



1
00:00:04,230 --> 00:00:02,550
a good morning everyone i'm pat ryan

2
00:00:06,309 --> 00:00:04,240
with the public affairs office here at

3
00:00:08,710 --> 00:00:06,319
the johnson space center in houston with

4
00:00:11,589 --> 00:00:08,720
me is megan levins she is one of the

5
00:00:13,749 --> 00:00:11,599
senior robotics instructors here and is

6
00:00:15,669 --> 00:00:13,759
currently getting certified to be a

7
00:00:17,109 --> 00:00:15,679
robotics officer to work here in the

8
00:00:18,870 --> 00:00:17,119
mission control room

9
00:00:22,150 --> 00:00:18,880
tell me real quickly about how you got

10
00:00:23,670 --> 00:00:22,160
interested in in that area of work

11
00:00:25,670 --> 00:00:23,680
well i've always been interested in the

12
00:00:27,189 --> 00:00:25,680
space program and who doesn't want to

13
00:00:29,830 --> 00:00:27,199

fly robots in space so it seemed like

14

00:00:31,269 --> 00:00:29,840

the right place to go

15

00:00:32,790 --> 00:00:31,279

i grew up in hawaii where we have very

16

00:00:34,709 --> 00:00:32,800

clear skies and you get a really nice

17

00:00:37,670 --> 00:00:34,719

view of those stars at night and it's

18

00:00:38,869 --> 00:00:37,680

inspiring nice nice we're ready to to

19

00:00:40,150 --> 00:00:38,879

find out what

20

00:00:48,069 --> 00:00:40,160

you guys

21

00:00:53,910 --> 00:00:51,510

hi my name is valeria and my question is

22

00:00:57,029 --> 00:00:53,920

how much training do you have to do to

23

00:00:58,869 --> 00:00:57,039

become a robotics engineer

24

00:01:00,950 --> 00:00:58,879

well to be a robotics engineer there's a

25

00:01:02,709 --> 00:01:00,960

lot of training you go through once you

26

00:01:05,590 --> 00:01:02,719

get out of college or university and

27

00:01:07,190 --> 00:01:05,600

come to nasa it's many years of training

28

00:01:09,350 --> 00:01:07,200

and you start off with writing

29

00:01:10,950 --> 00:01:09,360

procedures for crew members and learning

30

00:01:12,710 --> 00:01:10,960

all you can about your robotic system

31

00:01:14,789 --> 00:01:12,720

before you can come into mission control

32

00:01:16,870 --> 00:01:14,799

and and start moving the robots in space

33

00:01:24,310 --> 00:01:16,880

so it's a long process and there's lots

34

00:01:30,149 --> 00:01:27,830

hello my name is claire and my question

35

00:01:33,910 --> 00:01:30,159

is what controller would you call the

36

00:01:35,830 --> 00:01:33,920

brain of the mission control center

37

00:01:37,429 --> 00:01:35,840

the brain who's the brain

38

00:01:39,190 --> 00:01:37,439

that's a tough one a lot of people would

39

00:01:40,710 --> 00:01:39,200

say that that's the the flight director

40

00:01:42,630 --> 00:01:40,720

flight director is

41

00:01:44,710 --> 00:01:42,640

the person who's in charge of the whole

42

00:01:47,190 --> 00:01:44,720

team there's a team of

43

00:01:49,429 --> 00:01:47,200

10 20 people in here at a time all of

44

00:01:50,870 --> 00:01:49,439

them looking at just a specific system

45

00:01:53,350 --> 00:01:50,880

but they're all reporting to the flight

46

00:01:55,350 --> 00:01:53,360

director who has to keep track of what's

47

00:01:57,030 --> 00:01:55,360

going on on all of those systems all the

48

00:01:59,109 --> 00:01:57,040

time to make sure that the different

49

00:02:00,230 --> 00:01:59,119

components all work well with one

50

00:02:01,350 --> 00:02:00,240

another

51

00:02:02,630 --> 00:02:01,360

but if you think it's not the flight

52

00:02:09,910 --> 00:02:02,640

director it's probably the people who

53

00:02:14,869 --> 00:02:12,550

hello my name is gabriel and my question

54

00:02:16,470 --> 00:02:14,879

is who is the most important person in

55

00:02:19,990 --> 00:02:16,480

the space station

56

00:02:21,430 --> 00:02:20,000

flight control room and why

57

00:02:23,830 --> 00:02:21,440

most important person would be the

58

00:02:25,830 --> 00:02:23,840

robotics officer wouldn't it always yeah

59

00:02:27,510 --> 00:02:25,840

well i have to say the most important

60

00:02:29,830 --> 00:02:27,520

person is probably the person that has

61

00:02:31,350 --> 00:02:29,840

the most going on at that time you never

62

00:02:33,190 --> 00:02:31,360

know what can happen on a space station

63

00:02:35,350 --> 00:02:33,200

so whoever's whether it's the robotic

64

00:02:36,869 --> 00:02:35,360

system or we have astronauts outside

65

00:02:37,990 --> 00:02:36,879

whoever has the most information and

66

00:02:39,670 --> 00:02:38,000

knows what's going on is probably the

67

00:02:45,270 --> 00:02:39,680

most important person

68

00:02:50,070 --> 00:02:48,070

hi my name is emma and my question is if

69

00:02:52,229 --> 00:02:50,080

a crew member gets hurt or sick and they

70

00:02:54,790 --> 00:02:52,239

need surgery is there always a doctor on

71

00:03:00,470 --> 00:02:57,670

there are it is not always an actual

72

00:03:02,630 --> 00:03:00,480

doctor on board but there is always one

73

00:03:05,350 --> 00:03:02,640

member of the crew who is trained as a

74

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

medical officer in some cases you have a

75

00:03:09,589 --> 00:03:07,200

doctor or two

76
00:03:11,270 --> 00:03:09,599
doctors who may be on board at the time

77
00:03:14,630 --> 00:03:11,280
and so far we've been lucky enough that

78
00:03:16,630 --> 00:03:14,640
nobody has had to have surgery but all

79
00:03:18,790 --> 00:03:16,640
of the crew members get trained in not

80
00:03:20,710 --> 00:03:18,800
only first aid but also some more

81
00:03:22,229 --> 00:03:20,720
advanced things to take care of their

82
00:03:27,990 --> 00:03:22,239
crew mates just in case somebody does

83
00:03:32,789 --> 00:03:30,949
hi my name is jassidy and my question is

84
00:03:34,949 --> 00:03:32,799
do the team switch on and off so that

85
00:03:39,270 --> 00:03:34,959
they can get sleep if so how does it

86
00:03:43,110 --> 00:03:40,710
i think when the team switch over might

87
00:03:45,350 --> 00:03:43,120
be one of my favorite parts of the day

88
00:03:46,789 --> 00:03:45,360

we have about three teams that run in

89

00:03:48,149 --> 00:03:46,799

mission control

90

00:03:49,509 --> 00:03:48,159

every day of the week all year round

91

00:03:51,190 --> 00:03:49,519

even on christmas

92

00:03:52,550 --> 00:03:51,200

so luckily they only have to work one

93

00:03:53,830 --> 00:03:52,560

shift a day and then the next shift will

94

00:03:55,350 --> 00:03:53,840

come on so we can all go home and get

95

00:03:57,190 --> 00:03:55,360

some rest

96

00:03:59,589 --> 00:03:57,200

so the day gets split up into into

97

00:04:01,830 --> 00:03:59,599

thirds really so any of the teams that

98

00:04:02,789 --> 00:04:01,840

are here are here for

99

00:04:04,710 --> 00:04:02,799

about

100

00:04:06,550 --> 00:04:04,720

seven or eight hours in the room they

101
00:04:07,910 --> 00:04:06,560
come in and they find out from the

102
00:04:10,309 --> 00:04:07,920
person in front of them what's been

103
00:04:11,910 --> 00:04:10,319
going on then they take over and then at

104
00:04:13,910 --> 00:04:11,920
the end of the shift the next person

105
00:04:21,189 --> 00:04:13,920
comes in and you brief them about what's

106
00:04:27,110 --> 00:04:23,749
hello my name is gavin i would like to

107
00:04:28,950 --> 00:04:27,120
know how long is your shift

108
00:04:30,790 --> 00:04:28,960
well as a robotics officer my shifts are

109
00:04:32,390 --> 00:04:30,800
actually a little different than

110
00:04:34,390 --> 00:04:32,400
a lot of the other tumors like we said

111
00:04:36,230 --> 00:04:34,400
um when you're here all the time your

112
00:04:38,310 --> 00:04:36,240
shift is roughly seven hours and then

113
00:04:40,070 --> 00:04:38,320

you pass off to the next person for

114

00:04:42,469 --> 00:04:40,080

robotic shifts we can go from seven to

115

00:04:44,790 --> 00:04:42,479

12 hours depending on what kind of

116

00:04:46,710 --> 00:04:44,800

task we have for that day and then we're

117

00:04:48,310 --> 00:04:46,720

off for the rest of the day so ours may

118

00:04:53,909 --> 00:04:48,320

be a little longer but we have we're not

119

00:04:58,070 --> 00:04:55,990

hello my name is bella and i would like

120

00:04:59,510 --> 00:04:58,080

to know what is your favorite and least

121

00:05:01,590 --> 00:04:59,520

favorite part of working at mission

122

00:05:03,749 --> 00:05:01,600

control

123

00:05:05,510 --> 00:05:03,759

okay that's a good question

124

00:05:07,590 --> 00:05:05,520

i have to say my favorite part is every

125

00:05:09,110 --> 00:05:07,600

time i get to talk to an astronaut in

126

00:05:11,189 --> 00:05:09,120

space there's nothing like talking to

127

00:05:13,270 --> 00:05:11,199

somebody who you know is orbiting

128

00:05:15,430 --> 00:05:13,280

miles and miles and miles above you and

129

00:05:16,870 --> 00:05:15,440

doing some robotic tasks or another

130

00:05:18,310 --> 00:05:16,880

activity and getting to talk to them and

131

00:05:20,230 --> 00:05:18,320

get their thoughts and what they have

132

00:05:22,150 --> 00:05:20,240

going on in their day and in your job

133

00:05:24,150 --> 00:05:22,160

you folks do get to talk to them while

134

00:05:27,350 --> 00:05:24,160

they're in the midst of these of moving

135

00:05:29,830 --> 00:05:27,360

flying these big robots around we do

136

00:05:31,590 --> 00:05:29,840

for robotics we do a lot of activities

137

00:05:33,110 --> 00:05:31,600

free flyer captures when new vehicles

138

00:05:34,550 --> 00:05:33,120

are coming up and then we also train for

139

00:05:35,909 --> 00:05:34,560

them as well so not only do i get to

140

00:05:37,590 --> 00:05:35,919

talk to them about the activity they're

141

00:05:39,670 --> 00:05:37,600

doing but also in all their training

142

00:05:41,189 --> 00:05:39,680

sessions as they get ready

143

00:05:42,710 --> 00:05:41,199

i'd say my least favorite part is

144

00:05:44,150 --> 00:05:42,720

probably comes around two in the morning

145

00:05:45,590 --> 00:05:44,160

when you're still on console and ready

146

00:05:50,950 --> 00:05:45,600

to go home and it is way past your

147

00:05:58,550 --> 00:05:54,150

hi my name is reagan and what is your

148

00:06:03,029 --> 00:06:01,270

my favorite training exercise

149

00:06:04,230 --> 00:06:03,039

well you know here at jsc or johnson

150

00:06:05,909 --> 00:06:04,240

space center we have the neutral

151
00:06:08,150 --> 00:06:05,919
buoyancy lab and in the neutral buoyancy

152
00:06:09,990 --> 00:06:08,160
lab it's this huge pool with a almost

153
00:06:11,749 --> 00:06:10,000
exact replica of the whole space station

154
00:06:14,070 --> 00:06:11,759
at least parts of it and they have a

155
00:06:15,590 --> 00:06:14,080
robotic arm that is under water and can

156
00:06:17,270 --> 00:06:15,600
move around in this pool just like we do

157
00:06:19,029 --> 00:06:17,280
in space so my favorite training

158
00:06:21,350 --> 00:06:19,039
exercise is when we get to go there and

159
00:06:23,350 --> 00:06:21,360
put a crew member in their astronaut

160
00:06:25,909 --> 00:06:23,360
suit in the water and they're underwater

161
00:06:27,430 --> 00:06:25,919
and on the robotic arm doing activities

162
00:06:29,350 --> 00:06:27,440
and i can fly the arm around with them

163
00:06:31,270 --> 00:06:29,360

on it it's my favorite part of the day

164

00:06:32,870 --> 00:06:31,280

that's an example of what's going on in

165

00:06:34,309 --> 00:06:32,880

the neutral buoyancy laboratory it's

166

00:06:36,070 --> 00:06:34,319

what it looks like from one of the

167

00:06:38,469 --> 00:06:36,080

cameras that the divers have that

168

00:06:40,790 --> 00:06:38,479

they're floating around making sure that

169

00:06:43,590 --> 00:06:40,800

the astronauts are safe but also giving

170

00:06:45,670 --> 00:06:43,600

the the instructors a good close-up look

171

00:06:48,469 --> 00:06:45,680

at what the astronauts are doing so that

172

00:06:50,230 --> 00:06:48,479

they can get better information and help

173

00:06:55,029 --> 00:06:50,240

the astronauts become better prepared to

174

00:07:02,390 --> 00:06:57,990

hello my name is braden how and when did

175

00:07:07,350 --> 00:07:05,589

uh i've been interested in robotics and

176

00:07:09,189 --> 00:07:07,360

more specifically the space station

177

00:07:12,070 --> 00:07:09,199

since i was a little kid well in space

178

00:07:13,670 --> 00:07:12,080

since i was a little kid

179

00:07:15,510 --> 00:07:13,680

robotics has always been interesting you

180

00:07:17,189 --> 00:07:15,520

know i was always really excited for my

181

00:07:19,029 --> 00:07:17,199

math and my science classes and those

182

00:07:20,390 --> 00:07:19,039

are my favorite parts of my school day

183

00:07:21,830 --> 00:07:20,400

and from there you go to college and you

184

00:07:23,670 --> 00:07:21,840

get to learn more about the robotics and

185

00:07:26,070 --> 00:07:23,680

you build things with you know like you

186

00:07:27,510 --> 00:07:26,080

guys with your lego robots and it was

187

00:07:32,390 --> 00:07:27,520

just really fun and i wanted to do that

188

00:07:37,670 --> 00:07:35,670

hello my name is ella my question is did

189

00:07:42,629 --> 00:07:37,680

anything in your childhood inspire you

190

00:07:47,189 --> 00:07:45,350

as a big fan of my lego set anytime you

191

00:07:49,110 --> 00:07:47,199

get to build robots with legos and then

192

00:07:54,950 --> 00:07:49,120

you get to do it on a much larger scale

193

00:07:59,350 --> 00:07:57,430

hello my name is alex can you give us

194

00:08:02,230 --> 00:07:59,360

any tips on what to study if we are

195

00:08:04,309 --> 00:08:02,240

interested in robotics

196

00:08:05,990 --> 00:08:04,319

i think you definitely should pay real

197

00:08:08,469 --> 00:08:06,000

close attention in your math and science

198

00:08:11,510 --> 00:08:10,150

those were the basis and

199

00:08:13,430 --> 00:08:11,520

everything builds from there so if

200

00:08:14,550 --> 00:08:13,440

you're you know paying attention and

201
00:08:15,830 --> 00:08:14,560
really studying up on there and then

202
00:08:17,350 --> 00:08:15,840
when you get to college you'll study

203
00:08:18,150 --> 00:08:17,360
math and science there and it just keeps

204
00:08:21,189 --> 00:08:18,160
going

205
00:08:22,950 --> 00:08:21,199
are there particular kinds of math or or

206
00:08:25,270 --> 00:08:22,960
different areas of science that you

207
00:08:27,430 --> 00:08:25,280
found to be most helpful

208
00:08:29,029 --> 00:08:27,440
um

209
00:08:29,990 --> 00:08:29,039
i mean math is math is our universal

210
00:08:31,909 --> 00:08:30,000
language so

211
00:08:35,670 --> 00:08:31,919
it applies all kinds of math supplies

212
00:08:38,709 --> 00:08:36,949
all the engineering stuff you know

213
00:08:41,029 --> 00:08:38,719

building things or getting to work with

214

00:08:43,990 --> 00:08:41,039

your hands all of that applies and worry

215

00:08:45,990 --> 00:08:44,000

the basics of those

216

00:08:48,150 --> 00:08:46,000

okay

217

00:08:50,070 --> 00:08:48,160

hi my name is maggie and i would like to

218

00:08:53,110 --> 00:08:50,080

know what you find most interesting

219

00:08:55,829 --> 00:08:53,120

about robotics and why

220

00:08:57,110 --> 00:08:55,839

most interesting about robotics

221

00:08:58,230 --> 00:08:57,120

you know one of the most

222

00:09:00,949 --> 00:08:58,240

the greatest things i think about

223

00:09:03,030 --> 00:09:00,959

robotics is you are working and moving

224

00:09:05,590 --> 00:09:03,040

something that is miles and miles above

225

00:09:07,190 --> 00:09:05,600

you i actually come to work every day

226

00:09:08,949 --> 00:09:07,200

and i get to move around a robot that i

227

00:09:10,949 --> 00:09:08,959

will never see in real life i only get

228

00:09:12,550 --> 00:09:10,959

to see it through my camera views and my

229

00:09:15,509 --> 00:09:12,560

my workstation

230

00:09:17,670 --> 00:09:15,519

but here i am moving something you know

231

00:09:19,509 --> 00:09:17,680

all over a space station that's miles

232

00:09:22,630 --> 00:09:19,519

away from me without actually ever

233

00:09:25,750 --> 00:09:22,640

touching it and that arm is huge it is

234

00:09:27,750 --> 00:09:25,760

it's seven meters 11 meters huge the

235

00:09:30,230 --> 00:09:27,760

main arm on the international space

236

00:09:32,310 --> 00:09:30,240

station is over 50 feet long i don't

237

00:09:33,269 --> 00:09:32,320

remember how much it weighs on earth but

238

00:09:35,350 --> 00:09:33,279

uh

239

00:09:41,910 --> 00:09:35,360

it's not small it's it

240

00:09:45,350 --> 00:09:44,150

my name is evan and my question is

241

00:09:47,430 --> 00:09:45,360

working at

242

00:09:49,509 --> 00:09:47,440

mission control how many experiments

243

00:09:53,829 --> 00:09:49,519

have you supervised and finished with

244

00:09:57,350 --> 00:09:55,350

that's one of the fun things about the

245

00:10:01,269 --> 00:09:57,360

space station and specifically robotics

246

00:10:02,870 --> 00:10:01,279

is we help start so many experiments i

247

00:10:04,630 --> 00:10:02,880

mean we put the alpha magnetic

248

00:10:06,790 --> 00:10:04,640

spectrometer outside on part of the

249

00:10:08,710 --> 00:10:06,800

space station and it's still to this day

250

00:10:10,550 --> 00:10:08,720

looking at the cosmic rays and how the

251
00:10:12,550 --> 00:10:10,560
universe is made

252
00:10:14,550 --> 00:10:12,560
i don't know of any experiment that

253
00:10:17,030 --> 00:10:14,560
we've really completed as we just keep

254
00:10:19,030 --> 00:10:17,040
learning more and we keep going and we

255
00:10:20,069 --> 00:10:19,040
get to work with you know installing

256
00:10:23,110 --> 00:10:20,079
these new

257
00:10:25,110 --> 00:10:23,120
modules or free flyers like the

258
00:10:27,190 --> 00:10:25,120
dragon vehicle from spacex and the

259
00:10:28,550 --> 00:10:27,200
orbital vehicles and they bring more

260
00:10:30,550 --> 00:10:28,560
science experiments so the science just

261
00:10:31,430 --> 00:10:30,560
keeps going and we in robotics just help

262
00:10:33,350 --> 00:10:31,440
to keep

263
00:10:35,269 --> 00:10:33,360

keep all these experiments coming

264

00:10:37,110 --> 00:10:35,279

and it's a good example too there's

265

00:10:38,310 --> 00:10:37,120

another one of those dragon spacecraft

266

00:10:41,190 --> 00:10:38,320

that's supposed to be coming up to the

267

00:10:43,910 --> 00:10:41,200

station next week and your arm is is

268

00:10:46,310 --> 00:10:43,920

critical to getting it there we will be

269

00:10:49,110 --> 00:10:46,320

capturing and installing the third

270

00:10:53,829 --> 00:10:49,120

fourth dragon dragon 3 on the 16th of

271

00:10:57,829 --> 00:10:56,150

my name is eric and my question is what

272

00:11:00,150 --> 00:10:57,839

is the most challenging project you have

273

00:11:01,750 --> 00:11:00,160

worked on

274

00:11:03,829 --> 00:11:01,760

gosh i have to say the most challenging

275

00:11:05,829 --> 00:11:03,839

project i've ever worked on

276

00:11:07,829 --> 00:11:05,839

was when we first started capturing

277

00:11:10,470 --> 00:11:07,839

these free flying vehicles and the first

278

00:11:12,550 --> 00:11:10,480

one that came was an htv from japanese

279

00:11:14,550 --> 00:11:12,560

space agency and it was something that

280

00:11:16,949 --> 00:11:14,560

had never been done before and not

281

00:11:19,030 --> 00:11:16,959

something we had were had ever

282

00:11:20,389 --> 00:11:19,040

really looked into and i got to help and

283

00:11:22,069 --> 00:11:20,399

be on the team that looked into doing

284

00:11:23,509 --> 00:11:22,079

this for the first time how are we going

285

00:11:25,110 --> 00:11:23,519

to train these crew members and what are

286

00:11:27,110 --> 00:11:25,120

we going to do and what does this

287

00:11:28,790 --> 00:11:27,120

operation really look like all from from

288

00:11:31,030 --> 00:11:28,800

scratch all the way until it actually

289

00:11:32,310 --> 00:11:31,040

was captured the first day in 2009 so

290

00:11:33,430 --> 00:11:32,320

it's really nice to be on something all

291

00:11:35,590 --> 00:11:33,440

the way from the beginning and get to

292

00:11:36,630 --> 00:11:35,600

imagine it and see it played out and

293

00:11:38,389 --> 00:11:36,640

it's it

294

00:11:40,069 --> 00:11:38,399

if you haven't done it it's hard to

295

00:11:42,069 --> 00:11:40,079

imagine because we're talking about the

296

00:11:43,590 --> 00:11:42,079

space station and another thing that are

297

00:11:46,389 --> 00:11:43,600

both moving at

298

00:11:49,030 --> 00:11:46,399

five miles a second and you have to get

299

00:11:50,870 --> 00:11:49,040

them relatively so that they they are

300

00:11:54,150 --> 00:11:50,880

still so that you can reach out with a

301

00:12:00,230 --> 00:11:54,160

giant robot and grab the other thing uh

302

00:12:05,190 --> 00:12:03,269

hi my name is julia and my question is

303

00:12:08,829 --> 00:12:05,200

by what year would a manned mission to

304

00:12:14,069 --> 00:12:12,230

possible go ahead you win

305

00:12:14,949 --> 00:12:14,079

oh gosh i don't know if i can put a year

306

00:12:16,790 --> 00:12:14,959

on that

307

00:12:18,230 --> 00:12:16,800

i think it will be sooner than we all

308

00:12:20,150 --> 00:12:18,240

think and i hope it's sooner than we

309

00:12:21,829 --> 00:12:20,160

think and it will definitely be in one

310

00:12:25,269 --> 00:12:21,839

of our lifetimes and who knows maybe you

311

00:12:28,710 --> 00:12:27,430

hello my name is eric reed and my

312

00:12:30,710 --> 00:12:28,720

question is

313

00:12:32,389 --> 00:12:30,720

on what planets have you sent the rover

314

00:12:36,550 --> 00:12:32,399

to

315

00:12:39,269 --> 00:12:36,560

mars and i think mars is the only planet

316

00:12:41,110 --> 00:12:39,279

we have sent rovers to we also had

317

00:12:43,110 --> 00:12:41,120

manned rovers during the apollo program

318

00:12:47,910 --> 00:12:43,120

on the moon but mars is our

319

00:12:54,629 --> 00:12:50,389

my name is martine and my question is

320

00:12:59,430 --> 00:12:56,790

well on the space station we have a few

321

00:13:01,670 --> 00:12:59,440

robotic arms the canadian space agency

322

00:13:03,670 --> 00:13:01,680

has two and there's the space station

323

00:13:06,389 --> 00:13:03,680

robotic manipulator which is the arm i

324

00:13:08,310 --> 00:13:06,399

work with the most and it's the one that

325

00:13:10,550 --> 00:13:08,320

helps with our when our astronauts are

326

00:13:12,150 --> 00:13:10,560

outside and with and we have these

327

00:13:13,269 --> 00:13:12,160

vehicles coming up and captures them out

328

00:13:14,470 --> 00:13:13,279

of the sky

329

00:13:16,870 --> 00:13:14,480

and then we also have the special

330

00:13:20,069 --> 00:13:16,880

purpose dexterous manipulator and he

331

00:13:22,470 --> 00:13:20,079

does even small tasks with payloads and

332

00:13:24,550 --> 00:13:22,480

and really fine you know tuning things

333

00:13:26,550 --> 00:13:24,560

and he works with different tools and

334

00:13:28,550 --> 00:13:26,560

then the japanese space agency also

335

00:13:33,350 --> 00:13:28,560

built a robot and they have two robots

336

00:13:37,509 --> 00:13:35,670

hi my name is madeline and my question

337

00:13:41,269 --> 00:13:37,519

is are there any robots that have a mind

338

00:13:42,550 --> 00:13:41,279

of their own or are they all programmed

339

00:13:45,350 --> 00:13:42,560

actually i've worked for a couple of

340

00:13:46,550 --> 00:13:45,360

robots that had a mind of their own

341

00:13:47,990 --> 00:13:46,560

if they have a mind of their own they

342

00:13:49,590 --> 00:13:48,000

haven't told me yet they're very

343

00:13:50,870 --> 00:13:49,600

secretive but most of them are

344

00:13:52,150 --> 00:13:50,880

programmed but they're programmed so

345

00:13:56,470 --> 00:13:52,160

well you would think they have a mind of

346

00:14:01,350 --> 00:13:58,949

hi my name is hannah and my question is

347

00:14:04,389 --> 00:14:01,360

how do you train for operations on the

348

00:14:08,069 --> 00:14:05,750

well when i'm training to work in

349

00:14:09,990 --> 00:14:08,079

mission control we do these

350

00:14:11,509 --> 00:14:10,000

we just do simulations and we do it with

351
00:14:12,550 --> 00:14:11,519
the whole team and it's really exciting

352
00:14:14,230 --> 00:14:12,560
because we'll

353
00:14:15,590 --> 00:14:14,240
you know pretend to do a

354
00:14:17,829 --> 00:14:15,600
put the astronauts outside and we'll

355
00:14:19,990 --> 00:14:17,839
have real crew members participating and

356
00:14:21,350 --> 00:14:20,000
we'll have look at all of our data and

357
00:14:23,430 --> 00:14:21,360
get everything just like it's the real

358
00:14:25,110 --> 00:14:23,440
day but it's a simulation and the whole

359
00:14:26,790 --> 00:14:25,120
team gets to work together and work

360
00:14:29,030 --> 00:14:26,800
through different scenarios that our

361
00:14:32,069 --> 00:14:29,040
training counterparts have come up with

362
00:14:32,870 --> 00:14:32,079
you know rescuing a crew member or

363
00:14:35,990 --> 00:14:32,880

you know

364

00:14:37,590 --> 00:14:36,000

any kind of failure you might have in

365

00:14:39,110 --> 00:14:37,600

your house is just magnified on the

366

00:14:40,949 --> 00:14:39,120

space station and we plan for it and

367

00:14:42,790 --> 00:14:40,959

train for it it's real exciting to get

368

00:14:47,590 --> 00:14:42,800

everybody together in a room and work

369

00:14:53,829 --> 00:14:49,670

my name is olivia and my question is

370

00:14:57,829 --> 00:14:55,509

well we use bunch of different

371

00:14:59,590 --> 00:14:57,839

instruments when we do training we have

372

00:15:01,910 --> 00:14:59,600

the virtual reality lab where our

373

00:15:03,189 --> 00:15:01,920

astronauts and and flight controllers

374

00:15:05,269 --> 00:15:03,199

can train where you actually put a

375

00:15:06,949 --> 00:15:05,279

helmet on like a virtual reality helmet

376

00:15:08,310 --> 00:15:06,959

and you can look out of this helmet and

377

00:15:10,470 --> 00:15:08,320

it looks just like you're on a space

378

00:15:12,629 --> 00:15:10,480

station and there we have a robotic arm

379

00:15:14,150 --> 00:15:12,639

that we can drive around just like we do

380

00:15:15,590 --> 00:15:14,160

and the crew member in their helmet can

381

00:15:18,389 --> 00:15:15,600

see it and we see it in our in our

382

00:15:20,069 --> 00:15:18,399

simulated camera views

383

00:15:22,150 --> 00:15:20,079

on the real day we get telemetry to a

384

00:15:23,990 --> 00:15:22,160

computer very similar to how you can

385

00:15:25,590 --> 00:15:24,000

download books on the internet and it

386

00:15:26,949 --> 00:15:25,600

just comes from space station so we can

387

00:15:29,590 --> 00:15:26,959

see everything that's going on up there

388

00:15:31,189 --> 00:15:29,600

and look at where where everything is

389

00:15:39,509 --> 00:15:31,199

the big thing is our cameras we use a

390

00:15:44,389 --> 00:15:41,430

i believe that's the um the last of the

391

00:15:46,550 --> 00:15:44,399

student questions we have

392

00:15:48,629 --> 00:15:46,560

all right real quickly this is michael

393

00:15:50,629 --> 00:15:48,639

here at nasa's digital learning network

394

00:15:51,990 --> 00:15:50,639

just wanted to see do you guys have any

395

00:15:54,069 --> 00:15:52,000

additional ones maybe that weren't

396

00:15:55,829 --> 00:15:54,079

written down initially that you

397

00:15:59,189 --> 00:15:55,839

thought about as we did our first

398

00:16:00,550 --> 00:15:59,199

portion or you actually connected with

399

00:16:07,670 --> 00:16:00,560

myself

400

00:16:12,470 --> 00:16:10,230

hi my name is isaac and i would like to

401
00:16:17,030 --> 00:16:12,480
ask what programming language do you use

402
00:16:21,350 --> 00:16:19,749
that is a great question

403
00:16:23,030 --> 00:16:21,360
and i'm not actually on the program team

404
00:16:24,550 --> 00:16:23,040
and i don't know the specific language

405
00:16:26,790 --> 00:16:24,560
as i mentioned the arm is built by the

406
00:16:28,470 --> 00:16:26,800
canadian space agency and they took care

407
00:16:30,470 --> 00:16:28,480
of all of that for us what we get to

408
00:16:32,310 --> 00:16:30,480
deal with a lot is more like what that

409
00:16:33,990 --> 00:16:32,320
looks like on our computer screens with

410
00:16:44,470 --> 00:16:34,000
the data that comes down and how it's

411
00:16:44,480 --> 00:16:48,949
i see some hands in the back

412
00:16:57,350 --> 00:16:51,829
um

413
00:17:02,389 --> 00:16:59,350

it's a combination actually there there

414

00:17:04,470 --> 00:17:02,399

is an official language that's english

415

00:17:06,309 --> 00:17:04,480

but right now for example you've got

416

00:17:09,270 --> 00:17:06,319

crew members who are from the united

417

00:17:11,590 --> 00:17:09,280

states and from russia and japan and of

418

00:17:12,870 --> 00:17:11,600

course they all speak their own native

419

00:17:14,390 --> 00:17:12,880

languages

420

00:17:16,390 --> 00:17:14,400

because they've been training together

421

00:17:18,710 --> 00:17:16,400

for a long time and working together to

422

00:17:20,789 --> 00:17:18,720

prepare for the flight and then fly it

423

00:17:22,630 --> 00:17:20,799

they've all learned a little bit of all

424

00:17:24,230 --> 00:17:22,640

the other languages and i've heard some

425

00:17:25,990 --> 00:17:24,240

crews say that they've really developed

426

00:17:27,590 --> 00:17:26,000

a language of their own they can always

427

00:17:29,990 --> 00:17:27,600

communicate with each other through some

428

00:17:32,870 --> 00:17:30,000

combination of english and russian

429

00:17:35,350 --> 00:17:32,880

we also have european astronauts who fly

430

00:17:37,510 --> 00:17:35,360

who bring a variety of their languages

431

00:17:38,950 --> 00:17:37,520

as well so

432

00:17:40,310 --> 00:17:38,960

when they talk to the ground when they

433

00:17:41,990 --> 00:17:40,320

talk to houston they're speaking in

434

00:17:43,430 --> 00:17:42,000

english but they could be speaking in

435

00:17:50,070 --> 00:17:43,440

other languages when they talk to other

436

00:17:54,150 --> 00:17:52,549

my name is savannah

437

00:17:55,909 --> 00:17:54,160

my question is

438

00:17:58,710 --> 00:17:55,919

did your parents support you through

439

00:18:00,390 --> 00:17:58,720

what you wanted to do

440

00:18:02,549 --> 00:18:00,400

my parents were very supportive with

441

00:18:03,909 --> 00:18:02,559

what i wanted to do and and encouraged

442

00:18:05,830 --> 00:18:03,919

me all through college and when i got

443

00:18:07,270 --> 00:18:05,840

the job here at nasa

444

00:18:09,190 --> 00:18:07,280

the space station is very exciting and

445

00:18:10,630 --> 00:18:09,200

my family was very excited when i chose

446

00:18:22,470 --> 00:18:10,640

this career path as well and supported

447

00:18:29,270 --> 00:18:25,669

hi my name is olivia i was wondering

448

00:18:33,430 --> 00:18:29,280

if you have a regular daily basis and if

449

00:18:37,830 --> 00:18:35,110

a daily schedule

450

00:18:40,950 --> 00:18:37,840

a regular daily schedule

451
00:18:42,470 --> 00:18:40,960
um

452
00:18:43,830 --> 00:18:42,480
we do and we don't

453
00:18:45,830 --> 00:18:43,840
when

454
00:18:47,909 --> 00:18:45,840
there is nothing going on

455
00:18:50,150 --> 00:18:47,919
robotically on the space station our day

456
00:18:52,310 --> 00:18:50,160
looks just like a normal work day where

457
00:18:54,230 --> 00:18:52,320
we come into the office and we we work

458
00:18:55,750 --> 00:18:54,240
on our plans when it gets really

459
00:18:57,669 --> 00:18:55,760
interesting is when we do have robotics

460
00:18:59,270 --> 00:18:57,679
plans and those plans will go in and you

461
00:19:00,950 --> 00:18:59,280
find out about those weeks in advance

462
00:19:02,710 --> 00:19:00,960
you can really prepare for them and

463
00:19:04,150 --> 00:19:02,720

that's when you'll come in and you come

464

00:19:05,669 --> 00:19:04,160

onto console and you'll set up your

465

00:19:07,430 --> 00:19:05,679

workstation so you can see all the

466

00:19:09,190 --> 00:19:07,440

telemetry and the data that you need for

467

00:19:11,270 --> 00:19:09,200

whatever task it is you're doing that

468

00:19:12,710 --> 00:19:11,280

day and review the operation that you'll

469

00:19:14,230 --> 00:19:12,720

be doing that day and then actually

470

00:19:16,630 --> 00:19:14,240

execute it and you'll go through your

471

00:19:18,150 --> 00:19:16,640

shift and execute your procedures or

472

00:19:19,669 --> 00:19:18,160

whatever plan it is that you have in

473

00:19:21,830 --> 00:19:19,679

order to complete the task that you're

474

00:19:23,669 --> 00:19:21,840

doing whether it's a free flyer capture

475

00:19:24,470 --> 00:19:23,679

or a science experiment

476

00:19:28,950 --> 00:19:24,480

or

477

00:19:30,630 --> 00:19:28,960

activities you'll go through and plan

478

00:19:32,470 --> 00:19:30,640

and then at the end you'll review your

479

00:19:38,470 --> 00:19:32,480

data make sure you have everything ready

480

00:19:42,390 --> 00:19:40,870

my name is aiden and my question is how

481

00:19:47,830 --> 00:19:42,400

long do you expect the international

482

00:19:51,590 --> 00:19:50,150

how long will it stay livable

483

00:19:53,669 --> 00:19:51,600

i think well it's

484

00:19:55,990 --> 00:19:53,679

the partners have recently made an

485

00:19:59,270 --> 00:19:56,000

agreement to extend the life for another

486

00:20:01,909 --> 00:19:59,280

10 years that's to 2024.

487

00:20:04,149 --> 00:20:01,919

uh i think that there's some thought

488

00:20:05,909 --> 00:20:04,159

among some people that with a with the

489

00:20:08,230 --> 00:20:05,919

right kind of work it might be able to

490

00:20:09,270 --> 00:20:08,240

fly for even longer than that but right

491

00:20:11,190 --> 00:20:09,280

now

492

00:20:16,230 --> 00:20:11,200

we're looking at the station flying

493

00:20:21,590 --> 00:20:18,630

hi my name is jenna and i was wondering

494

00:20:23,669 --> 00:20:21,600

what college you went to

495

00:20:29,430 --> 00:20:23,679

i went to the university of nevada in

496

00:20:36,230 --> 00:20:31,830

um when you're on the space station

497

00:20:40,390 --> 00:20:38,310

well the space station uses greenwich

498

00:20:43,590 --> 00:20:40,400

mean time which is a little different

499

00:20:44,950 --> 00:20:43,600

than houston time and can change

500

00:20:46,870 --> 00:20:44,960

periodically

501
00:20:48,950 --> 00:20:46,880
greenwich mean time is

502
00:20:49,830 --> 00:20:48,960
essentially the same as london because

503
00:20:55,830 --> 00:20:49,840
the

504
00:20:58,710 --> 00:20:55,840
to pick just one time to operate on so

505
00:21:01,750 --> 00:20:58,720
on board it's a greenwich mean time

506
00:21:08,149 --> 00:21:01,760
which right now is five hours ahead of

507
00:21:13,350 --> 00:21:11,029
hi i'm michael and do you think nasa has

508
00:21:18,149 --> 00:21:13,360
the technology and robots to search the

509
00:21:24,310 --> 00:21:19,510
it took longer for that question to come

510
00:21:27,430 --> 00:21:26,230
i think if nasa has the technology to do

511
00:21:29,430 --> 00:21:27,440
it they would be doing everything they

512
00:21:31,270 --> 00:21:29,440
can to try to find it

513
00:21:33,190 --> 00:21:31,280

and they are doing everything they can

514

00:21:36,070 --> 00:21:33,200

i know we do have we have been using

515

00:21:39,270 --> 00:21:36,080

some of the cameras on board the station

516

00:21:44,870 --> 00:21:39,280

to take pictures of the search areas

517

00:21:48,870 --> 00:21:47,110

hello my name is elissa and i was

518

00:21:49,990 --> 00:21:48,880

wondering if there is a problem with the

519

00:21:51,990 --> 00:21:50,000

connection

520

00:21:53,110 --> 00:21:52,000

how it

521

00:21:55,590 --> 00:21:53,120

if there was a problem with the

522

00:22:00,470 --> 00:21:55,600

connection to the people on the iss who

523

00:22:03,909 --> 00:22:02,470

well it would be a combination of our

524

00:22:05,430 --> 00:22:03,919

communications experts here on the

525

00:22:07,669 --> 00:22:05,440

ground as well as our astronauts on

526

00:22:09,350 --> 00:22:07,679

board you can believe if we've lost

527

00:22:11,190 --> 00:22:09,360

communication with our space station for

528

00:22:12,789 --> 00:22:11,200

any reason everybody is trying to

529

00:22:14,470 --> 00:22:12,799

recover it and they'll be looking on

530

00:22:15,830 --> 00:22:14,480

both sides both on the space station and

531

00:22:23,270 --> 00:22:15,840

here on the ground for what could

532

00:22:29,669 --> 00:22:26,549

hi my name is colby and

533

00:22:33,510 --> 00:22:29,679

why is the international space station

534

00:22:39,510 --> 00:22:36,630

why is it shaped the way it is

535

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

a lot of it has to do it wasn't

536

00:22:42,549 --> 00:22:40,960

i don't think they started off thinking

537

00:22:45,190 --> 00:22:42,559

let's have a station that looks like

538

00:22:47,350 --> 00:22:45,200

this it looks like it does because the

539

00:22:48,310 --> 00:22:47,360

components are built to to serve a

540

00:22:50,549 --> 00:22:48,320

purpose

541

00:22:52,549 --> 00:22:50,559

it's got these giant solar array wings

542

00:22:54,549 --> 00:22:52,559

out there because they need them to

543

00:22:57,669 --> 00:22:54,559

generate electric electrical power that

544

00:22:59,110 --> 00:22:57,679

runs everything on it for example and so

545

00:23:01,110 --> 00:22:59,120

i mean if you were flying through the

546

00:23:03,110 --> 00:23:01,120

air that wouldn't be a good shape when

547

00:23:05,430 --> 00:23:03,120

you're flying in orbit the shape doesn't

548

00:23:07,270 --> 00:23:05,440

matter it's not not a question of being

549

00:23:09,350 --> 00:23:07,280

moving smoothly through the air because

550

00:23:11,029 --> 00:23:09,360

there is no air and all of the rest of

551
00:23:13,990 --> 00:23:11,039
the components of it too are built with

552
00:23:15,430 --> 00:23:14,000
that in mind that that along with the

553
00:23:17,750 --> 00:23:15,440
knowing that they had to be a certain

554
00:23:19,909 --> 00:23:17,760
shape in order to fit inside the space

555
00:23:21,430 --> 00:23:19,919
shuttle or or russian rockets in order

556
00:23:23,029 --> 00:23:21,440
to be launched

557
00:23:24,710 --> 00:23:23,039
we couldn't be

558
00:23:26,310 --> 00:23:24,720
much bigger than that in terms of the

559
00:23:29,430 --> 00:23:26,320
cylinders because they wouldn't have fit

560
00:23:31,750 --> 00:23:29,440
inside the shuttle in the first place

561
00:23:33,909 --> 00:23:31,760
and corpus christi catholic school this

562
00:23:35,590 --> 00:23:33,919
is nasa's johnson space center this is a

563
00:23:37,830 --> 00:23:35,600

digital learning network it looks like

564

00:23:39,990 --> 00:23:37,840

we've run out of time so i wanted to see

565

00:23:42,470 --> 00:23:40,000

if you want to say any final words maybe

566

00:23:44,149 --> 00:23:42,480

a teacher speak up and

567

00:23:46,470 --> 00:23:44,159

thank our very special guests in mission

568

00:23:51,990 --> 00:23:46,480

control for actually connecting for this

569

00:23:55,830 --> 00:23:53,990

on behalf of corpus christi catholic

570

00:23:57,350 --> 00:23:55,840

school we'd like um to thank you for

571

00:23:59,510 --> 00:23:57,360

taking the time out of your day to talk

572

00:24:01,430 --> 00:23:59,520

to our students i know they were looking

573

00:24:03,669 --> 00:24:01,440

very forward to this

574

00:24:04,870 --> 00:24:03,679

so thank you very much