
PAO

1
00:00:06,070 --> 00:00:04,150
hey well uh welcome into mission control

2
00:00:08,230 --> 00:00:06,080
houston victory lakes intermediate

3
00:00:09,830 --> 00:00:08,240
school uh you're joining me

4
00:00:10,870 --> 00:00:09,840
again mission control houston where

5
00:00:12,629 --> 00:00:10,880
we're

6
00:00:14,629 --> 00:00:12,639
controlling all the systems onboard the

7
00:00:16,630 --> 00:00:14,639
international space station and i'm

8
00:00:19,189 --> 00:00:16,640
joined today by glenda brown who's one

9
00:00:20,710 --> 00:00:19,199
of our eva operations specialists she's

10
00:00:22,390 --> 00:00:20,720
responsible for

11
00:00:23,750 --> 00:00:22,400
training the crews and making sure that

12
00:00:25,189 --> 00:00:23,760
everything goes smoothly and probably

13
00:00:27,029 --> 00:00:25,199

one of the most exciting things that our

14
00:00:29,429 --> 00:00:27,039
astronauts do in that spacewalk so it's

15
00:00:31,109 --> 00:00:29,439
really exciting stuff

16
00:00:32,709 --> 00:00:31,119
glenda thanks for being here i know i'm

17
00:00:33,670 --> 00:00:32,719
excited to have you on i hope they are

18
00:00:35,670 --> 00:00:33,680
too

19
00:00:36,709 --> 00:00:35,680
sure i'm really happy to be here and

20
00:00:38,069 --> 00:00:36,719
looking forward to all your great

21
00:00:39,270 --> 00:00:38,079
question questions

22
00:00:40,630 --> 00:00:39,280
all right well why don't we go ahead and

23
00:00:56,630 --> 00:00:40,640
get started you guys can go ahead and

24
00:01:00,389 --> 00:00:58,790
why did the president stop the space

25
00:01:01,990 --> 00:01:00,399
shuttle missions

26
00:01:04,469 --> 00:01:02,000
why did the president stop the space

27
00:01:07,270 --> 00:01:04,479
shuttle missions well you know that one

28
00:01:09,350 --> 00:01:07,280
is a tough one so here's the deal

29
00:01:12,070 --> 00:01:09,360
president bush

30
00:01:14,469 --> 00:01:12,080
put out a request for a report got a

31
00:01:17,030 --> 00:01:14,479
bunch of experts together on all things

32
00:01:19,510 --> 00:01:17,040
having to do with nasa so that's the

33
00:01:21,749 --> 00:01:19,520
interplanetary work that we do all of

34
00:01:23,350 --> 00:01:21,759
the mission to earth stuff which is like

35
00:01:25,429 --> 00:01:23,360
the satellites that look back at the

36
00:01:28,789 --> 00:01:25,439
weather on earth

37
00:01:29,590 --> 00:01:28,799
um all the programs having to do with um

38
00:01:31,030 --> 00:01:29,600

uh

39
00:01:32,469 --> 00:01:31,040
any of the exploration that we do

40
00:01:33,590 --> 00:01:32,479
including the manned space flight

41
00:01:35,830 --> 00:01:33,600
program

42
00:01:37,830 --> 00:01:35,840
and he commissioned this report to be

43
00:01:39,910 --> 00:01:37,840
done to see how much each thing cost and

44
00:01:41,510 --> 00:01:39,920
then how much benefit we get back from

45
00:01:42,310 --> 00:01:41,520
each of the things

46
00:01:43,190 --> 00:01:42,320
and

47
00:01:45,590 --> 00:01:43,200
what the

48
00:01:48,069 --> 00:01:45,600
results of that report were was that in

49
00:01:50,149 --> 00:01:48,079
order to do our exploration of sending

50
00:01:52,710 --> 00:01:50,159
people on to

51
00:01:55,749 --> 00:01:52,720
the stars going on to

52
00:01:57,749 --> 00:01:55,759
the moon or mars or an asteroid in order

53
00:01:59,830 --> 00:01:57,759
to have enough money to do that we would

54
00:02:01,749 --> 00:01:59,840
have to cut back on something else they

55
00:02:03,429 --> 00:02:01,759
looked around at all of the cost of all

56
00:02:05,109 --> 00:02:03,439
of the projects and it turns out that

57
00:02:06,870 --> 00:02:05,119
the space shuttle program was costing a

58
00:02:08,229 --> 00:02:06,880
lot of money more and more each year

59
00:02:09,749 --> 00:02:08,239
because the shuttles were getting pretty

60
00:02:10,630 --> 00:02:09,759
old and we were having to refurbish

61
00:02:12,550 --> 00:02:10,640
those

62
00:02:14,710 --> 00:02:12,560
so in order to come up with enough money

63
00:02:16,390 --> 00:02:14,720

that we could go on and do exploration

64
00:02:18,710 --> 00:02:16,400
they decided to cut the space shuttle

65
00:02:20,229 --> 00:02:18,720
program and in order to do that they had

66
00:02:22,150 --> 00:02:20,239
to make sure we had another way to get

67
00:02:23,830 --> 00:02:22,160
to the international space station

68
00:02:25,990 --> 00:02:23,840
because we have international partners

69
00:02:27,990 --> 00:02:26,000
now all around the world we could ask

70
00:02:29,510 --> 00:02:28,000
the russians if they would be willing to

71
00:02:31,589 --> 00:02:29,520
take us to the space station and

72
00:02:33,509 --> 00:02:31,599
certainly for a certain cost they would

73
00:02:35,350 --> 00:02:33,519
be able to provide that service to us

74
00:02:36,390 --> 00:02:35,360
then at the same time we were able to

75
00:02:38,390 --> 00:02:36,400
turn on

76
00:02:41,110 --> 00:02:38,400
all the exploration money to start

77
00:02:43,670 --> 00:02:41,120
working on producing our own way to get

78
00:02:45,990 --> 00:02:43,680
back to the stars and we've commissioned

79
00:02:47,030 --> 00:02:46,000
several commercial companies to go and

80
00:02:49,030 --> 00:02:47,040
build

81
00:02:50,869 --> 00:02:49,040
another vehicle that'll take us back to

82
00:02:53,350 --> 00:02:50,879
the international space station and then

83
00:02:55,430 --> 00:02:53,360
take that same vehicle and launch it off

84
00:02:56,710 --> 00:02:55,440
further to the next prog project that

85
00:02:58,710 --> 00:02:56,720
we're going to do it's really the

86
00:03:00,149 --> 00:02:58,720
shuttle you know design only to be in

87
00:03:01,670 --> 00:03:00,159
low earth orbit so just a few hundred

88
00:03:03,350 --> 00:03:01,680

miles off the earth's surface we want to

89
00:03:05,350 --> 00:03:03,360
go tens and hundreds of thousands and

90
00:03:06,869 --> 00:03:05,360
millions of miles away so we need a new

91
00:03:08,470 --> 00:03:06,879
vehicle and we couldn't do that while we

92
00:03:10,470 --> 00:03:08,480
still have the shuttle does that make

93
00:03:11,430 --> 00:03:10,480
sense

94
00:03:16,790 --> 00:03:11,440
yeah

95
00:03:20,630 --> 00:03:18,630
is there a certain plant that can

96
00:03:22,149 --> 00:03:20,640
sustain life in space

97
00:03:23,990 --> 00:03:22,159
can you speak up just a little bit i

98
00:03:25,830 --> 00:03:24,000
just couldn't hear that

99
00:03:28,149 --> 00:03:25,840
you haven't talked really well is there

100
00:03:30,070 --> 00:03:28,159
a certain type of plant that can sustain

101
00:03:31,030 --> 00:03:30,080
life in space

102
00:03:33,190 --> 00:03:31,040
um

103
00:03:36,309 --> 00:03:33,200
well so uh on the international space

104
00:03:39,830 --> 00:03:36,319
station we are already doing all kinds

105
00:03:42,070 --> 00:03:39,840
of uh plant growth experiments to see

106
00:03:43,990 --> 00:03:42,080
what grows in zero gravity and it turns

107
00:03:46,630 --> 00:03:44,000
out almost all kinds of plants will grow

108
00:03:49,190 --> 00:03:46,640
in zero gravity as long as they have an

109
00:03:51,190 --> 00:03:49,200
environment and a subsequent substrate

110
00:03:52,710 --> 00:03:51,200
to grow on meaning some dirt or

111
00:03:54,390 --> 00:03:52,720
something that they can you can plant

112
00:03:56,550 --> 00:03:54,400
the seed in and then it can grow and it

113
00:03:59,030 --> 00:03:56,560

just needs light and water like here on

114
00:04:00,869 --> 00:03:59,040
earth and it'll grow just fine i know

115
00:04:02,550 --> 00:04:00,879
don pettit right now is growing quite a

116
00:04:04,309 --> 00:04:02,560
few plants he's got a cucumber and a

117
00:04:06,309 --> 00:04:04,319
broccoli and i think some sunflowers

118
00:04:07,830 --> 00:04:06,319
growing on board the station right now

119
00:04:09,030 --> 00:04:07,840
and uh he's been doing a pretty funny

120
00:04:11,509 --> 00:04:09,040
blog where he's talking from the

121
00:04:13,190 --> 00:04:11,519
perspective of the cucumber as it uh

122
00:04:15,429 --> 00:04:13,200
goes on as a crew member on board the

123
00:04:16,949 --> 00:04:15,439
international space station so yeah i

124
00:04:19,110 --> 00:04:16,959
mean quite a diverse plant life can

125
00:04:24,390 --> 00:04:19,120
actually exist in space

126
00:04:31,830 --> 00:04:27,430
how long can a person live in space

127
00:04:33,830 --> 00:04:31,840
now i'm going to assume that you

128
00:04:37,510 --> 00:04:33,840
understand that you have to have an

129
00:04:39,670 --> 00:04:37,520
environment in space so you have to have

130
00:04:40,950 --> 00:04:39,680
air around you in a pressurized

131
00:04:43,270 --> 00:04:40,960
environment

132
00:04:44,710 --> 00:04:43,280
and as long as you have that

133
00:04:46,790 --> 00:04:44,720
we think that you can live as long as

134
00:04:48,790 --> 00:04:46,800
you can here on earth but there you have

135
00:04:50,629 --> 00:04:48,800
to take some preventative measures you

136
00:04:52,550 --> 00:04:50,639
have to make sure that you're exercising

137
00:04:54,390 --> 00:04:52,560
because the ground the earth isn't

138
00:04:56,230 --> 00:04:54,400

pulling on your system it's not

139
00:04:58,550 --> 00:04:56,240
compressing your bones the way it is

140
00:05:01,350 --> 00:04:58,560
here on earth and so what we see on

141
00:05:03,590 --> 00:05:01,360
orbit is a loss of bone mass in the

142
00:05:04,950 --> 00:05:03,600
bones um

143
00:05:06,710 --> 00:05:04,960
and we can measure that when crew

144
00:05:09,670 --> 00:05:06,720
members come back from space so we've

145
00:05:12,070 --> 00:05:09,680
implemented an exercise program with um

146
00:05:14,710 --> 00:05:12,080
a resistive exercise program that

147
00:05:17,029 --> 00:05:14,720
basically looks like a a

148
00:05:18,870 --> 00:05:17,039
a weight lift system on

149
00:05:21,110 --> 00:05:18,880
on steroids

150
00:05:22,950 --> 00:05:21,120
so they put it on a little high um i

151
00:05:25,670 --> 00:05:22,960
think it's a hydraulic kind of system or

152
00:05:28,469 --> 00:05:25,680
maybe a spring kind of system that

153
00:05:31,350 --> 00:05:28,479
pushes down on the crew member on on his

154
00:05:33,270 --> 00:05:31,360
uh arms and shoulders while he's also

155
00:05:35,590 --> 00:05:33,280
pushing away on his feet and that

156
00:05:37,029 --> 00:05:35,600
creates some uh effective gravity and

157
00:05:38,710 --> 00:05:37,039
that's what keeps their bones strong and

158
00:05:39,909 --> 00:05:38,720
we're finding some great success with

159
00:05:41,830 --> 00:05:39,919
that

160
00:05:43,830 --> 00:05:41,840
yep i've heard i mean the astronauts are

161
00:05:45,749 --> 00:05:43,840
exercising like two hours a day every

162
00:05:46,950 --> 00:05:45,759
single day of the week so some of them

163
00:05:49,189 --> 00:05:46,960

are actually saying they're coming down

164
00:05:50,230 --> 00:05:49,199
with stronger yeah that's absolutely

165
00:05:53,749 --> 00:05:50,240
true

166
00:05:55,909 --> 00:05:53,759
all right next question guys

167
00:05:57,830 --> 00:05:55,919
what do people do at mission control now

168
00:05:58,950 --> 00:05:57,840
that this shuttle program is no longer

169
00:06:00,790 --> 00:05:58,960
running

170
00:06:02,629 --> 00:06:00,800
i'm sorry oh what do what are we doing

171
00:06:04,150 --> 00:06:02,639
mission control now oh well we still

172
00:06:06,390 --> 00:06:04,160
have the international space station

173
00:06:08,950 --> 00:06:06,400
which is uh beyond world-class we'll

174
00:06:11,270 --> 00:06:08,960
call it a uniqlo universe class uh

175
00:06:13,990 --> 00:06:11,280
science platform we can do all kinds of

176
00:06:16,469 --> 00:06:14,000
laboratory experiments up there

177
00:06:19,110 --> 00:06:16,479
and in order to maintain that laboratory

178
00:06:20,950 --> 00:06:19,120
system we have to maintain uh the

179
00:06:23,110 --> 00:06:20,960
electricity coming in so we have to

180
00:06:24,870 --> 00:06:23,120
manage all the power systems

181
00:06:27,350 --> 00:06:24,880
we have to provide an environment for

182
00:06:29,749 --> 00:06:27,360
the crew members so we have to monitor

183
00:06:32,150 --> 00:06:29,759
the temperature and that

184
00:06:34,070 --> 00:06:32,160
the pressure inside the vehicle as well

185
00:06:35,990 --> 00:06:34,080
as the oxygen balance you need to have a

186
00:06:37,830 --> 00:06:36,000
good balance of oxygen just like here on

187
00:06:39,670 --> 00:06:37,840
the ground

188
00:06:41,270 --> 00:06:39,680

so we have to monitor all of those and

189
00:06:43,830 --> 00:06:41,280
then we have to maintain all of those

190
00:06:45,590 --> 00:06:43,840
systems as well so

191
00:06:48,309 --> 00:06:45,600
we keep really busy maintaining the

192
00:06:50,629 --> 00:06:48,319
spacesuits so that we can go outside and

193
00:06:53,110 --> 00:06:50,639
either take a science experiment outside

194
00:06:56,070 --> 00:06:53,120
bring it back in or maintain the system

195
00:06:57,990 --> 00:06:56,080
so for example if the big batteries um

196
00:06:59,990 --> 00:06:58,000
that are powered by the solar arrays if

197
00:07:02,390 --> 00:07:00,000
those were to fail

198
00:07:05,510 --> 00:07:02,400
we would have to go outside and change

199
00:07:07,510 --> 00:07:05,520
out the big box that was broken and in

200
00:07:10,950 --> 00:07:07,520
order to do that we have to maintain our

201
00:07:12,870 --> 00:07:10,960
spacesuits and be ready at all times

202
00:07:14,230 --> 00:07:12,880
so that's what's keeping me really busy

203
00:07:16,550 --> 00:07:14,240
there's a lot of maintenance that has to

204
00:07:17,830 --> 00:07:16,560
be done on the spacesuits to get ready

205
00:07:19,589 --> 00:07:17,840
as well as training all of the

206
00:07:21,430 --> 00:07:19,599
astronauts to be ready to do that here

207
00:07:22,309 --> 00:07:21,440
on the ground so we're really busy here

208
00:07:23,909 --> 00:07:22,319
at

209
00:07:26,550 --> 00:07:23,919
johnson space center taking care of all

210
00:07:28,629 --> 00:07:26,560
those things at the same time all around

211
00:07:31,189 --> 00:07:28,639
the the entire

212
00:07:34,309 --> 00:07:31,199
nation we've got people that are working

213
00:07:36,070 --> 00:07:34,319

on planetary exploration mission to

214
00:07:37,510 --> 00:07:36,080
planet earth stuff trying to figure out

215
00:07:39,510 --> 00:07:37,520
how we're going to get more data about

216
00:07:41,909 --> 00:07:39,520
the earth and

217
00:07:43,510 --> 00:07:41,919
and then planning the next um

218
00:07:44,629 --> 00:07:43,520
manned space flights

219
00:07:46,950 --> 00:07:44,639
onto

220
00:07:48,950 --> 00:07:46,960
mars and beyond and in terms of just you

221
00:07:50,790 --> 00:07:48,960
know mission control here which is where

222
00:07:52,230 --> 00:07:50,800
again we're sitting right now all the

223
00:07:53,830 --> 00:07:52,240
men and women in this room are actually

224
00:07:55,270 --> 00:07:53,840
controlling the majority of the systems

225
00:07:57,430 --> 00:07:55,280
on board the station it's kind of like a

226
00:07:59,990 --> 00:07:57,440
big remote control vehicle so even

227
00:08:02,390 --> 00:08:00,000
though it's you know 240 miles away at

228
00:08:04,469 --> 00:08:02,400
any one time and traveling at 17 000

229
00:08:05,589 --> 00:08:04,479
miles an hour people at these computer

230
00:08:08,150 --> 00:08:05,599
systems are actually what are

231
00:08:10,390 --> 00:08:08,160
controlling it and kind of flying it so

232
00:08:12,710 --> 00:08:10,400
yeah mission control is still manned 24

233
00:08:14,070 --> 00:08:12,720
7 365 so there's still a lot of work

234
00:08:18,309 --> 00:08:14,080
being done here

235
00:08:22,390 --> 00:08:20,230
do astronauts get sick the first time

236
00:08:23,589 --> 00:08:22,400
going up into space or does this happen

237
00:08:25,510 --> 00:08:23,599
often

238
00:08:28,550 --> 00:08:25,520

do astronauts get sick when they go to

239
00:08:30,710 --> 00:08:28,560
space well the answer to that is yes

240
00:08:32,310 --> 00:08:30,720
mostly and but it only happens right at

241
00:08:33,509 --> 00:08:32,320
the beginning

242
00:08:36,550 --> 00:08:33,519
have you guys studied about the

243
00:08:37,430 --> 00:08:36,560
vestibular system and and how we have a

244
00:08:39,509 --> 00:08:37,440
little

245
00:08:40,870 --> 00:08:39,519
organ in our ears that helps keep our

246
00:08:43,190 --> 00:08:40,880
balance

247
00:08:45,509 --> 00:08:43,200
the way that works is they're i think of

248
00:08:47,509 --> 00:08:45,519
them as little hairs that are inside

249
00:08:49,430 --> 00:08:47,519
that your vestibular inside your inner

250
00:08:50,870 --> 00:08:49,440
ear and there's some fluid in there and

251
00:08:53,590 --> 00:08:50,880
it is always

252
00:08:54,550 --> 00:08:53,600
testing how how straight we're standing

253
00:08:57,829 --> 00:08:54,560
up

254
00:08:59,590 --> 00:08:57,839
well that fluid needs gravity to work

255
00:09:02,150 --> 00:08:59,600
and when you get to space it doesn't

256
00:09:04,710 --> 00:09:02,160
have that anymore so your brain thinks

257
00:09:06,310 --> 00:09:04,720
it doesn't know where you are and just

258
00:09:07,829 --> 00:09:06,320
like when you're on a crazy roller

259
00:09:09,750 --> 00:09:07,839
coaster ride

260
00:09:11,670 --> 00:09:09,760
you've been up there way too long doing

261
00:09:12,870 --> 00:09:11,680
them over and over and over again you

262
00:09:15,110 --> 00:09:12,880
start to feel sick because your

263
00:09:16,630 --> 00:09:15,120

vestibular system isn't working

264
00:09:17,990 --> 00:09:16,640
and on the opposite side of that i was

265
00:09:19,670 --> 00:09:18,000
just talking to one of the astronauts

266
00:09:22,710 --> 00:09:19,680
that came back from a mission not long

267
00:09:24,710 --> 00:09:22,720
ago and he said that

268
00:09:26,710 --> 00:09:24,720
you know your brain unlearns that pretty

269
00:09:30,470 --> 00:09:26,720
quickly it kind of turns off those

270
00:09:32,070 --> 00:09:30,480
senses and so after a few hours um maybe

271
00:09:33,990 --> 00:09:32,080
just a few minutes you start to feel

272
00:09:35,590 --> 00:09:34,000
better maybe it takes a couple of days

273
00:09:37,829 --> 00:09:35,600
but then on the other side of it when

274
00:09:40,630 --> 00:09:37,839
you come back from space your brain has

275
00:09:42,150 --> 00:09:40,640
to relearn that so going for a bike ride

276
00:09:43,829 --> 00:09:42,160
that first day is right out because

277
00:09:45,670 --> 00:09:43,839
you'd fall right over because your brain

278
00:09:47,430 --> 00:09:45,680
hasn't relearned how to balance i've

279
00:09:48,949 --> 00:09:47,440
heard stories of astronauts come down

280
00:09:50,470 --> 00:09:48,959
and they fall asleep and they get up to

281
00:09:51,350 --> 00:09:50,480
maybe get a drink of water and they get

282
00:09:52,949 --> 00:09:51,360
out of bed and they think they're just

283
00:09:54,310 --> 00:09:52,959
going to float away and then they

284
00:09:56,070 --> 00:09:54,320
realize oh i'm not floating they just

285
00:09:57,750 --> 00:09:56,080
kind of fall to the ground so it can be

286
00:09:59,190 --> 00:09:57,760
a bit of an adjustment yeah yeah and

287
00:10:00,870 --> 00:09:59,200
that's all that microgravity that

288
00:10:02,230 --> 00:10:00,880

they're exposed to

289
00:10:03,990 --> 00:10:02,240
lots of fun for them but a little

290
00:10:07,910 --> 00:10:04,000
difficult sometimes yeah really good

291
00:10:11,430 --> 00:10:10,310
how heavy are spacesuits on earth and on

292
00:10:13,750 --> 00:10:11,440
the moon

293
00:10:15,269 --> 00:10:13,760
how much do our spacesuits wear wait

294
00:10:17,990 --> 00:10:15,279
okay well i'm going to answer that in a

295
00:10:19,350 --> 00:10:18,000
couple of different ways um let's just

296
00:10:21,030 --> 00:10:19,360
to give you

297
00:10:22,870 --> 00:10:21,040
so overall by the time you put the

298
00:10:25,350 --> 00:10:22,880
spacesuit on and you have the person

299
00:10:28,470 --> 00:10:25,360
inside and you have all of the tools

300
00:10:31,590 --> 00:10:28,480
that they need for their job

301
00:10:34,069 --> 00:10:31,600
they weigh about 800 pounds here on the

302
00:10:36,389 --> 00:10:34,079
ground so you can imagine there's no way

303
00:10:38,069 --> 00:10:36,399
that a person could carry that much

304
00:10:39,910 --> 00:10:38,079
weight around so when we're doing

305
00:10:41,990 --> 00:10:39,920
training here on the ground we'll go out

306
00:10:43,990 --> 00:10:42,000
to the nutribuoyancy laboratory so that

307
00:10:45,590 --> 00:10:44,000
they can float and do the work in the

308
00:10:46,630 --> 00:10:45,600
water just like they would be doing it

309
00:10:49,430 --> 00:10:46,640
in space

310
00:10:51,750 --> 00:10:49,440
so that's how we create that negative

311
00:10:52,949 --> 00:10:51,760
weight or that neutral weight so like

312
00:10:54,550 --> 00:10:52,959
you would be in space you'd be

313
00:10:57,190 --> 00:10:54,560

weightless that's how we demonstrate

314
00:10:59,509 --> 00:10:57,200
that in the neutral buoyancy laboratory

315
00:11:01,990 --> 00:10:59,519
so then when you take that 800 pounds to

316
00:11:04,230 --> 00:11:02,000
space we'll talk about that first

317
00:11:06,630 --> 00:11:04,240
there's very very little gravity in

318
00:11:08,069 --> 00:11:06,640
space microgravity is what we call it

319
00:11:09,829 --> 00:11:08,079
and it's not enough that you really

320
00:11:13,110 --> 00:11:09,839
weigh anything at all

321
00:11:15,269 --> 00:11:13,120
and then when you go on to the moon the

322
00:11:17,910 --> 00:11:15,279
moon is a lot smaller than the earth it

323
00:11:20,310 --> 00:11:17,920
has a smaller mass so what that means is

324
00:11:23,509 --> 00:11:20,320
gravity is a lot less on the moon it's

325
00:11:24,949 --> 00:11:23,519
about one-sixth that amount of earth so

326
00:11:27,350 --> 00:11:24,959
can you guys do the math in your heads

327
00:11:28,630 --> 00:11:27,360
real quick what is one-sixth of eight

328
00:11:30,470 --> 00:11:28,640
hundred

329
00:11:32,790 --> 00:11:30,480
is everybody doing it

330
00:11:36,230 --> 00:11:32,800
anybody know

331
00:11:38,310 --> 00:11:36,240
the answer is about 133 pounds

332
00:11:40,389 --> 00:11:38,320
and um

333
00:11:42,310 --> 00:11:40,399
of that

334
00:11:44,710 --> 00:11:42,320
the crew member weighs about we we just

335
00:11:46,550 --> 00:11:44,720
averaged about 200 pounds and so the

336
00:11:49,030 --> 00:11:46,560
spacesuit without the crew member in it

337
00:11:51,030 --> 00:11:49,040
would weigh 600 pounds so

338
00:11:53,350 --> 00:11:51,040

on the moon it would only weigh 100

339
00:11:56,310 --> 00:11:53,360
pounds so a person or at least two

340
00:11:58,870 --> 00:11:56,320
people together could pick it up very

341
00:12:00,389 --> 00:11:58,880
fascinating stuff it's amazing like the

342
00:12:01,430 --> 00:12:00,399
the size of the objects they can move

343
00:12:03,350 --> 00:12:01,440
when they're up there on the space

344
00:12:04,870 --> 00:12:03,360
station i mean you can see them rotating

345
00:12:06,629 --> 00:12:04,880
racks that weigh hundreds or even

346
00:12:07,990 --> 00:12:06,639
thousands of pounds down here on earth

347
00:12:10,389 --> 00:12:08,000
and they can just kind of toss them

348
00:12:12,069 --> 00:12:10,399
around and it's no problem at all

349
00:12:15,350 --> 00:12:12,079
very very good very good question

350
00:12:19,509 --> 00:12:17,430
what type of job does a person have to

351
00:12:21,030 --> 00:12:19,519
have to become an astronaut

352
00:12:22,790 --> 00:12:21,040
i'm sorry i didn't hear that what type

353
00:12:25,829 --> 00:12:22,800
of job does a person have to have before

354
00:12:27,990 --> 00:12:25,839
they become an astronaut oh okay almost

355
00:12:30,470 --> 00:12:28,000
any kind of job you'll want to have a

356
00:12:32,389 --> 00:12:30,480
good background in math and science that

357
00:12:34,470 --> 00:12:32,399
is most important for

358
00:12:37,030 --> 00:12:34,480
gosh so many jobs

359
00:12:40,710 --> 00:12:38,550
science engineering

360
00:12:41,990 --> 00:12:40,720
building and that's what we need for

361
00:12:43,910 --> 00:12:42,000
astronauts they have to be able to

362
00:12:46,150 --> 00:12:43,920
perform the science experiments they

363
00:12:48,389 --> 00:12:46,160

need to be able to run their is their

364
00:12:50,629 --> 00:12:48,399
systems for their you know all the

365
00:12:52,470 --> 00:12:50,639
breathing air and stuff that they need

366
00:12:54,470 --> 00:12:52,480
all the power systems so they have to

367
00:12:56,470 --> 00:12:54,480
understand some mechanical stuff and

368
00:12:57,829 --> 00:12:56,480
then they also have to understand how to

369
00:12:59,269 --> 00:12:57,839
take care of each other because they

370
00:13:00,629 --> 00:12:59,279
don't have doctor up there so they have

371
00:13:03,030 --> 00:13:00,639
to be their own doctor so they have to

372
00:13:05,750 --> 00:13:03,040
understand some medical stuff too

373
00:13:07,509 --> 00:13:05,760
so not not everybody has to do every

374
00:13:10,550 --> 00:13:07,519
single thing they do divide the work

375
00:13:12,870 --> 00:13:10,560
there so as long as you get a good

376
00:13:14,870 --> 00:13:12,880
education in any one of those areas and

377
00:13:16,629 --> 00:13:14,880
then start to work in one of those areas

378
00:13:18,629 --> 00:13:16,639
for a while

379
00:13:19,590 --> 00:13:18,639
then you can apply to be an astronaut

380
00:13:21,350 --> 00:13:19,600
and

381
00:13:23,350 --> 00:13:21,360
they select astronauts every couple

382
00:13:25,030 --> 00:13:23,360
years and there's a

383
00:13:26,949 --> 00:13:25,040
many thousands of people apply and then

384
00:13:29,269 --> 00:13:26,959
they they kind of break that down they

385
00:13:30,949 --> 00:13:29,279
find that the 100 or so that they think

386
00:13:34,150 --> 00:13:30,959
have all the right stuff

387
00:13:36,230 --> 00:13:34,160
all the math science and and

388
00:13:38,069 --> 00:13:36,240

medical background that that they

389
00:13:39,829 --> 00:13:38,079
they're going to need if they need this

390
00:13:41,670 --> 00:13:39,839
if they're short on doctors they might

391
00:13:43,509 --> 00:13:41,680
take more from the medical field doesn't

392
00:13:45,670 --> 00:13:43,519
necessarily mean that they are doctors

393
00:13:49,350 --> 00:13:45,680
but maybe they've done research in the

394
00:13:51,430 --> 00:13:49,360
laboratory on uh drugs pharmaceuticals

395
00:13:54,790 --> 00:13:51,440
or something like that

396
00:13:56,389 --> 00:13:54,800
so that's kind of uh that's kind of

397
00:13:58,790 --> 00:13:56,399
the background we've even had a

398
00:14:01,030 --> 00:13:58,800
veterinarian before

399
00:14:03,350 --> 00:14:01,040
let's see we've had lots of different

400
00:14:06,069 --> 00:14:03,360
pilots that have come from the military

401
00:14:08,389 --> 00:14:06,079
and all of them have studied engineering

402
00:14:09,990 --> 00:14:08,399
and a lot of math and science so

403
00:14:11,910 --> 00:14:10,000
definitely all walks of life but with

404
00:14:14,389 --> 00:14:11,920
the focus on that math and science

405
00:14:16,790 --> 00:14:14,399
background math science and medical so

406
00:14:18,870 --> 00:14:16,800
any you future astronaut hopefuls make

407
00:14:20,710 --> 00:14:18,880
sure you stick with it if you want to be

408
00:14:22,550 --> 00:14:20,720
an astronaut someday really focus on

409
00:14:24,230 --> 00:14:22,560
your math and science classes especially

410
00:14:25,189 --> 00:14:24,240
in college and your job and things like

411
00:14:28,389 --> 00:14:25,199
that

412
00:14:33,110 --> 00:14:30,470
what happens if somebody like goes crazy

413
00:14:37,030 --> 00:14:34,949

oh i'm just having trouble hearing you

414
00:14:39,110 --> 00:14:37,040
our microphone must not be very good

415
00:14:40,870 --> 00:14:39,120
one more time what happened somebody

416
00:14:43,350 --> 00:14:40,880
goes crazy

417
00:14:44,389 --> 00:14:43,360
what happened

418
00:14:47,430 --> 00:14:44,399
up in space

419
00:14:49,269 --> 00:14:47,440
oh okay um well you know i suppose

420
00:14:51,750 --> 00:14:49,279
that's possible just like it is here on

421
00:14:53,910 --> 00:14:51,760
the ground um but the doctors here on

422
00:14:55,829 --> 00:14:53,920
the ground um go through and there's a

423
00:14:57,829 --> 00:14:55,839
selection process where they kind of

424
00:15:01,590 --> 00:14:57,839
look at the psychological background of

425
00:15:04,790 --> 00:15:01,600
the person each individual person

426
00:15:06,949 --> 00:15:04,800
and they look at family history and then

427
00:15:09,350 --> 00:15:06,959
their history from how they've performed

428
00:15:11,430 --> 00:15:09,360
in their job and so on and how they

429
00:15:14,790 --> 00:15:11,440
handle stressful situations they do a

430
00:15:16,790 --> 00:15:14,800
lot of that kind of testing and

431
00:15:18,150 --> 00:15:16,800
so you're pretty much pre-selected to

432
00:15:20,470 --> 00:15:18,160
have a group of people that aren't going

433
00:15:22,069 --> 00:15:20,480
to have a tendency toward

434
00:15:24,150 --> 00:15:22,079
mental health issues

435
00:15:26,389 --> 00:15:24,160
but say for example you did have someone

436
00:15:27,509 --> 00:15:26,399
because that's possible in any in any

437
00:15:29,910 --> 00:15:27,519
field

438
00:15:32,069 --> 00:15:29,920

they also have they have a kind of a

439
00:15:34,069 --> 00:15:32,079
think of it as a medicine cabinet on

440
00:15:36,310 --> 00:15:34,079
board the international space station

441
00:15:37,829 --> 00:15:36,320
and it has different kinds of drugs that

442
00:15:40,949 --> 00:15:37,839
can treat any different kinds of

443
00:15:42,550 --> 00:15:40,959
situations so the medical officer on

444
00:15:45,030 --> 00:15:42,560
board or the one that's trained most in

445
00:15:47,590 --> 00:15:45,040
that would talk to the surgeons on the

446
00:15:49,430 --> 00:15:47,600
ground the flight surgeons and

447
00:15:52,150 --> 00:15:49,440
then they'd select the medication that

448
00:15:54,069 --> 00:15:52,160
would be applicable for the situation

449
00:15:56,230 --> 00:15:54,079
but i mean these astronauts spend almost

450
00:15:57,829 --> 00:15:56,240
two years together training often in

451
00:15:59,269 --> 00:15:57,839
close quarters and things like that even

452
00:16:01,269 --> 00:15:59,279
before they fly to the international

453
00:16:02,550 --> 00:16:01,279
space station so by the time they get up

454
00:16:04,629 --> 00:16:02,560
there it's almost like their family

455
00:16:05,990 --> 00:16:04,639
already so i mean you might pick them

456
00:16:07,990 --> 00:16:06,000
with your brothers and sisters every

457
00:16:09,430 --> 00:16:08,000
once in a while but you know they're

458
00:16:10,550 --> 00:16:09,440
they're really close by the time they

459
00:16:12,150 --> 00:16:10,560
get up there

460
00:16:14,949 --> 00:16:12,160
yeah we have an excellent group of

461
00:16:17,269 --> 00:16:14,959
astronauts boy i would be friends with

462
00:16:19,670 --> 00:16:17,279
any of them any day and as a matter of

463
00:16:22,790 --> 00:16:19,680

fact i'm friends with several of them

464
00:16:24,550 --> 00:16:22,800
all right next question guys

465
00:16:26,150 --> 00:16:24,560
how do astronauts communicate with

466
00:16:27,189 --> 00:16:26,160
family and friends and while they're in

467
00:16:29,670 --> 00:16:27,199
space

468
00:16:31,350 --> 00:16:29,680
oh wow that was a great lead-in wow two

469
00:16:32,710 --> 00:16:31,360
questions that lead right into each

470
00:16:34,949 --> 00:16:32,720
other well you know i mentioned the

471
00:16:37,269 --> 00:16:34,959
flight surgeons they talk to them

472
00:16:39,990 --> 00:16:37,279
almost every day to see about their

473
00:16:42,389 --> 00:16:40,000
health and so on but we also schedule

474
00:16:44,069 --> 00:16:42,399
family conferences think of it as

475
00:16:46,230 --> 00:16:44,079
skyping so they have a little video

476
00:16:49,030 --> 00:16:46,240
camera up on board and then they have a

477
00:16:50,790 --> 00:16:49,040
two-way link and they can talk to their

478
00:16:53,509 --> 00:16:50,800
families they usually schedule those on

479
00:16:56,389 --> 00:16:53,519
saturdays so that

480
00:16:58,629 --> 00:16:56,399
you know dads can talk to their kids or

481
00:17:00,629 --> 00:16:58,639
husbands can talk to their wives wives

482
00:17:02,389 --> 00:17:00,639
can talk to their husbands

483
00:17:04,549 --> 00:17:02,399
anybody can talk to their parents or

484
00:17:06,789 --> 00:17:04,559
wherever you get it set up so they could

485
00:17:08,069 --> 00:17:06,799
talk to you if you were in their family

486
00:17:10,150 --> 00:17:08,079
you just are right there on your home

487
00:17:12,230 --> 00:17:10,160
computer with the little the little uh

488
00:17:15,029 --> 00:17:12,240

television that's on or the um little

489
00:17:16,870 --> 00:17:15,039
camera yeah the webcam exactly and uh

490
00:17:19,429 --> 00:17:16,880
just exactly like if you were skyping

491
00:17:21,350 --> 00:17:19,439
have all you guys been skyping before if

492
00:17:23,029 --> 00:17:21,360
not you should really check it out set

493
00:17:25,429 --> 00:17:23,039
up a link with your grandparents or

494
00:17:45,750 --> 00:17:25,439
something it's really fun

495
00:17:49,190 --> 00:17:47,190
i'm sorry could he ask that again we

496
00:17:51,270 --> 00:17:49,200
couldn't quite hear

497
00:17:52,230 --> 00:17:51,280
uh i saw that there was a map in the

498
00:17:53,750 --> 00:17:52,240
background

499
00:17:56,549 --> 00:17:53,760
of the world

500
00:17:58,950 --> 00:17:56,559
what is that used for oh you're talking

501
00:18:01,590 --> 00:17:58,960
about the world map well we like to know

502
00:18:03,590 --> 00:18:01,600
where the crew is at all times and so i

503
00:18:06,230 --> 00:18:03,600
don't know if you can quite see it way

504
00:18:07,270 --> 00:18:06,240
out there over the pacific ocean you see

505
00:18:10,789 --> 00:18:07,280
that little

506
00:18:14,630 --> 00:18:12,710
yeah there it is way out over the

507
00:18:16,870 --> 00:18:14,640
pacific ocean you can see where the

508
00:18:18,789 --> 00:18:16,880
international space station is right now

509
00:18:21,350 --> 00:18:18,799
and those little wavy lines that are on

510
00:18:24,150 --> 00:18:21,360
there that represents the track

511
00:18:26,230 --> 00:18:24,160
uh on the ground where the space station

512
00:18:28,789 --> 00:18:26,240
is flying over so if people out in the

513
00:18:29,990 --> 00:18:28,799

south pacific we'll look up in the sky

514
00:18:32,630 --> 00:18:30,000
right now

515
00:18:33,990 --> 00:18:32,640
uh oh it's after it's after daylight so

516
00:18:36,549 --> 00:18:34,000
they probably can't see it because the

517
00:18:39,190 --> 00:18:36,559
sun's too bright but if you're just um

518
00:18:41,430 --> 00:18:39,200
before or just after what we call the

519
00:18:43,750 --> 00:18:41,440
terminator that's where it goes from the

520
00:18:45,909 --> 00:18:43,760
darker color to the lighter color

521
00:18:46,870 --> 00:18:45,919
the sun's shining brightly off the space

522
00:18:48,950 --> 00:18:46,880
station

523
00:18:51,750 --> 00:18:48,960
and you can see it up in this in the

524
00:18:53,750 --> 00:18:51,760
early morning sky or the early evening

525
00:18:55,029 --> 00:18:53,760
sky

526
00:18:56,950 --> 00:18:55,039
so that's where the earth is and then

527
00:19:00,070 --> 00:18:56,960
there's some other circles on there the

528
00:19:02,470 --> 00:19:00,080
other circles represent um

529
00:19:03,909 --> 00:19:02,480
different ground stations where we can

530
00:19:06,310 --> 00:19:03,919
talk to the crew from so you see the

531
00:19:08,310 --> 00:19:06,320
ones over russia those are all the ones

532
00:19:10,870 --> 00:19:08,320
where the russian communications system

533
00:19:14,230 --> 00:19:10,880
can talk to the crew and then there are

534
00:19:15,909 --> 00:19:14,240
some bigger squ bigger lines there's one

535
00:19:18,710 --> 00:19:15,919
that kind of

536
00:19:21,510 --> 00:19:18,720
circles over the white line that goes

537
00:19:24,230 --> 00:19:21,520
way around the united you know the north

538
00:19:25,750 --> 00:19:24,240

america south america all of that area

539
00:19:29,510 --> 00:19:25,760
and then there's a yellow one off to the

540
00:19:33,270 --> 00:19:29,520
other side those are where um

541
00:19:35,430 --> 00:19:33,280
the tdrs satellite the tracking data

542
00:19:37,029 --> 00:19:35,440
relays the satellite

543
00:19:38,630 --> 00:19:37,039
we bounce signals off of that think of

544
00:19:41,430 --> 00:19:38,640
it like a um

545
00:19:43,350 --> 00:19:41,440
a radio tower for your cell phone it's

546
00:19:46,230 --> 00:19:43,360
the same kind of thing in space there's

547
00:19:48,070 --> 00:19:46,240
a big satellite that we can bounce the

548
00:19:50,830 --> 00:19:48,080
signals off to of and then we can talk

549
00:19:52,549 --> 00:19:50,840
to the crew through that system

550
00:19:54,230 --> 00:19:52,559
yep

551
00:19:54,950 --> 00:19:54,240
so

552
00:19:57,350 --> 00:19:54,960
just

553
00:19:59,350 --> 00:19:57,360
pretty much a tracking uh system so we

554
00:20:01,990 --> 00:19:59,360
can see where the uh the crew and the

555
00:20:03,110 --> 00:20:02,000
international space station always are

556
00:20:06,950 --> 00:20:03,120
um

557
00:20:09,430 --> 00:20:06,960
all right any more questions guys

558
00:20:11,669 --> 00:20:09,440
questions you said that

559
00:20:14,470 --> 00:20:11,679
there was a pilot that's gotten from the

560
00:20:17,190 --> 00:20:14,480
military into an astronaut do they have

561
00:20:18,950 --> 00:20:17,200
to be a pilot from the military to go be

562
00:20:20,470 --> 00:20:18,960
an astronaut

563
00:20:22,310 --> 00:20:20,480

do you have to be a pilot to be an

564
00:20:24,390 --> 00:20:22,320
astronaut if you're in the military or

565
00:20:26,390 --> 00:20:24,400
not and the answer to that is no you

566
00:20:28,870 --> 00:20:26,400
don't have to be a pilot it is something

567
00:20:30,710 --> 00:20:28,880
that helps because you know the nasa is

568
00:20:32,310 --> 00:20:30,720
looking for the top candidate so they

569
00:20:35,830 --> 00:20:32,320
want to know that you can operate

570
00:20:37,830 --> 00:20:35,840
complicated equipment so that might be a

571
00:20:39,669 --> 00:20:37,840
plane which is very complicated you have

572
00:20:41,110 --> 00:20:39,679
to know how to follow a checklist

573
00:20:42,630 --> 00:20:41,120
operate it

574
00:20:44,390 --> 00:20:42,640
or it could be

575
00:20:47,510 --> 00:20:44,400
it could be stuff in the lab you could

576
00:20:49,430 --> 00:20:47,520
be working in a science lab and

577
00:20:51,350 --> 00:20:49,440
that would show that you can work on

578
00:20:53,830 --> 00:20:51,360
complicated things so it doesn't

579
00:20:55,510 --> 00:20:53,840
necessarily have to be a pilot but

580
00:20:58,070 --> 00:20:55,520
somebody who can demonstrate that they

581
00:20:59,830 --> 00:20:58,080
can do complicated operations

582
00:21:01,510 --> 00:20:59,840
i know a lot of our early astronauts

583
00:21:03,270 --> 00:21:01,520
were test pilots and things like that

584
00:21:04,789 --> 00:21:03,280
but a lot of that was because you know

585
00:21:06,390 --> 00:21:04,799
the stuff they were doing it was very

586
00:21:08,870 --> 00:21:06,400
new was very dangerous and that's what

587
00:21:10,390 --> 00:21:08,880
test pilots are known for doing so a lot

588
00:21:12,630 --> 00:21:10,400

of your early astronauts were test

589
00:21:14,710 --> 00:21:12,640
pilots and a lot of astronauts even now

590
00:21:16,470 --> 00:21:14,720
still come from the military but you

591
00:21:18,390 --> 00:21:16,480
know since the advent of shuttle and

592
00:21:19,830 --> 00:21:18,400
station and all the experiment work and

593
00:21:22,390 --> 00:21:19,840
the science and the engineering we've

594
00:21:24,310 --> 00:21:22,400
been doing we now have astronauts from

595
00:21:26,390 --> 00:21:24,320
all walks of life so you don't have to

596
00:21:27,669 --> 00:21:26,400
be a test pilot it could help though now

597
00:21:29,750 --> 00:21:27,679
if you're interested in going into the

598
00:21:32,070 --> 00:21:29,760
military though it really will prepare

599
00:21:33,909 --> 00:21:32,080
you for all kinds of things in life so

600
00:21:35,669 --> 00:21:33,919
think about that if you think that you

601
00:21:38,630 --> 00:21:35,679
might want to move on to be an astronaut

602
00:21:40,549 --> 00:21:38,640
or a doctor they'll pay for your school

603
00:21:42,310 --> 00:21:40,559
anything like that and it's a good way

604
00:21:44,950 --> 00:21:42,320
to serve your country before you get out

605
00:21:46,950 --> 00:21:44,960
there and and live the rest of of your

606
00:21:49,430 --> 00:21:46,960
life in whatever career you choose you

607
00:21:53,350 --> 00:21:49,440
can even stay in the military

608
00:21:57,029 --> 00:21:55,510
anybody have a question

609
00:21:58,950 --> 00:21:57,039
do you guys know when your next mission

610
00:22:00,789 --> 00:21:58,960
is going to be do you know where the

611
00:22:02,789 --> 00:22:00,799
next mission will be when the next

612
00:22:04,230 --> 00:22:02,799
mission will be well we're still doing

613
00:22:05,590 --> 00:22:04,240

missions to the international space

614
00:22:07,350 --> 00:22:05,600
station all the time they're actually

615
00:22:10,149 --> 00:22:07,360
going to launch another crew in just

616
00:22:11,590 --> 00:22:10,159
about two weeks from now

617
00:22:13,110 --> 00:22:11,600
so the

618
00:22:14,630 --> 00:22:13,120
international space station missions are

619
00:22:16,950 --> 00:22:14,640
going you know constantly we've had

620
00:22:17,990 --> 00:22:16,960
people flying in space

621
00:22:20,149 --> 00:22:18,000
for over

622
00:22:22,549 --> 00:22:20,159
for more than a decade continuously you

623
00:22:24,549 --> 00:22:22,559
know since the early 2000s we call the

624
00:22:27,669 --> 00:22:24,559
mission that's going on right now

625
00:22:29,190 --> 00:22:27,679
increment 31 it means it's the 31st

626
00:22:30,870 --> 00:22:29,200
group of people to stay on the

627
00:22:34,310 --> 00:22:30,880
international space station we've been

628
00:22:35,909 --> 00:22:34,320
manning it continuously for 31 different

629
00:22:38,710 --> 00:22:35,919
crews that have come and gone from the

630
00:22:40,870 --> 00:22:38,720
international space station so the

631
00:22:42,470 --> 00:22:40,880
the next mission is increment 32 and

632
00:22:44,630 --> 00:22:42,480
that's the one that joe acaba is going

633
00:22:46,149 --> 00:22:44,640
to launch uh on a soyuz vehicle here in

634
00:22:47,590 --> 00:22:46,159
just a couple of weeks

635
00:22:51,029 --> 00:22:47,600
so we're going to keep having lots and

636
00:22:53,669 --> 00:22:51,039
lots of science missions yep

637
00:22:55,350 --> 00:22:53,679
but then they're for space

638
00:22:57,110 --> 00:22:55,360

that that is basically going to the

639
00:22:58,950 --> 00:22:57,120
international space station oh we're

640
00:23:00,549 --> 00:22:58,960
flying around in space

641
00:23:02,390 --> 00:23:00,559
if there's a question we can't hear it

642
00:23:04,149 --> 00:23:02,400
can you try to speak real loud into the

643
00:23:05,510 --> 00:23:04,159
microphone

644
00:23:12,149 --> 00:23:05,520
another question

645
00:23:16,549 --> 00:23:14,149
is there an age limit to be an astronaut

646
00:23:18,070 --> 00:23:16,559
um not not really basically as long as

647
00:23:20,390 --> 00:23:18,080
you're in you know good physical shape

648
00:23:22,950 --> 00:23:20,400
you can do it i know john glenn famously

649
00:23:25,669 --> 00:23:22,960
flew on the shuttle uh back when he was

650
00:23:27,430 --> 00:23:25,679
i think he was in his late 70s i i

651
00:23:28,950 --> 00:23:27,440
believe and they did um something like

652
00:23:31,110 --> 00:23:28,960
that something like that and they did a

653
00:23:32,630 --> 00:23:31,120
lot of uh testing on aging and things

654
00:23:34,310 --> 00:23:32,640
like that so there's not really an age

655
00:23:37,029 --> 00:23:34,320
limit to it as long as you're still you

656
00:23:40,149 --> 00:23:37,039
know in a good physical condition you

657
00:23:41,830 --> 00:23:40,159
can withstand the rigors of space flight

658
00:23:43,110 --> 00:23:41,840
well i think that's about all the time

659
00:23:44,630 --> 00:23:43,120
we're going to have for questions today

660
00:23:45,990 --> 00:23:44,640
there are some great questions guys i

661
00:23:47,750 --> 00:23:46,000
hope you enjoyed your time here in

662
00:23:49,510 --> 00:23:47,760
mission control and you're able to learn

663
00:23:51,510 --> 00:23:49,520

a little bit more about what we're doing

664
00:23:53,350 --> 00:23:51,520
here at nasa so again thanks for your

665
00:23:55,590 --> 00:23:53,360
questions thank you for being here and

666
00:23:57,909 --> 00:23:55,600
joining me today it was very exciting

667
00:23:59,830 --> 00:23:57,919
stuff oh i loved it anytime just give me

668
00:24:01,269 --> 00:23:59,840
a call if i can take a break out from

669
00:24:03,269 --> 00:24:01,279
helping the astronauts with their