
PAO

1
00:00:04,390 --> 00:00:02,950
good morning welcome to mission control

2
00:00:06,070 --> 00:00:04,400
center here in houston we're in the

3
00:00:07,829 --> 00:00:06,080
international space station flight

4
00:00:08,870 --> 00:00:07,839
control room and i have one of our

5
00:00:11,030 --> 00:00:08,880
international space station flight

6
00:00:13,589 --> 00:00:11,040
controllers with us joe pascucci who is

7
00:00:15,270 --> 00:00:13,599
a trajectory operations officer has

8
00:00:16,550 --> 00:00:15,280
trouble with that word for some reason

9
00:00:18,150 --> 00:00:16,560
joe why don't you tell us a little bit

10
00:00:20,630 --> 00:00:18,160
about what you do

11
00:00:22,470 --> 00:00:20,640
sure just in short my job is to know

12
00:00:23,349 --> 00:00:22,480
where the space station is

13
00:00:25,269 --> 00:00:23,359

and

14
00:00:26,870 --> 00:00:25,279
make sure that it is in the right place

15
00:00:28,230 --> 00:00:26,880
in the future

16
00:00:30,310 --> 00:00:28,240
for it to

17
00:00:31,349 --> 00:00:30,320
be ready to do anything that we need it

18
00:00:33,350 --> 00:00:31,359
to do

19
00:00:35,110 --> 00:00:33,360
and to protect it from any debris in

20
00:00:36,389 --> 00:00:35,120
space and make sure the astronauts on

21
00:00:38,389 --> 00:00:36,399
board stay safe

22
00:00:40,470 --> 00:00:38,399
great that's important stuff

23
00:00:42,470 --> 00:00:40,480
yes and now we have i think students in

24
00:00:50,630 --> 00:00:42,480
pennsylvania ap students who are going

25
00:00:54,150 --> 00:00:52,470
hi my name is leanne

26
00:00:56,310 --> 00:00:54,160
i had a question

27
00:00:58,869 --> 00:00:56,320
regarding the flight controller's duty

28
00:01:00,389 --> 00:00:58,879
of monitoring the location of jettisoned

29
00:01:01,990 --> 00:01:00,399
items in space which are the items that

30
00:01:04,229 --> 00:01:02,000
people intentionally throw away during

31
00:01:05,750 --> 00:01:04,239
the extravehicular activity

32
00:01:07,750 --> 00:01:05,760
i was wondering what types of items are

33
00:01:11,109 --> 00:01:07,760
typically thrown away and if that poses

34
00:01:12,550 --> 00:01:11,119
a greater risk for space debris later on

35
00:01:14,310 --> 00:01:12,560
that's a great question and that's

36
00:01:15,270 --> 00:01:14,320
actually one of the things i deal with a

37
00:01:17,590 --> 00:01:15,280
lot

38
00:01:19,190 --> 00:01:17,600

um so there's a number of things that we

39
00:01:21,830 --> 00:01:19,200
throw away uh

40
00:01:23,510 --> 00:01:21,840
during evas a lot of times crew will

41
00:01:25,429 --> 00:01:23,520
jettison items

42
00:01:27,109 --> 00:01:25,439
that are not safe to bring back inside

43
00:01:29,670 --> 00:01:27,119
or maybe will not fit through the hatch

44
00:01:31,910 --> 00:01:29,680
to go back inside or there's no place to

45
00:01:33,830 --> 00:01:31,920
store them outside the space station and

46
00:01:37,109 --> 00:01:33,840
they need to be gotten rid of

47
00:01:38,789 --> 00:01:37,119
so when those things are thrown away

48
00:01:40,630 --> 00:01:38,799
they do move away and we always make

49
00:01:41,990 --> 00:01:40,640
sure that they will be safe relative to

50
00:01:43,190 --> 00:01:42,000
the space station

51
00:01:45,190 --> 00:01:43,200
and because there actually is an

52
00:01:46,870 --> 00:01:45,200
atmosphere still in the area of the

53
00:01:48,550 --> 00:01:46,880
space station the atmosphere actually

54
00:01:50,550 --> 00:01:48,560
drags them down and eventually they

55
00:01:53,270 --> 00:01:50,560
re-enter

56
00:01:55,670 --> 00:01:53,280
so we keep track of them through our

57
00:01:57,270 --> 00:01:55,680
our relationship with the air force who

58
00:01:59,429 --> 00:01:57,280
keeps track of all of those objects in

59
00:02:03,190 --> 00:01:59,439
space and we make sure that they will

60
00:02:05,109 --> 00:02:03,200
not pose a safety risk to the iss

61
00:02:08,550 --> 00:02:05,119
thank you

62
00:02:12,150 --> 00:02:09,589
um

63
00:02:14,309 --> 00:02:12,160

the topo flight controller is

64
00:02:16,869 --> 00:02:14,319
responsible for informing universities

65
00:02:18,949 --> 00:02:16,879
and companies that have researched cargo

66
00:02:21,430 --> 00:02:18,959
aboard the iss with updates on its

67
00:02:24,150 --> 00:02:21,440
location what types of research

68
00:02:25,350 --> 00:02:24,160
cargo are typically brought aboard

69
00:02:26,630 --> 00:02:25,360
well the last question was about

70
00:02:29,030 --> 00:02:26,640
jettisons and one of the other things

71
00:02:31,110 --> 00:02:29,040
that we jettison or i prefer to say is

72
00:02:32,869 --> 00:02:31,120
deploy is payloads

73
00:02:34,790 --> 00:02:32,879
so there's been a number of small

74
00:02:36,869 --> 00:02:34,800
cubesats that have been built either by

75
00:02:38,550 --> 00:02:36,879
countries or universities

76
00:02:40,070 --> 00:02:38,560
that have been deployed from the iss the

77
00:02:42,630 --> 00:02:40,080
most recent ones were deployed a few

78
00:02:44,869 --> 00:02:42,640
weeks ago we deployed four cubesats

79
00:02:48,390 --> 00:02:44,879
from a deployer that was built by our

80
00:02:52,470 --> 00:02:49,910
we have we provide trajectory

81
00:02:55,270 --> 00:02:52,480
information for those payloads

82
00:02:57,110 --> 00:02:55,280
uh also uh there's a number of payloads

83
00:02:58,550 --> 00:02:57,120
that are on board that have like cameras

84
00:02:59,430 --> 00:02:58,560
and stuff that are looking down at the

85
00:03:02,070 --> 00:02:59,440
earth

86
00:03:03,350 --> 00:03:02,080
and our our trajectory information is

87
00:03:04,790 --> 00:03:03,360
used

88
00:03:06,070 --> 00:03:04,800

in conjunction with those cameras and

89
00:03:07,750 --> 00:03:06,080
stuff to make sure they're pointing at

90
00:03:09,110 --> 00:03:07,760
the things that they're interested in

91
00:03:11,670 --> 00:03:09,120
seeing

92
00:03:13,190 --> 00:03:11,680
or letting them know what they saw

93
00:03:16,630 --> 00:03:13,200
as they flew over the earth and were

94
00:03:16,640 --> 00:03:22,390
thank you next question

95
00:03:26,630 --> 00:03:24,470
hi i'm melissa and one of the questions

96
00:03:30,390 --> 00:03:26,640
i wanted to know was how is trajectory

97
00:03:33,589 --> 00:03:32,070
well without the trajectory we wouldn't

98
00:03:35,910 --> 00:03:33,599
have a space station because we need to

99
00:03:36,949 --> 00:03:35,920
be in orbit to do our jobs

100
00:03:38,390 --> 00:03:36,959
um

101
00:03:40,710 --> 00:03:38,400
but the main thing that we do we are

102
00:03:42,470 --> 00:03:40,720
constantly monitoring where the iss is

103
00:03:44,470 --> 00:03:42,480
we need to keep track

104
00:03:45,990 --> 00:03:44,480
of when the sun is going to rise and

105
00:03:48,149 --> 00:03:46,000
going to set

106
00:03:49,990 --> 00:03:48,159
so that we generate the power that we

107
00:03:51,990 --> 00:03:50,000
need and we keep the iss the temperature

108
00:03:53,350 --> 00:03:52,000
that it needs to be we need to keep

109
00:03:54,630 --> 00:03:53,360
track of where our communication

110
00:03:55,750 --> 00:03:54,640
satellites are

111
00:03:56,550 --> 00:03:55,760
so that we

112
00:03:58,390 --> 00:03:56,560
have

113
00:03:59,589 --> 00:03:58,400

constant or near constant communication

114
00:04:00,949 --> 00:03:59,599
with the ground

115
00:04:06,550 --> 00:04:00,959
to mission control in the control

116
00:04:11,110 --> 00:04:09,190
and my next question was what it what is

117
00:04:13,670 --> 00:04:11,120
the worst case scenario if a shuttle

118
00:04:15,990 --> 00:04:13,680
part of the iss is launched at a wrong

119
00:04:19,189 --> 00:04:17,430
so i guess i'll

120
00:04:21,430 --> 00:04:19,199
i'll take that question in two parts if

121
00:04:23,030 --> 00:04:21,440
something was launched at the right time

122
00:04:25,110 --> 00:04:23,040
in the right direction but at the wrong

123
00:04:27,270 --> 00:04:25,120
angle the worst thing is is it could not

124
00:04:29,189 --> 00:04:27,280
make it into orbit

125
00:04:31,030 --> 00:04:29,199
the other part would getting a little

126
00:04:32,710 --> 00:04:31,040
more technical would be

127
00:04:34,710 --> 00:04:32,720
if you launched something into orbit but

128
00:04:36,870 --> 00:04:34,720
you didn't do it at the right time you

129
00:04:38,870 --> 00:04:36,880
could put yourself in a position to be

130
00:04:40,950 --> 00:04:38,880
in an orbit that you couldn't actually

131
00:04:43,270 --> 00:04:40,960
get to the iss

132
00:04:45,749 --> 00:04:43,280
because once you're in space uh in order

133
00:04:47,830 --> 00:04:45,759
to move the orbit around takes a lot of

134
00:04:49,990 --> 00:04:47,840
energy and uh

135
00:04:52,150 --> 00:04:50,000
that is not enough there usually is not

136
00:04:55,270 --> 00:04:52,160
enough energy on board a vehicle to be

137
00:04:56,790 --> 00:04:55,280
in the wrong place at the wrong time

138
00:05:00,790 --> 00:04:56,800

can i ask a question real quick has that

139
00:05:04,550 --> 00:05:02,550
in terms of the u.s space program and

140
00:05:06,710 --> 00:05:04,560
the russian space program i don't

141
00:05:08,070 --> 00:05:06,720
believe we've ever launched into orbit

142
00:05:09,909 --> 00:05:08,080
and not been able to successfully

143
00:05:11,590 --> 00:05:09,919
complete a rendezvous imagine that would

144
00:05:13,510 --> 00:05:11,600
be hard with all the safeguards sorry go

145
00:05:16,790 --> 00:05:13,520
ahead next question

146
00:05:20,230 --> 00:05:19,029
hi my name is christine

147
00:05:22,390 --> 00:05:20,240
what type of

148
00:05:24,950 --> 00:05:22,400
degree does a trajectory operations

149
00:05:27,350 --> 00:05:24,960
officer need

150
00:05:30,150 --> 00:05:27,360
most of uh all of the topos have a

151
00:05:33,189 --> 00:05:30,160
degrees in in engineering of some kind i

152
00:05:34,629 --> 00:05:33,199
have a degree in aerospace engineering

153
00:05:36,230 --> 00:05:34,639
uh there are some other topos who have

154
00:05:38,710 --> 00:05:36,240
degrees in mechanical engineering or

155
00:05:40,230 --> 00:05:38,720
mathematics

156
00:05:42,950 --> 00:05:40,240
okay thank you and i have another

157
00:05:44,950 --> 00:05:42,960
question um if you were told as a child

158
00:05:47,189 --> 00:05:44,960
that you would work for nasa in mission

159
00:05:48,950 --> 00:05:47,199
control when you grew up how would you

160
00:05:50,150 --> 00:05:48,960
have reacted

161
00:05:52,070 --> 00:05:50,160
i think i would have been extremely

162
00:05:53,590 --> 00:05:52,080
excited

163
00:05:55,110 --> 00:05:53,600

i have a very old picture from when i

164
00:05:58,150 --> 00:05:55,120
was probably seven years old and me

165
00:06:04,309 --> 00:05:58,160
playing with the space shuttle

166
00:06:07,830 --> 00:06:05,670
good afternoon my name is matt the

167
00:06:09,990 --> 00:06:07,840
question i have for you today is um have

168
00:06:12,230 --> 00:06:10,000
there any living organisms been found in

169
00:06:14,390 --> 00:06:12,240
outer space

170
00:06:16,469 --> 00:06:14,400
i'm not the best person to answer that

171
00:06:17,830 --> 00:06:16,479
question but i don't believe i've ever

172
00:06:19,350 --> 00:06:17,840
heard of that

173
00:06:21,189 --> 00:06:19,360
i think that's right i think we haven't

174
00:06:23,670 --> 00:06:21,199
found any living organisms that we

175
00:06:28,790 --> 00:06:23,680
didn't put there anyway

176
00:06:32,629 --> 00:06:30,469
hi my name is adam and i was just

177
00:06:35,029 --> 00:06:32,639
wondering how often do you have to

178
00:06:37,510 --> 00:06:35,039
change the direction of the space

179
00:06:41,909 --> 00:06:37,520
station and how often is that

180
00:06:46,070 --> 00:06:44,150
i don't have the answer for how often

181
00:06:47,590 --> 00:06:46,080
it's specifically debris from nasa

182
00:06:49,589 --> 00:06:47,600
missions

183
00:06:52,390 --> 00:06:49,599
in general the space station has been

184
00:06:54,629 --> 00:06:52,400
maneuvered about once per year

185
00:06:56,629 --> 00:06:54,639
due to debris in space that we're trying

186
00:06:58,550 --> 00:06:56,639
to get away from

187
00:07:00,710 --> 00:06:58,560
as a normal part of our process of

188
00:07:02,309 --> 00:07:00,720

making sure the space station is going

189
00:07:03,350 --> 00:07:02,319
to be in the right place at the right

190
00:07:05,189 --> 00:07:03,360
time

191
00:07:07,589 --> 00:07:05,199
for all of the trajectory events that we

192
00:07:10,150 --> 00:07:07,599
have we usually do what we call them

193
00:07:11,990 --> 00:07:10,160
reboosts about once a month

194
00:07:13,110 --> 00:07:12,000
we actually just performed a reboost

195
00:07:17,110 --> 00:07:13,120
yesterday and we're planning on

196
00:07:17,120 --> 00:07:22,150
thank you

197
00:07:26,230 --> 00:07:24,629
hey my name is morgan and my two

198
00:07:28,309 --> 00:07:26,240
questions have to deal with space in

199
00:07:30,390 --> 00:07:28,319
general rather than the space station

200
00:07:32,629 --> 00:07:30,400
but i was wondering if there's any way

201
00:07:35,510 --> 00:07:32,639
of knowing of anything beyond our

202
00:07:38,790 --> 00:07:37,189
i don't know that i'm the right person

203
00:07:41,510 --> 00:07:38,800
to ask that question to that seems like

204
00:07:44,230 --> 00:07:41,520
a question for a theoretical physicist i

205
00:07:46,469 --> 00:07:44,240
think we've got a lot of different um

206
00:07:47,589 --> 00:07:46,479
things like the hubble space telescope

207
00:07:48,869 --> 00:07:47,599
and we're getting ready to launch

208
00:07:50,790 --> 00:07:48,879
something called the james webb space

209
00:07:53,510 --> 00:07:50,800
telescope that give us just that kind of

210
00:07:55,350 --> 00:07:53,520
information they can look far beyond um

211
00:07:56,950 --> 00:07:55,360
you know what we're able to see from

212
00:07:59,670 --> 00:07:56,960
here on earth and give us all kinds of

213
00:08:01,909 --> 00:07:59,680

information about our universe

214
00:08:03,510 --> 00:08:01,919
where it came from um how it started

215
00:08:05,909 --> 00:08:03,520
things like that so there's lots of

216
00:08:07,909 --> 00:08:05,919
information online at nasa.gov if you

217
00:08:10,629 --> 00:08:07,919
want to go look that up

218
00:08:12,230 --> 00:08:10,639
okay awesome thanks and is space

219
00:08:14,950 --> 00:08:12,240
infinite

220
00:08:16,629 --> 00:08:14,960
or does it have an end

221
00:08:19,589 --> 00:08:16,639
that's another one that would be

222
00:08:22,150 --> 00:08:19,599
really hard for me to answer sorry

223
00:08:25,110 --> 00:08:22,160
it's okay thank you

224
00:08:31,029 --> 00:08:28,230
hello again um question i want to ask is

225
00:08:34,630 --> 00:08:31,039
um what is the future plans for the iss

226
00:08:38,389 --> 00:08:36,469
well so we've got a lot of things going

227
00:08:40,310 --> 00:08:38,399
on at nasa um here in the human

228
00:08:42,949 --> 00:08:40,320
spaceflight program which is basically

229
00:08:44,230 --> 00:08:42,959
where we work and know the most about

230
00:08:46,070 --> 00:08:44,240
we've got a few different things going

231
00:08:47,350 --> 00:08:46,080
on um first of all of course there's the

232
00:08:50,389 --> 00:08:47,360
international space station where we

233
00:08:51,990 --> 00:08:50,399
have people living 24 7 and have had for

234
00:08:53,430 --> 00:08:52,000
more than a decade

235
00:08:55,509 --> 00:08:53,440
that's going on right now they're doing

236
00:08:57,670 --> 00:08:55,519
a lot of really cool research and you

237
00:09:00,150 --> 00:08:57,680
can find out more about that at nasa.gov

238
00:09:02,230 --> 00:09:00,160

station meanwhile we're also working

239
00:09:04,790 --> 00:09:02,240
with commercial companies to develop new

240
00:09:07,030 --> 00:09:04,800
vehicles to take cargo and people up to

241
00:09:08,310 --> 00:09:07,040
the space station and letting

242
00:09:10,790 --> 00:09:08,320
those commercial companies kind of take

243
00:09:13,750 --> 00:09:10,800
over that gives us the ability to focus

244
00:09:16,310 --> 00:09:13,760
more on future missions which we are

245
00:09:17,670 --> 00:09:16,320
building the orion spacecraft for um

246
00:09:19,590 --> 00:09:17,680
that's going to be launching actually on

247
00:09:21,509 --> 00:09:19,600
its first mission next year it's going

248
00:09:23,590 --> 00:09:21,519
to be uncrew there won't be people on it

249
00:09:25,430 --> 00:09:23,600
for this first time but it's going to go

250
00:09:27,110 --> 00:09:25,440
up actually about 15 times farther than

251
00:09:29,030 --> 00:09:27,120
the international space station orbits

252
00:09:30,710 --> 00:09:29,040
and farther than any

253
00:09:32,230 --> 00:09:30,720
spacecraft built for humans has been in

254
00:09:34,389 --> 00:09:32,240
40 years so that's called the

255
00:09:36,470 --> 00:09:34,399
exploration flight test 1

256
00:09:37,910 --> 00:09:36,480
and then scheduled for next fall so you

257
00:09:39,990 --> 00:09:37,920
should definitely pay attention to that

258
00:09:42,150 --> 00:09:40,000
and then we'll be doing one more flight

259
00:09:43,990 --> 00:09:42,160
test with the space launch system which

260
00:09:46,230 --> 00:09:44,000
nasa is building a it's a new rocket

261
00:09:48,070 --> 00:09:46,240
that's going to let us launch orion out

262
00:09:49,910 --> 00:09:48,080
of low earth orbit um

263
00:09:51,350 --> 00:09:49,920

low earth orbit is was where the space

264
00:09:52,790 --> 00:09:51,360
station is and where the space shuttle

265
00:09:54,150 --> 00:09:52,800
flew as well so it's been a while since

266
00:09:55,829 --> 00:09:54,160
we've had people outside of low earth

267
00:09:58,310 --> 00:09:55,839
orbit and we're really excited about

268
00:10:00,949 --> 00:09:58,320
that that's going to be in 2017 and then

269
00:10:02,790 --> 00:10:00,959
in 2021 we'll be able to send people on

270
00:10:04,630 --> 00:10:02,800
board orion outside of orbit for the

271
00:10:06,310 --> 00:10:04,640
first time so lots of cool stuff coming

272
00:10:13,110 --> 00:10:06,320
up

273
00:10:17,590 --> 00:10:15,430
hello my name is madison and i was

274
00:10:19,110 --> 00:10:17,600
wondering what type of interaction do

275
00:10:21,350 --> 00:10:19,120
you have with the other countries

276
00:10:22,630 --> 00:10:21,360
involved with the ifs

277
00:10:24,550 --> 00:10:22,640
we actually have quite a bit of

278
00:10:25,910 --> 00:10:24,560
interaction with the other countries

279
00:10:28,230 --> 00:10:25,920
involved

280
00:10:30,710 --> 00:10:28,240
of course a major part of managing our

281
00:10:32,470 --> 00:10:30,720
trajectory is performing maneuvers or

282
00:10:34,389 --> 00:10:32,480
reboosts like i said earlier

283
00:10:35,990 --> 00:10:34,399
and the propulsion system on the iss is

284
00:10:38,069 --> 00:10:36,000
actually in the russian segment so we

285
00:10:39,910 --> 00:10:38,079
have a very close relationship with our

286
00:10:42,630 --> 00:10:39,920
counterparts in russia

287
00:10:45,269 --> 00:10:42,640
and also we have visiting vehicles that

288
00:10:48,470 --> 00:10:45,279

come from the european space agency and

289
00:10:49,590 --> 00:10:48,480
the japanese space agency the atv and

290
00:10:51,190 --> 00:10:49,600
htv

291
00:10:53,590 --> 00:10:51,200
plus commercial partners that are now

292
00:10:55,990 --> 00:10:53,600
sending vehicles to the iss so we have

293
00:10:58,069 --> 00:10:56,000
relationships with all of them

294
00:10:59,190 --> 00:10:58,079
with their visiting vehicles to to make

295
00:11:01,190 --> 00:10:59,200
sure that we can support them

296
00:11:04,949 --> 00:11:01,200
successfully

297
00:11:09,670 --> 00:11:07,110
hello my name is emily

298
00:11:11,110 --> 00:11:09,680
i was wondering if nasa is currently

299
00:11:13,430 --> 00:11:11,120
searching for new

300
00:11:15,990 --> 00:11:13,440
new planets and solar systems that can

301
00:11:19,190 --> 00:11:16,000
sustain human life and has nasa found

302
00:11:23,430 --> 00:11:21,670
we nasa does have um some

303
00:11:25,269 --> 00:11:23,440
various instruments that are looking for

304
00:11:27,030 --> 00:11:25,279
exactly that sort of thing and i think

305
00:11:30,230 --> 00:11:27,040
just recently we had announcement about

306
00:11:31,590 --> 00:11:30,240
a new earth-like planet that we found

307
00:11:32,949 --> 00:11:31,600
that's another thing that probably we're

308
00:11:34,710 --> 00:11:32,959
not the best people to tell you about

309
00:11:36,949 --> 00:11:34,720
but there's lots of good information on

310
00:11:43,590 --> 00:11:36,959
nasa.gov

311
00:11:47,030 --> 00:11:45,110
hello again

312
00:11:49,509 --> 00:11:47,040
um i'm backtracking a little bit but i

313
00:11:52,230 --> 00:11:49,519

was wondering if reboots are performed

314
00:11:54,629 --> 00:11:52,240
manually by the people aboard the iss or

315
00:11:56,710 --> 00:11:54,639
if you guys manage them

316
00:11:58,550 --> 00:11:56,720
we actually manage them from the ground

317
00:12:00,470 --> 00:11:58,560
uh the crew is aware of when they're

318
00:12:03,190 --> 00:12:00,480
going to happen but there's actually no

319
00:12:04,470 --> 00:12:03,200
crew involvement necessary for reboost

320
00:12:06,389 --> 00:12:04,480
as a matter of fact there have been

321
00:12:08,310 --> 00:12:06,399
times when reboots have been performed

322
00:12:11,190 --> 00:12:08,320
while the crew is sleeping

323
00:12:12,870 --> 00:12:11,200
and the acceleration is so low

324
00:12:14,310 --> 00:12:12,880
that the crew doesn't even realize it's

325
00:12:15,670 --> 00:12:14,320
going on

326
00:12:17,750 --> 00:12:15,680
there are some great videos that you can

327
00:12:18,710 --> 00:12:17,760
find on youtube that the crew crews have

328
00:12:21,190 --> 00:12:18,720
done

329
00:12:24,310 --> 00:12:21,200
of what it's like to be on board the iss

330
00:12:32,550 --> 00:12:24,320
during a reboost

331
00:12:36,790 --> 00:12:35,110
um hi my name is kiana and my question

332
00:12:38,389 --> 00:12:36,800
is what are some of the things nasa is

333
00:12:42,310 --> 00:12:38,399
doing to make travel time to other

334
00:12:46,949 --> 00:12:45,430
well um we travel to another planet is

335
00:12:48,790 --> 00:12:46,959
is going to take a long time at least

336
00:12:50,550 --> 00:12:48,800
for the foreseeable future it's it's not

337
00:12:51,750 --> 00:12:50,560
a quick process but what we're doing is

338
00:12:53,590 --> 00:12:51,760

we're building

339
00:12:55,829 --> 00:12:53,600
spacecrafts that will support the crew

340
00:12:57,509 --> 00:12:55,839
over that long journey um not just

341
00:13:00,069 --> 00:12:57,519
necessarily a spacecraft even they

342
00:13:01,110 --> 00:13:00,079
probably if we went to mars we need not

343
00:13:03,110 --> 00:13:01,120
only the

344
00:13:05,350 --> 00:13:03,120
orion capsule that we're building that i

345
00:13:06,389 --> 00:13:05,360
mentioned earlier but also a habitat for

346
00:13:07,670 --> 00:13:06,399
the crew to live in to give them a

347
00:13:09,350 --> 00:13:07,680
little bit more space to move around

348
00:13:11,509 --> 00:13:09,360
because it can be it can be several

349
00:13:15,590 --> 00:13:11,519
months to get to just for instance mars

350
00:13:15,600 --> 00:13:27,990
thank you

351
00:13:34,470 --> 00:13:30,629
um how long does the does it take for

352
00:13:37,430 --> 00:13:34,480
the iss to recharge in the sun like

353
00:13:40,790 --> 00:13:37,440
under the sun's rays

354
00:13:44,710 --> 00:13:40,800
the solar rays yeah the solar rays so

355
00:13:50,949 --> 00:13:44,720
as the iss passes into daylight it

356
00:13:55,269 --> 00:13:53,670
so that's okay uh so as there are

357
00:13:58,230 --> 00:13:55,279
certain times where we actually need to

358
00:13:59,990 --> 00:13:58,240
stop moving the solar arrays uh say when

359
00:14:01,670 --> 00:14:00,000
a vehicle is approaching or departing

360
00:14:03,590 --> 00:14:01,680
the iss or

361
00:14:05,350 --> 00:14:03,600
for other reasons

362
00:14:06,870 --> 00:14:05,360
that essentially

363
00:14:09,509 --> 00:14:06,880

because we're not tracking the sun we're

364
00:14:12,230 --> 00:14:09,519
not charging batteries as efficiently as

365
00:14:15,189 --> 00:14:12,240
they could be charged and the iss can

366
00:14:16,710 --> 00:14:15,199
can stay in that condition for

367
00:14:19,750 --> 00:14:16,720
a fair amount of time i think at least

368
00:14:21,509 --> 00:14:19,760
in orbit or two before it needs to uh be

369
00:14:24,629 --> 00:14:21,519
pointing its arrays back at the sun to

370
00:14:26,870 --> 00:14:24,639
maintain charge in batteries

371
00:14:29,110 --> 00:14:26,880
and orbit takes about 90 minutes so yeah

372
00:14:33,350 --> 00:14:29,120
orbit one one orbit of the earth is

373
00:14:37,829 --> 00:14:35,590
hello my name is shannon and i wanted to

374
00:14:39,910 --> 00:14:37,839
know if you knew about any asteroids or

375
00:14:43,110 --> 00:14:39,920
comments that could impact the path of

376
00:14:45,509 --> 00:14:43,120
the iss in the near future

377
00:14:47,110 --> 00:14:45,519
i am not aware of any comments or

378
00:14:48,550 --> 00:14:47,120
asteroids that we're concerned about the

379
00:14:49,670 --> 00:14:48,560
the main thing that we're constantly

380
00:14:51,030 --> 00:14:49,680
tracking

381
00:14:53,269 --> 00:14:51,040
is uh

382
00:14:55,829 --> 00:14:53,279
the stuff that people have put in space

383
00:14:59,350 --> 00:14:55,839
uh that threaten the iss and we're

384
00:15:05,350 --> 00:14:59,360
watching for that stuff all the time

385
00:15:08,310 --> 00:15:06,150
um

386
00:15:13,750 --> 00:15:08,320
hi i'm mark case and i'm what happened

387
00:15:17,269 --> 00:15:15,269
those would be the apollo missions that

388
00:15:18,230 --> 00:15:17,279

were never flown

389
00:15:20,870 --> 00:15:18,240
right

390
00:15:22,150 --> 00:15:20,880
those we um canceled those missions so

391
00:15:23,750 --> 00:15:22,160
that we could go ahead and get started

392
00:15:25,910 --> 00:15:23,760
on work for the space shuttle which then

393
00:15:29,590 --> 00:15:25,920
went on to fly for 30 years and help us

394
00:15:32,790 --> 00:15:30,550
okay

395
00:15:34,629 --> 00:15:32,800
and i have another question um when is

396
00:15:39,670 --> 00:15:34,639
nasa planning on landing on mars and

397
00:15:45,189 --> 00:15:43,110
oh okay so uh nasa has plans um i think

398
00:15:48,389 --> 00:15:45,199
we would we would be going to mars and

399
00:15:50,710 --> 00:15:48,399
probably the 2030s um is

400
00:15:51,910 --> 00:15:50,720
our our thoughts at this point and as

401
00:15:53,670 --> 00:15:51,920
for what the topo would do that would

402
00:15:55,749 --> 00:15:53,680
probably be a question for you so the

403
00:15:57,910 --> 00:15:55,759
role of the topo would be to manage the

404
00:15:58,870 --> 00:15:57,920
trajectory uh to get us to mars to make

405
00:16:00,470 --> 00:15:58,880
sure

406
00:16:02,069 --> 00:16:00,480
that we were flying a safe trajectory

407
00:16:05,110 --> 00:16:02,079
and the most efficient trajectory that

408
00:16:05,120 --> 00:16:12,310
okay thank you

409
00:16:17,030 --> 00:16:14,949
hi my name is monica and um

410
00:16:19,990 --> 00:16:17,040
have there been recent discoveries of

411
00:16:22,790 --> 00:16:20,000
ufos or suspicious suspicious objects

412
00:16:25,269 --> 00:16:22,800
and with our current technology how is

413
00:16:27,829 --> 00:16:25,279

how easy is it for nasa to define these

414
00:16:32,550 --> 00:16:30,069
suspicious objects i i don't think i've

415
00:16:33,829 --> 00:16:32,560
heard of any any suspicious objects that

416
00:16:35,590 --> 00:16:33,839
have been found

417
00:16:37,030 --> 00:16:35,600
we obviously keep an eye on a lot of

418
00:16:39,670 --> 00:16:37,040
different things in this in this space

419
00:16:40,550 --> 00:16:39,680
in in space um and in the universe but i

420
00:16:41,670 --> 00:16:40,560
haven't heard of anything that's

421
00:16:44,230 --> 00:16:41,680
suspicious

422
00:16:54,389 --> 00:16:44,240
and i would agree with that

423
00:16:58,550 --> 00:16:56,949
hello i have a question the

424
00:17:01,030 --> 00:16:58,560
international space station is

425
00:17:03,749 --> 00:17:01,040
constantly falling because and because

426
00:17:06,870 --> 00:17:03,759
of this do astronauts on the iss have

427
00:17:08,789 --> 00:17:06,880
the constant feeling of weightlessness

428
00:17:10,789 --> 00:17:08,799
while in the space station like feeling

429
00:17:14,470 --> 00:17:10,799
of weightlessness like on a

430
00:17:18,870 --> 00:17:16,230
yes they do have a constant feeling of

431
00:17:21,829 --> 00:17:18,880
weightlessness while they're in orbit

432
00:17:25,429 --> 00:17:21,839
and as a matter of fact uh

433
00:17:27,350 --> 00:17:25,439
as long as they stay uh near the uh the

434
00:17:29,430 --> 00:17:27,360
center of iss

435
00:17:32,310 --> 00:17:29,440
uh they're in an area that that we refer

436
00:17:34,950 --> 00:17:32,320
to as the microgravity envelope where uh

437
00:17:36,549 --> 00:17:34,960
where it truly does feel like there's no

438
00:17:38,630 --> 00:17:36,559

gravity

439
00:17:40,870 --> 00:17:38,640
there's actually you can move away from

440
00:17:43,190 --> 00:17:40,880
the center of the iss and actually begin

441
00:17:47,750 --> 00:17:43,200
to see the effects of the fact that you

442
00:17:53,350 --> 00:17:47,760
actually still are in a gravity field

443
00:17:58,789 --> 00:17:56,150
hello again um i was wondering what is

444
00:18:01,750 --> 00:17:58,799
the protocol if or when the iss gets hit

445
00:18:03,270 --> 00:18:01,760
with debris

446
00:18:04,870 --> 00:18:03,280
that's a great question

447
00:18:06,470 --> 00:18:04,880
uh

448
00:18:09,190 --> 00:18:06,480
i'll start with

449
00:18:11,830 --> 00:18:09,200
not letting it get hit with debris

450
00:18:13,190 --> 00:18:11,840
so we're constantly monitoring

451
00:18:14,470 --> 00:18:13,200
through our relationship with the air

452
00:18:16,230 --> 00:18:14,480
force

453
00:18:18,950 --> 00:18:16,240
all the debris that's in space and

454
00:18:21,270 --> 00:18:18,960
whether or not it's a threat to the iss

455
00:18:23,190 --> 00:18:21,280
and if it's if we do find debris that is

456
00:18:25,750 --> 00:18:23,200
a threat to the iss

457
00:18:27,909 --> 00:18:25,760
we begin planning to move the iss to

458
00:18:29,909 --> 00:18:27,919
make sure that debris is not a threat if

459
00:18:31,430 --> 00:18:29,919
something were to happen

460
00:18:33,830 --> 00:18:31,440
that

461
00:18:35,669 --> 00:18:33,840
we were not able to move the iss in time

462
00:18:37,750 --> 00:18:35,679
or we found out too late

463
00:18:39,990 --> 00:18:37,760

we do have procedures in place to

464
00:18:42,070 --> 00:18:40,000
shelter our the crew

465
00:18:44,470 --> 00:18:42,080
in the two soyuz vehicles onboard the

466
00:18:45,669 --> 00:18:44,480
iss which are the the well it's the

467
00:18:47,190 --> 00:18:45,679
vehicles that they used to get to the

468
00:18:49,270 --> 00:18:47,200
iss but they would be there also their

469
00:18:52,150 --> 00:18:49,280
emergency escape vehicles

470
00:18:53,990 --> 00:18:52,160
uh to get away from the iss

471
00:18:55,990 --> 00:18:54,000
and uh they do that and they're

472
00:18:59,110 --> 00:18:56,000
essentially ready to undock and leave

473
00:19:02,150 --> 00:18:59,120
the iss if it were to get hit by debris

474
00:19:02,160 --> 00:19:09,270
thank you

475
00:19:17,750 --> 00:19:12,870
um when will the robonaut 2 be finished

476
00:19:22,549 --> 00:19:20,150
unfortunately i have to turn to you to

477
00:19:24,549 --> 00:19:22,559
answer questions about robonaut um so

478
00:19:26,549 --> 00:19:24,559
you may have heard that just this week

479
00:19:29,350 --> 00:19:26,559
we announced that robonaut which has

480
00:19:31,590 --> 00:19:29,360
been on the space station since sts-133

481
00:19:33,669 --> 00:19:31,600
is going to be getting some legs sent up

482
00:19:37,430 --> 00:19:33,679
um on a future spacex vehicle that's

483
00:19:38,789 --> 00:19:37,440
going up in february so that'll get it

484
00:19:41,510 --> 00:19:38,799
that'll get it a little farther along on

485
00:19:43,830 --> 00:19:41,520
the journey um as far as being really

486
00:19:45,350 --> 00:19:43,840
complete you know robonaut's kind of a

487
00:19:46,549 --> 00:19:45,360
test project so that i don't know that

488
00:19:49,590 --> 00:19:46,559

there's a point where you really say

489
00:19:52,710 --> 00:19:49,600
it's complete um we'll probably keep

490
00:19:55,350 --> 00:19:52,720
sending up changes and new ideas to try

491
00:19:57,590 --> 00:19:55,360
out and and see what we end up see see

492
00:20:03,590 --> 00:19:57,600
what we end up with

493
00:20:09,350 --> 00:20:05,270
how do you learn to deal with the stress

494
00:20:14,390 --> 00:20:11,190
is it stressful here it could be a

495
00:20:15,830 --> 00:20:14,400
little stressful sometimes uh

496
00:20:18,470 --> 00:20:15,840
well it

497
00:20:20,390 --> 00:20:18,480
it's a matter of

498
00:20:24,710 --> 00:20:20,400
learning and knowing about yourself and

499
00:20:28,470 --> 00:20:26,230
what's the most struggle

500
00:20:30,149 --> 00:20:28,480
i'm sorry go ahead what's the most

501
00:20:31,830 --> 00:20:30,159
what's the most stressful situation

502
00:20:34,710 --> 00:20:31,840
you've ever experienced in mission

503
00:20:36,470 --> 00:20:34,720
control and with trajectory

504
00:20:38,789 --> 00:20:36,480
i'd say the most stressful uh

505
00:20:40,149 --> 00:20:38,799
experiences i've had here in in mission

506
00:20:41,990 --> 00:20:40,159
control since i've been working on the

507
00:20:44,470 --> 00:20:42,000
space station as a toppo

508
00:20:47,190 --> 00:20:44,480
have been the times when uh there is a

509
00:20:48,870 --> 00:20:47,200
piece of debris threatening the iss

510
00:20:51,270 --> 00:20:48,880
that we are monitoring and whether or

511
00:20:53,510 --> 00:20:51,280
not we're actually going to uh maneuver

512
00:20:54,630 --> 00:20:53,520
the iss to get away from it

513
00:20:56,950 --> 00:20:54,640

and that's probably different for

514
00:20:58,549 --> 00:20:56,960
different positions in the space in the

515
00:21:00,549 --> 00:20:58,559
in the flight control team right

516
00:21:02,950 --> 00:21:00,559
spacewalk officer might say that the

517
00:21:05,110 --> 00:21:02,960
spacewalk is the most stressful time or

518
00:21:06,390 --> 00:21:05,120
for a public affairs person like me and

519
00:21:07,830 --> 00:21:06,400
when we're i'm trying to talk about

520
00:21:09,190 --> 00:21:07,840
something that's really complicated so

521
00:21:10,470 --> 00:21:09,200
there it just depends on what you're

522
00:21:11,990 --> 00:21:10,480
doing i would agree that's probably

523
00:21:13,590 --> 00:21:12,000
probably about the same for every job

524
00:21:14,870 --> 00:21:13,600
there's there's times that are exciting

525
00:21:16,870 --> 00:21:14,880
and that's kind of what you what you

526
00:21:19,990 --> 00:21:16,880
like about the job but they're a little

527
00:21:25,190 --> 00:21:23,669
um yesterday the cooling capacitor

528
00:21:26,310 --> 00:21:25,200
something went wrong with it is there

529
00:21:31,350 --> 00:21:26,320
any

530
00:21:34,470 --> 00:21:31,360
new news that you can tell me about that

531
00:21:35,909 --> 00:21:34,480
sure um i can take that um so

532
00:21:37,909 --> 00:21:35,919
like you said we have

533
00:21:39,430 --> 00:21:37,919
a cooling two cooling loops actually on

534
00:21:41,590 --> 00:21:39,440
the space station and one of them had a

535
00:21:42,710 --> 00:21:41,600
problem yesterday

536
00:21:44,549 --> 00:21:42,720
that

537
00:21:45,830 --> 00:21:44,559
caused it to shut down and so the teams

538
00:21:47,190 --> 00:21:45,840

here on the ground have been working

539
00:21:49,110 --> 00:21:47,200
real hard to figure out exactly what

540
00:21:50,710 --> 00:21:49,120
caused the shutdown and what they're

541
00:21:52,549 --> 00:21:50,720
going to do to fix it so there's still a

542
00:21:54,630 --> 00:21:52,559
lot of work going on to to determine

543
00:21:56,230 --> 00:21:54,640
what the next steps are but people are

544
00:21:59,029 --> 00:21:56,240
people are working pretty hard and in

545
00:22:00,710 --> 00:21:59,039
the meantime the crew is doing just fine

546
00:22:02,070 --> 00:22:00,720
on board the space station they've got

547
00:22:03,990 --> 00:22:02,080
several things that they're able to work

548
00:22:07,110 --> 00:22:04,000
on today while they wait for the team

549
00:22:09,590 --> 00:22:07,120
here on the ground to work through that

550
00:22:12,870 --> 00:22:09,600
okay thank you um and what are your

551
00:22:14,789 --> 00:22:12,880
hours for working in mission control

552
00:22:16,789 --> 00:22:14,799
the hours can be

553
00:22:19,270 --> 00:22:16,799
anything that is required

554
00:22:22,149 --> 00:22:19,280
uh for my console specifically

555
00:22:25,270 --> 00:22:22,159
we normally work uh daytime hours

556
00:22:28,070 --> 00:22:25,280
uh only and then when we're required for

557
00:22:30,310 --> 00:22:28,080
overnight or evening shifts we come in

558
00:22:31,909 --> 00:22:30,320
and take care of that we're also on call

559
00:22:34,230 --> 00:22:31,919
24 hours a day

560
00:22:36,470 --> 00:22:34,240
again associated with protecting the iss

561
00:22:38,470 --> 00:22:36,480
from debris in space

562
00:22:41,029 --> 00:22:38,480
but the space station crew actually gets

563
00:22:43,590 --> 00:22:41,039

up at midnight central time so there

564
00:22:45,270 --> 00:22:43,600
have to be teams in here to help them um

565
00:22:46,710 --> 00:22:45,280
for that in the middle of the night for

566
00:22:49,190 --> 00:22:46,720
us which is just the beginning of their

567
00:22:51,350 --> 00:22:49,200
morning and we actually have

568
00:22:52,789 --> 00:22:51,360
three different teams that overlap by an

569
00:22:55,029 --> 00:22:52,799
hour and so each of their shifts are

570
00:22:57,190 --> 00:22:55,039
nine hours a piece and so the first one

571
00:22:58,950 --> 00:22:57,200
comes in and stays for nine hours and

572
00:23:00,310 --> 00:22:58,960
for the last hour they're handing over

573
00:23:03,669 --> 00:23:00,320
to somebody who's taken their place and

574
00:23:03,679 --> 00:23:11,669
okay thank you

575
00:23:15,590 --> 00:23:13,830
hi i have one more question i was

576
00:23:18,070 --> 00:23:15,600
wondering what type of software or

577
00:23:20,830 --> 00:23:18,080
technology you use to do your job on a

578
00:23:25,669 --> 00:23:23,590
basis so we have uh

579
00:23:27,430 --> 00:23:25,679
several pieces of software that we use

580
00:23:31,190 --> 00:23:27,440
to

581
00:23:33,270 --> 00:23:31,200
have uh

582
00:23:35,430 --> 00:23:33,280
most of them have been built

583
00:23:37,990 --> 00:23:35,440
in-house at nasa

584
00:23:40,149 --> 00:23:38,000
some are specialized for working in the

585
00:23:42,310 --> 00:23:40,159
control room they're specialized to be

586
00:23:44,870 --> 00:23:42,320
fast and allow us to

587
00:23:47,029 --> 00:23:44,880
perform computations very quickly

588
00:23:49,269 --> 00:23:47,039

with like a reasonable level of accuracy

589
00:23:51,190 --> 00:23:49,279
to do things in the immediate future

590
00:23:52,950 --> 00:23:51,200
we have other higher fidelity software

591
00:23:54,070 --> 00:23:52,960
that that is slower and takes more time

592
00:23:56,230 --> 00:23:54,080
to run

593
00:23:59,350 --> 00:23:56,240
that we use off console when doing

594
00:23:59,360 --> 00:24:05,430
okay thank you

595
00:24:09,350 --> 00:24:07,269
what was your favorite subject in high

596
00:24:13,830 --> 00:24:09,360
school

597
00:24:17,590 --> 00:24:13,840
favorite subject being

598
00:24:23,430 --> 00:24:20,710
probably followed by chemistry

599
00:24:25,190 --> 00:24:23,440
this will be the last question oh okay

600
00:24:28,310 --> 00:24:25,200
what was the highest level math you've

601
00:24:32,870 --> 00:24:30,470
uh the highest level math uh was just

602
00:24:35,029 --> 00:24:32,880
referred to as engineering mathematics

603
00:24:38,630 --> 00:24:35,039
but that would be a class above

604
00:24:38,640 --> 00:24:41,669
okay thank you

605
00:24:45,190 --> 00:24:43,430
thanks so much guys we really appreciate

606
00:24:47,350 --> 00:24:45,200
your questions and again

607
00:24:49,510 --> 00:24:47,360
we enjoyed answering them and you should

608
00:24:51,350 --> 00:24:49,520
check out nasa.gov for more information

609
00:24:53,350 --> 00:24:51,360
on some of the things we weren't able to

610
00:24:54,549 --> 00:24:53,360
to fill you in completely on thanks