questions yup we're still

186

00:08:55,350 --> 00:08:53,040

here and ready to go ryan

187

00:08:57,110 --> 00:08:55,360

great then i'll let the kids ask some

188

00:08:58,389 --> 00:08:57,120

more questions

189

00:08:59,670 --> 00:08:58,399

okay can we

190

00:09:01,110 --> 00:08:59,680

can we hear the answer to the last

191

00:09:03,750 --> 00:09:01,120

question about the time zone because we

192

00:09:06,389 --> 00:09:03,760

didn't get all of that oh yeah sure

193

00:09:08,470 --> 00:09:06,399

okay so again a really good question uh

194

00:09:09,990 --> 00:09:08,480

time and space is is a little bit

195

00:09:12,310 --> 00:09:10,000

difficult it's something we take for

196

00:09:13,110 --> 00:09:12,320

granted here here on the ground uh

197

00:09:14,550 --> 00:09:13,120

so

198

00:09:16,470 --> 00:09:14,560

the the space station's going around the

199

00:09:18,550 --> 00:09:16,480

earth every 90 minutes it's going really

200

00:09:21,350 --> 00:09:18,560

really fast so it's it's not something

201
00:09:23,670 --> 00:09:21,360
like we can't keep time like we do

202
00:09:25,110 --> 00:09:23,680
do here on on on the planet

203
00:09:27,829 --> 00:09:25,120
because you know the sun sun rises and

204
00:09:29,269 --> 00:09:27,839
sets every 45 minutes so what we've done

205
00:09:31,829 --> 00:09:29,279
is we've adopted

206
00:09:34,630 --> 00:09:31,839
a common time it's greenwich mean time

207
00:09:37,030 --> 00:09:34,640
so the time it's in in greenwich

208
00:09:38,710 --> 00:09:37,040
england right now and all the control

209
00:09:40,949 --> 00:09:38,720
centers that uh that talk and control

210
00:09:43,670 --> 00:09:40,959
the space station from from around the

211
00:09:45,030 --> 00:09:43,680
world all all use the same time so that

212
00:09:46,070 --> 00:09:45,040
we use the same time as the space

213
00:09:48,070 --> 00:09:46,080

station

214

00:09:50,550 --> 00:09:48,080

um and uh we're all doing the same

215

00:09:53,110 --> 00:09:50,560

things at the same time and looking at

216

00:09:56,230 --> 00:09:53,120

our clock right now it looks like it's

217

00:09:59,430 --> 00:09:56,240

16 15 and 21 seconds that's about you

218

00:10:02,949 --> 00:09:59,440

know 4 15 they use the military the 24

219

00:10:04,790 --> 00:10:02,959

hour times so right now yet 16 15 on

220

00:10:11,590 --> 00:10:04,800

board station

221

00:10:16,790 --> 00:10:13,670

do you think any

222

00:10:20,150 --> 00:10:16,800

living organisms could survive on any

223

00:10:23,670 --> 00:10:21,509

i think the question was do you think

224

00:10:26,069 --> 00:10:23,680

any living organisms could survive on

225

00:10:28,150 --> 00:10:26,079

other planets

226

00:10:30,230 --> 00:10:28,160

well i that that's a really big question

227

00:10:31,750 --> 00:10:30,240

and uh and another one of those that i

228

00:10:34,550 --> 00:10:31,760

know that we have a lot of people

229

00:10:35,910 --> 00:10:34,560

looking into it uh and and trying to do

230

00:10:38,550 --> 00:10:35,920

that that very same thing you know kind

231

00:10:39,829 --> 00:10:38,560

of goes back to you know our is mars

232

00:10:45,509 --> 00:10:39,839

inhabitable and

233

00:10:47,990 --> 00:10:45,519

things have to happen um between now and

234

00:10:49,910 --> 00:10:48,000

now and then but uh i i certainly think

235

00:10:51,670 --> 00:10:49,920

that uh that that's something that

236

00:10:54,069 --> 00:10:51,680

it's a goal for a lot of people

237

00:10:57,030 --> 00:10:54,079

and i i agree i think it

238

00:10:58,790 --> 00:10:57,040

i think it is definitely possible um i

239

00:11:00,310 --> 00:10:58,800

mean a lot of the times we think if

240

00:11:03,110 --> 00:11:00,320

something's going to be alive it has to

241

00:11:05,430 --> 00:11:03,120

have things like sunlight and water

242

00:11:06,870 --> 00:11:05,440

but at the same time we found organisms

243

00:11:09,350 --> 00:11:06,880

in some of the deepest and most

244

00:11:10,310 --> 00:11:09,360

uninhabitable places on earth actually

245

00:11:12,550 --> 00:11:10,320

living

246

00:11:14,470 --> 00:11:12,560

so there could be any number of things

247

00:11:16,710 --> 00:11:14,480

out there that are surviving in ways we

248

00:11:18,389 --> 00:11:16,720

don't even understand that could very

249

00:11:19,990 --> 00:11:18,399

well be alive so it's it's definitely a

250

00:11:21,990 --> 00:11:20,000

possibility when there's

251
00:11:24,069 --> 00:11:22,000
as many stars and planets out there as

252
00:11:29,190 --> 00:11:24,079
there are you never know

253
00:11:37,030 --> 00:11:30,949
um

254
00:11:39,509 --> 00:11:37,040
what is r2 doing now

255
00:11:42,630 --> 00:11:39,519
so right now r2 is uh

256
00:11:43,430 --> 00:11:42,640
he's asleep if you will so um when when

257
00:11:45,829 --> 00:11:43,440
uh

258
00:11:47,910 --> 00:11:45,839
when he's not out and and activated then

259
00:11:50,150 --> 00:11:47,920
we keep him all all uh

260
00:11:52,069 --> 00:11:50,160
buttoned up and and kind of kind of

261
00:11:53,829 --> 00:11:52,079
sleeping in his own little uh cubby hole

262
00:11:55,269 --> 00:11:53,839
if you will

263
00:11:58,310 --> 00:11:55,279

so i i think that the crew isn't

264

00:12:00,310 --> 00:11:58,320
scheduled to to play with r2 today

265

00:12:02,150 --> 00:12:00,320
but uh i know coming out here pretty

266

00:12:05,030 --> 00:12:02,160
soon they'll pull them out for for some

267

00:12:07,269 --> 00:12:05,040
more tests and uh we'll get to to

268

00:12:09,350 --> 00:12:07,279
further expand and understand exactly

269

00:12:11,190 --> 00:12:09,360
everything that we can can use r2 for

270

00:12:15,110 --> 00:12:11,200
and so it's a wonderful wonderful tool

271

00:12:16,310 --> 00:12:15,120
and and a great uh asset for nasa yep

272

00:12:17,670 --> 00:12:16,320
and i mean some of the tests that

273

00:12:19,269 --> 00:12:17,680
they've been doing lately they've been

274

00:12:20,949 --> 00:12:19,279
kind of powering them on and moving his

275

00:12:23,190 --> 00:12:20,959
arms around and i think he might have

276

00:12:25,269 --> 00:12:23,200

done some sign language the other day

277

00:12:27,190 --> 00:12:25,279

yeah the other day i saw he signed hello

278

00:12:28,870 --> 00:12:27,200

world american sign language it was it

279

00:12:30,230 --> 00:12:28,880

was a really neat thing to see so just

280

00:12:32,150 --> 00:12:30,240

kind of putting him through his first

281

00:12:34,710 --> 00:12:32,160

paces and getting them ready for some

282

00:12:49,750 --> 00:12:34,720

more advanced stuff coming up

283

00:12:53,030 --> 00:12:51,269

do you get that one

284

00:12:55,750 --> 00:12:53,040

i'm sorry could you ask the question one

285

00:13:03,350 --> 00:13:00,389

could the clock go backwards up in space

286

00:13:04,150 --> 00:13:03,360

does the clock go backwards up in space

287

00:13:05,670 --> 00:13:04,160

so

288

00:13:08,710 --> 00:13:05,680

um

289

00:13:10,629 --> 00:13:08,720

not not really the the the clocks clocks

290

00:13:11,990 --> 00:13:10,639

in space you know operate just like they

291

00:13:13,829 --> 00:13:12,000

they do here on the ground you know

292

00:13:15,269 --> 00:13:13,839

they'll they'll just uh measure how many

293

00:13:17,190 --> 00:13:15,279

seconds or how many minutes or hours are

294

00:13:18,790 --> 00:13:17,200

going by and they'll just kind of kind

295

00:13:20,790 --> 00:13:18,800

of take away we i'm not that i know that

296

00:13:22,150 --> 00:13:20,800

we've ever seen one one go backwards and

297

00:13:24,150 --> 00:13:22,160

unless we're we're setting the clock

298

00:13:25,910 --> 00:13:24,160

like uh like we would hear on the ground

299

00:13:27,430 --> 00:13:25,920

we haven't quite mastered time travel

300

00:13:29,590 --> 00:13:27,440

yet but you know we're all hoping

301

00:13:30,949 --> 00:13:29,600

sometime in the future uh one

302

00:13:33,110 --> 00:13:30,959

interesting thing that could happen in

303

00:13:35,269 --> 00:13:33,120

space flight and once you guys kind of

304

00:13:37,509 --> 00:13:35,279

get into some higher level science and

305

00:13:39,189 --> 00:13:37,519

math courses is the idea that if you're

306

00:13:41,910 --> 00:13:39,199

traveling really really fast time

307

00:13:44,790 --> 00:13:41,920

doesn't go backwards but it slows down

308

00:13:46,470 --> 00:13:44,800

um and so there are

309

00:13:47,590 --> 00:13:46,480

studies being done with clocks that you

310

00:13:49,269 --> 00:13:47,600

know we send them out there and they

311

00:13:51,430 --> 00:13:49,279

travel at thousands and thousands and

312

00:13:53,509 --> 00:13:51,440

thousands of miles an hour and when you

313

00:13:55,189 --> 00:13:53,519

compare them to a clock here on earth i

314

00:13:57,189 --> 00:13:55,199

mean it's the time has progressed a

315

00:13:58,949 --> 00:13:57,199

little bit slower on those clocks but i

316

00:14:00,310 --> 00:13:58,959

mean it's such a such a small amount

317

00:14:03,189 --> 00:14:00,320

unless you're traveling the speed of

318

00:14:05,189 --> 00:14:03,199

light which we don't quite do yet

319

00:14:07,509 --> 00:14:05,199

it's not even noticeable so they don't

320

00:14:09,269 --> 00:14:07,519

go backwards but we may someday be able

321

00:14:22,550 --> 00:14:09,279

to slow time down

322

00:14:27,910 --> 00:14:24,790

astronauts have a favorite of what kind

323

00:14:32,470 --> 00:14:30,550

do astronauts have favorite foods uh you

324

00:14:34,550 --> 00:14:32,480

know they they do and then it's kind of

325

00:14:35,910 --> 00:14:34,560

a an individual taste just just like you

326

00:14:37,590 --> 00:14:35,920

would here on the ground you know

327

00:14:39,350 --> 00:14:37,600

sometimes you know you like a good you

328

00:14:41,350 --> 00:14:39,360

know hamburger hot dogs nice people like

329

00:14:42,710 --> 00:14:41,360

you know spaghetti or lasagna so it's

330

00:14:44,310 --> 00:14:42,720

it's the same thing for the for the

331

00:14:46,790 --> 00:14:44,320

astronauts on the space station they

332

00:14:47,590 --> 00:14:46,800

have a wide variety of food to choose

333

00:14:49,350 --> 00:14:47,600

from

334

00:14:50,790 --> 00:14:49,360

and uh they uh

335

00:14:52,150 --> 00:14:50,800

they they kind of their own favorites

336

00:14:53,829 --> 00:14:52,160

what i'm what i'm told a lot of them

337

00:14:55,750 --> 00:14:53,839

tell me uh after they come back is they

338

00:14:57,430 --> 00:14:55,760

really like spicy foods for for some

339

00:14:59,670 --> 00:14:57,440

reason you know when they get into space

340

00:15:01,509 --> 00:14:59,680

uh something about spicy foods just is a

341

00:15:03,670 --> 00:15:01,519

little bit more appealing to them so i

342

00:15:06,069 --> 00:15:03,680

hear the shrimp cocktail is to die for

343

00:15:08,550 --> 00:15:06,079

when you're in space quite a bit yeah so

344

00:15:10,389 --> 00:15:08,560

uh so um they they do have foods that

345

00:15:12,069 --> 00:15:10,399

they have a lot of different kinds is

346

00:15:14,710 --> 00:15:12,079

kind of the big thing to keep in mind so

347

00:15:16,389 --> 00:15:14,720

they they try a lot of different things

348

00:15:18,470 --> 00:15:16,399

so pretty much almost whatever you like

349

00:15:20,550 --> 00:15:18,480

on the ground you can have up in space

350

00:15:22,949 --> 00:15:20,560

just about to a degree yeah just about

351
00:15:24,470 --> 00:15:22,959
you can have a

352
00:15:25,590 --> 00:15:24,480
you know of all kinds of different kinds

353
00:15:29,030 --> 00:15:25,600
of food

354
00:15:30,389 --> 00:15:29,040
all right next question guys

355
00:15:33,030 --> 00:15:30,399
well which

356
00:15:35,829 --> 00:15:33,040
where is the international space station

357
00:15:37,670 --> 00:15:35,839
over the earth right now

358
00:15:40,550 --> 00:15:37,680
oh wow where is the over the earth right

359
00:15:44,310 --> 00:15:40,560
now well it looks like we are tracking

360
00:15:46,870 --> 00:15:44,320
right over the northern pacific ocean

361
00:15:48,310 --> 00:15:46,880
uh it's so it's pretty much right in the

362
00:15:49,310 --> 00:15:48,320
middle of the ocean right now and it's

363
00:15:52,550 --> 00:15:49,320

about

364

00:15:54,389 --> 00:15:52,560

247 miles above the surface

365

00:15:56,870 --> 00:15:54,399

so and again it's moving at about i

366

00:15:58,150 --> 00:15:56,880

think 17 500 miles an hour that's

367

00:16:00,550 --> 00:15:58,160

correct so it's only going to be there

368

00:16:02,069 --> 00:16:00,560

for a little while pretty soon it'll be

369

00:16:04,389 --> 00:16:02,079

over a completely other part of the

370

00:16:05,509 --> 00:16:04,399

planet as it goes around in about 90

371

00:16:06,949 --> 00:16:05,519

minutes

372

00:16:08,470 --> 00:16:06,959

looks like it's coming up pretty here

373

00:16:10,870 --> 00:16:08,480

pretty soon on the southern part of

374

00:16:12,629 --> 00:16:10,880

south america and it'll fly up

375

00:16:15,430 --> 00:16:12,639

over europe and then

376

00:16:17,350 --> 00:16:15,440

then over uh

377

00:16:18,790 --> 00:16:17,360

go back over you know the pacific ocean

378

00:16:22,069 --> 00:16:18,800

again yep

379

00:16:24,949 --> 00:16:22,079

all right next question guys

380

00:16:28,310 --> 00:16:24,959

um does their food come in like packages

381

00:16:29,749 --> 00:16:28,320

like military food does

382

00:16:30,870 --> 00:16:29,759

oh that that's a good one to know you

383

00:16:32,389 --> 00:16:30,880

know that i think that's something that

384

00:16:34,150 --> 00:16:32,399

uh that someone should ask before they

385

00:16:35,350 --> 00:16:34,160

become an astronaut is you know how's

386

00:16:36,710 --> 00:16:35,360

the food come

387

00:16:39,110 --> 00:16:36,720

so like i said there there's a wide

388

00:16:40,790 --> 00:16:39,120

variety of food they get to eat a number

389

00:16:42,629 --> 00:16:40,800

of different kinds but they're they're

390

00:16:45,269 --> 00:16:42,639

kind of broken up in the into several

391

00:16:46,710 --> 00:16:45,279

categories so uh the military you know

392

00:16:50,069 --> 00:16:46,720

style food that you're talking about is

393

00:16:51,509 --> 00:16:50,079

uh you know mres meals ready to eat so

394

00:16:53,749 --> 00:16:51,519

it's kind of a

395

00:16:55,430 --> 00:16:53,759

you know a package where you can open

396

00:16:57,030 --> 00:16:55,440

and eat it right away

397

00:16:59,350 --> 00:16:57,040

and uh and and some astronauts really

398

00:17:00,949 --> 00:16:59,360

like the the mres to let them come from

399

00:17:03,350 --> 00:17:00,959

the military or a lot of you know

400

00:17:04,390 --> 00:17:03,360

camping and hiking backgrounds so uh

401
00:17:07,029 --> 00:17:04,400
they're used to that kind of food and

402
00:17:09,270 --> 00:17:07,039
they eat a lot uh some food comes

403
00:17:11,429 --> 00:17:09,280
dehydrated so they have

404
00:17:13,189 --> 00:17:11,439
they have to and put water into it first

405
00:17:15,429 --> 00:17:13,199
so they they'll heat up with some water

406
00:17:17,590 --> 00:17:15,439
and make it warm and then and inject it

407
00:17:19,189 --> 00:17:17,600
into into the food and it kind of comes

408
00:17:21,110 --> 00:17:19,199
to life if you will need that and then

409
00:17:23,350 --> 00:17:21,120
there's some some food that's uh

410
00:17:25,750 --> 00:17:23,360
that's a little bit more fresh and and

411
00:17:27,669 --> 00:17:25,760
ready to eat but um that they don't get

412
00:17:29,029 --> 00:17:27,679
a whole lot of that so it's it's it's

413
00:17:30,950 --> 00:17:29,039

kind of a treat when they're able to eat

414

00:17:33,830 --> 00:17:30,960

some some fresh fruit vegetables yeah i

415

00:17:35,990 --> 00:17:33,840

know um on the cargo craft that just

416

00:17:37,750 --> 00:17:36,000

stocked one of the european ones i

417

00:17:39,029 --> 00:17:37,760

brought up some fresh fruit for the crew

418

00:17:40,789 --> 00:17:39,039

and they always look forward to that

419

00:17:42,070 --> 00:17:40,799

they get real excited because i mean

420

00:17:43,590 --> 00:17:42,080

pretty much pretty much the vast

421

00:17:45,430 --> 00:17:43,600

majority of the food it's kind of like

422

00:17:47,669 --> 00:17:45,440

these little

423

00:17:49,190 --> 00:17:47,679

dehydrated plastic packets where they

424

00:17:51,029 --> 00:17:49,200

have to put water in and like you said

425

00:17:52,230 --> 00:17:51,039

it kind of makes the food come to life

426

00:17:54,870 --> 00:17:52,240

after that

427

00:17:56,630 --> 00:17:54,880

yeah exactly and i know on the on the

428

00:17:58,310 --> 00:17:56,640

cargo vehicle just talked we make sure

429

00:17:59,750 --> 00:17:58,320

that we pack the food one of the last

430

00:18:00,630 --> 00:17:59,760

things to make sure they can get to it

431

00:18:01,669 --> 00:18:00,640

quick because they're really looking

432

00:18:03,990 --> 00:18:01,679

forward to that you don't want to open

433

00:18:05,270 --> 00:18:04,000

it up and have all kinds of nasty smells

434

00:18:07,430 --> 00:18:05,280

coming out as soon as they open up that

435

00:18:18,789 --> 00:18:07,440

cargo vehicle all right next question

436

00:18:21,830 --> 00:18:20,230

what kind of training do they do to

437

00:18:24,630 --> 00:18:21,840

prepare for everything was that what i

438

00:18:28,789 --> 00:18:26,470

yes okay

439

00:18:30,549 --> 00:18:28,799

training well you know that that's a big

440

00:18:31,909 --> 00:18:30,559

uh it's a really really good question

441

00:18:33,110 --> 00:18:31,919

and very insightful

442

00:18:35,029 --> 00:18:33,120

um you know

443

00:18:36,789 --> 00:18:35,039

quite often you see astronauts on tv and

444

00:18:37,990 --> 00:18:36,799

you know watch nasa tv and and see them

445

00:18:39,510 --> 00:18:38,000

floating around doing all these really

446

00:18:40,950 --> 00:18:39,520

cool things you know these cool you know

447

00:18:42,870 --> 00:18:40,960

science experiments and getting to play

448

00:18:44,630 --> 00:18:42,880

with r2 and all those types of things

449

00:18:46,630 --> 00:18:44,640

but what you don't see is the hours and

450

00:18:48,470 --> 00:18:46,640

hours and hours that the astronauts have

451
00:18:50,310 --> 00:18:48,480
to go through training they they do all

452
00:18:52,310 --> 00:18:50,320
kinds of training everything from you

453
00:18:53,750 --> 00:18:52,320
know learning about the the simpsons on

454
00:18:55,430 --> 00:18:53,760
systems onboard the space station just

455
00:18:57,190 --> 00:18:55,440
in case something were to go wrong

456
00:18:59,029 --> 00:18:57,200
they they spend a lot of time uh with

457
00:19:00,710 --> 00:18:59,039
the the science developers the the

458
00:19:01,669 --> 00:19:00,720
science folks to sit down and make sure

459
00:19:02,870 --> 00:19:01,679
that they're doing all their science

460
00:19:03,990 --> 00:19:02,880
experiments correctly and they're

461
00:19:05,669 --> 00:19:04,000
they're getting all the all the good

462
00:19:07,510 --> 00:19:05,679
data back back to earth

463
00:19:09,350 --> 00:19:07,520

to be studied and analyzed

464

00:19:11,190 --> 00:19:09,360

and then they do a lot of training for

465

00:19:12,470 --> 00:19:11,200

specific tasks like a spacewalk so

466

00:19:14,630 --> 00:19:12,480

they'll go and go into the neutral

467

00:19:16,150 --> 00:19:14,640

buoyancy lab and go into the big pool

468

00:19:18,950 --> 00:19:16,160

get in their spacesuits and practice

469

00:19:20,470 --> 00:19:18,960

doing spacewalks so you know for for

470

00:19:22,070 --> 00:19:20,480

everything you see them do

471

00:19:23,990 --> 00:19:22,080

do uh all the cool stuff floating around

472

00:19:25,830 --> 00:19:24,000

the space station um there's many many

473

00:19:27,590 --> 00:19:25,840

hours behind the scenes where they they

474

00:19:29,430 --> 00:19:27,600

drive and learn how to do that how long

475

00:19:32,390 --> 00:19:29,440

do they train you know before they

476

00:19:33,190 --> 00:19:32,400

actually launch on these expeditions

477

00:19:37,750 --> 00:19:33,200

um

478

00:19:39,350 --> 00:19:37,760

know it's on order of years so you know

479

00:19:41,350 --> 00:19:39,360

sometimes you know astronauts will train

480

00:19:42,789 --> 00:19:41,360

for you know two or two or three years

481

00:19:44,549 --> 00:19:42,799

before they they're able to go up on the

482

00:19:45,909 --> 00:19:44,559

space station to do all the various

483

00:19:47,669 --> 00:19:45,919

things they need to do so about two

484

00:19:49,270 --> 00:19:47,679

years of training for six months of

485

00:19:50,789 --> 00:19:49,280

actual space flight time so there's

486

00:19:52,789 --> 00:19:50,799

there's a lot of you know front-end

487

00:19:54,549 --> 00:19:52,799

stuff involved before they actually get

488

00:19:56,470 --> 00:19:54,559

to go up there and do all the fun things

489

00:19:57,669 --> 00:19:56,480

yeah absolutely when and even while

490

00:19:59,190 --> 00:19:57,679

they're up there we'll we'll do some

491

00:20:00,630 --> 00:19:59,200

training with them you know we'll you

492

00:20:01,669 --> 00:20:00,640

know we mention the some of the

493

00:20:03,430 --> 00:20:01,679

different types of ways we can

494

00:20:05,110 --> 00:20:03,440

communicate with the with astronauts

495

00:20:06,470 --> 00:20:05,120

we'll sit down and

496

00:20:07,909 --> 00:20:06,480

go through some additional training

497

00:20:09,110 --> 00:20:07,919

maybe something coming up that they

498

00:20:11,110 --> 00:20:09,120

haven't quite seen before they need a

499

00:20:12,630 --> 00:20:11,120

refresher we'll sit down and train them

500

00:20:14,710 --> 00:20:12,640

while they're up there too so a lot of

501
00:20:16,470 --> 00:20:14,720
training a lot of school it and it never

502
00:20:18,470 --> 00:20:16,480
ends there's always learning to do never

503
00:20:21,510 --> 00:20:18,480
stop learning all right next question

504
00:20:24,950 --> 00:20:23,110
do they have to train whenever they get

505
00:20:28,710 --> 00:20:24,960
back

506
00:20:33,669 --> 00:20:31,590
and they they do do a lot of work when

507
00:20:35,430 --> 00:20:33,679
they get back um you know post mission

508
00:20:36,950 --> 00:20:35,440
them um one of the bigger things that

509
00:20:38,549 --> 00:20:36,960
they do is not necessarily receive a

510
00:20:39,909 --> 00:20:38,559
whole lot of training but they conduct a

511
00:20:41,510 --> 00:20:39,919
lot of training you know once you've

512
00:20:44,310 --> 00:20:41,520
been up there for six months you know

513
00:20:45,830 --> 00:20:44,320

you you are the are the expert on on on

514

00:20:47,909 --> 00:20:45,840

how to operate the space station and

515

00:20:49,669 --> 00:20:47,919

what to do so we really try to

516

00:20:52,149 --> 00:20:49,679

capitalize on a lot of their experience

517

00:20:53,430 --> 00:20:52,159

and and knowledge when they come back to

518

00:20:55,830 --> 00:20:53,440

to teach the next generation of

519

00:20:57,510 --> 00:20:55,840

astronauts you know um you know just all

520

00:20:59,990 --> 00:20:57,520

the little ins and outs and tips and

521

00:21:01,190 --> 00:21:00,000

tricks of of of how to really maximize

522

00:21:03,430 --> 00:21:01,200

this this wonderful space station that

523

00:21:04,630 --> 00:21:03,440

we have so it's it's there there's not

524

00:21:06,549 --> 00:21:04,640

necessarily training that they receive

525

00:21:07,510 --> 00:21:06,559

but they they do conduct a lot of

526
00:21:11,830 --> 00:21:07,520
training

527
00:21:17,510 --> 00:21:15,029
you astronauts exercise up in space

528
00:21:19,350 --> 00:21:17,520
oh boy do that in quite a bit yes so you

529
00:21:21,350 --> 00:21:19,360
know the the the environment of space is

530
00:21:23,669 --> 00:21:21,360
really hard on the human body you know

531
00:21:25,830 --> 00:21:23,679
um without without gravity you know the

532
00:21:27,350 --> 00:21:25,840
your muscles don't have to to to work as

533
00:21:29,590 --> 00:21:27,360
hard and you know the heart doesn't have

534
00:21:30,950 --> 00:21:29,600
to pump blood as much and and the bones

535
00:21:31,909 --> 00:21:30,960
don't have to support your structure all

536
00:21:32,630 --> 00:21:31,919
that much

537
00:21:34,549 --> 00:21:32,640
so

538
00:21:36,549 --> 00:21:34,559

um one of the things we have to do to

539

00:21:39,110 --> 00:21:36,559

counteract all all the the effects of

540

00:21:40,789 --> 00:21:39,120

space on the human body is exercise so

541

00:21:42,310 --> 00:21:40,799

they usually extras about two hours a

542

00:21:44,230 --> 00:21:42,320

day so a good portion of their day is

543

00:21:46,230 --> 00:21:44,240

spent just exercising they can do

544

00:21:47,990 --> 00:21:46,240

anything from running on a treadmill to

545

00:21:49,590 --> 00:21:48,000

uh you know riding on an exercise bike

546

00:21:50,710 --> 00:21:49,600

to to

547

00:21:52,470 --> 00:21:50,720

doing some some things that kind of

548

00:21:53,830 --> 00:21:52,480

simulate uh you know doing some weight

549

00:21:56,950 --> 00:21:53,840

lifting it's kind of like a like a giant

550

00:21:58,549 --> 00:21:56,960

bowflex so you know they they uh they do

551
00:21:59,830 --> 00:21:58,559
extensive amount of exercising you know

552
00:22:01,750 --> 00:21:59,840
to make sure that when they get back to

553
00:22:03,909 --> 00:22:01,760
the back to earth that uh their body

554
00:22:05,830 --> 00:22:03,919
still can can work in this this gravity

555
00:22:07,830 --> 00:22:05,840
environment and so that they can still

556
00:22:08,950 --> 00:22:07,840
walk and and move and lift things so

557
00:22:10,549 --> 00:22:08,960
it's it's very important to the

558
00:22:11,909 --> 00:22:10,559
astronauts to exercise we've actually

559
00:22:13,750 --> 00:22:11,919
heard some of them come back and they

560
00:22:15,430 --> 00:22:13,760
almost feel stronger just because of all

561
00:22:17,029 --> 00:22:15,440
that exercise they've been doing up on

562
00:22:18,230 --> 00:22:17,039
space i mean two hours a day it's quite

563
00:22:19,909 --> 00:22:18,240

it's quite a bit

564

00:22:21,750 --> 00:22:19,919

yeah yeah they uh they they really work

565

00:22:23,510 --> 00:22:21,760

their muscles and and sets a lot of

566

00:22:25,029 --> 00:22:23,520

habits you know a lot of them become

567

00:22:25,990 --> 00:22:25,039

you know big exercise buffs afterwards

568

00:22:27,510 --> 00:22:26,000

because they're so used to doing it for

569

00:22:31,270 --> 00:22:27,520

two hours a day

570

00:22:36,470 --> 00:22:34,149

has anybody ever got hurt doing

571

00:22:38,310 --> 00:22:36,480

stuff

572

00:22:40,630 --> 00:22:38,320

has anyone ever gotten hurt doing things

573

00:22:41,909 --> 00:22:40,640

well you know just like like working you

574

00:22:43,510 --> 00:22:41,919

know uh

575

00:22:45,350 --> 00:22:43,520

here on earth you know there's some

576

00:22:46,710 --> 00:22:45,360

things to happen you know the

577

00:22:49,350 --> 00:22:46,720

uh you know you get you know a little

578

00:22:51,430 --> 00:22:49,360

bumper or bruise but you know uh

579

00:22:53,909 --> 00:22:51,440

they do a a lot of work making sure that

580

00:22:55,510 --> 00:22:53,919

everything the astronauts do in space is

581

00:22:57,350 --> 00:22:55,520

very safe you know it's something that

582

00:22:58,950 --> 00:22:57,360

we take very very seriously and and

583

00:23:00,789 --> 00:22:58,960

dedicate a lot of time and you know we

584

00:23:01,990 --> 00:23:00,799

talk about a lot of training uh training

585

00:23:04,230 --> 00:23:02,000

the crew does to make sure that

586

00:23:08,870 --> 00:23:04,240

everything every aspect of their job is

587

00:23:09,909 --> 00:23:08,880

is safe so uh you know you know we uh

588

00:23:11,590 --> 00:23:09,919

to my knowledge i don't think an

589

00:23:12,950 --> 00:23:11,600

astronaut has ever actually been injured

590

00:23:15,270 --> 00:23:12,960

in any way

591

00:23:16,950 --> 00:23:15,280

i'm pretty sure and i mean even if they

592

00:23:18,470 --> 00:23:16,960

were there are a lot of flight surgeons

593

00:23:20,310 --> 00:23:18,480

and people here you know in mission

594

00:23:22,310 --> 00:23:20,320

control and all around

595

00:23:23,669 --> 00:23:22,320

the country that monitor all the

596

00:23:25,510 --> 00:23:23,679

astronauts health and everything like

597

00:23:27,669 --> 00:23:25,520

that while they're on board so if a

598

00:23:30,710 --> 00:23:27,679

problem ever did arose you know we'd

599

00:23:31,750 --> 00:23:30,720

have people here to help them handle it

600

00:23:33,190 --> 00:23:31,760

absolutely

601
00:23:34,789 --> 00:23:33,200
all right and i think we got about one

602
00:23:39,909 --> 00:23:34,799
minute left so let's do one last

603
00:23:42,549 --> 00:23:40,710
um

604
00:23:45,190 --> 00:23:42,559
what do they drink up in

605
00:23:47,750 --> 00:23:45,200
in the international space station

606
00:23:51,190 --> 00:23:47,760
what do they drink tang right tang tang

607
00:23:52,549 --> 00:23:51,200
is the drink of all astronauts um

608
00:23:54,230 --> 00:23:52,559
they they drink a number of different

609
00:23:55,990 --> 00:23:54,240
things they drink a lot of water you

610
00:23:57,350 --> 00:23:56,000
know they just just like

611
00:23:59,110 --> 00:23:57,360
on earth you know water is really good

612
00:24:00,950 --> 00:23:59,120
for them and then they they drink as

613
00:24:02,390 --> 00:24:00,960

much of that as they can you know in the

614

00:24:04,390 --> 00:24:02,400

morning they like their morning cup of

615

00:24:06,710 --> 00:24:04,400

coffee so they'll drink some coffee they

616

00:24:08,789 --> 00:24:06,720

have you know tang or orange juice to to

617

00:24:10,230 --> 00:24:08,799

drink you know various juices some apple

618

00:24:12,870 --> 00:24:10,240

juice you know cranberry juice things

619

00:24:15,190 --> 00:24:12,880

like that so uh you know kind of like

620

00:24:17,110 --> 00:24:15,200

like the food a pretty wide variety of

621

00:24:19,590 --> 00:24:17,120

drinks and one of the one of the

622

00:24:21,430 --> 00:24:19,600

interesting things about their water is

623

00:24:23,830 --> 00:24:21,440

it's all recycled

624

00:24:25,510 --> 00:24:23,840

so some of the one of the funny quotes

625

00:24:27,669 --> 00:24:25,520

that we hear is uh sometimes you're

626
00:24:28,789 --> 00:24:27,679
drinking yesterday's coffee the morning

627
00:24:29,990 --> 00:24:28,799
of today

628
00:24:31,110 --> 00:24:30,000
so they actually i mean they have a

629
00:24:33,510 --> 00:24:31,120
recycling

630
00:24:35,669 --> 00:24:33,520
system onboard the station that recycles

631
00:24:37,190 --> 00:24:35,679
human waste things like that

632
00:24:38,710 --> 00:24:37,200
expired water

633
00:24:40,950 --> 00:24:38,720
and then turns it back into potable

634
00:24:43,190 --> 00:24:40,960
drinking water so

635
00:24:44,549 --> 00:24:43,200
but yeah lots of water lots of again a

636
00:24:48,230 --> 00:24:44,559
lot like the food a lot of drinks that

637
00:24:49,669 --> 00:24:48,240
you'd find just down here on earth

638
00:24:51,590 --> 00:24:49,679

all right well i think that's about all

639

00:24:52,870 --> 00:24:51,600

the time we have i really want to thank

640

00:24:54,549 --> 00:24:52,880

you guys for your questions hope you

641

00:24:56,549 --> 00:24:54,559

learned a little bit and hope you

642

00:25:01,269 --> 00:24:56,559

enjoyed your visit and your stop here

643

00:25:05,029 --> 00:25:02,390

oh thank you