
PAO

1
00:00:05,910 --> 00:00:03,590
well welcome to mission control at the

2
00:00:08,310 --> 00:00:05,920
johnson space center in houston i'm pat

3
00:00:10,549 --> 00:00:08,320
ryan i'm the public affairs officer on

4
00:00:12,870 --> 00:00:10,559
the orbit 2 shift here in mission

5
00:00:15,430 --> 00:00:12,880
control and we just got finished with

6
00:00:17,830 --> 00:00:15,440
our international space station update

7
00:00:20,070 --> 00:00:17,840
program now we're looking forward to the

8
00:00:21,910 --> 00:00:20,080
opportunity to talk with you and find

9
00:00:24,230 --> 00:00:21,920
out what's on your mind today i have

10
00:00:27,269 --> 00:00:24,240
invited along somebody who knows all of

11
00:00:29,910 --> 00:00:27,279
these things even better than i do tracy

12
00:00:32,030 --> 00:00:29,920
colwell dyson is a nasa astronaut who is

13
00:00:34,870 --> 00:00:32,040

selected for the astronaut program in

14
00:00:37,910 --> 00:00:34,880
1998 she flew to the space station on

15
00:00:39,670 --> 00:00:37,920
space shuttle endeavour in 2007 and

16
00:00:41,750 --> 00:00:39,680
spent six months onboard the

17
00:00:46,310 --> 00:00:41,760
international space station as a member

18
00:00:48,549 --> 00:00:46,320
of expeditions 23 and 24 in 2010 that

19
00:00:51,270 --> 00:00:48,559
was a trip back and forth on a russian

20
00:00:52,950 --> 00:00:51,280
soyuz spacecraft yes it was pretty cool

21
00:00:53,670 --> 00:00:52,960
it was very cool

22
00:00:55,510 --> 00:00:53,680
when

23
00:00:56,869 --> 00:00:55,520
before you made that flight i remember

24
00:00:58,709 --> 00:00:56,879
you telling me

25
00:01:00,709 --> 00:00:58,719
that you got excited about being an

26
00:01:03,110 --> 00:01:00,719
astronaut when you were in junior high

27
00:01:05,030 --> 00:01:03,120
school so about the same age as these as

28
00:01:06,870 --> 00:01:05,040
these folks what was it that got you

29
00:01:09,190 --> 00:01:06,880
excited at that age about being an

30
00:01:11,670 --> 00:01:09,200
astronaut well at that age i think it

31
00:01:14,149 --> 00:01:11,680
was all the trips that i took out into

32
00:01:16,469 --> 00:01:14,159
the desert with my family we would

33
00:01:19,030 --> 00:01:16,479
ride motorcycles and and out in the

34
00:01:21,590 --> 00:01:19,040
desert where there's no lights and a

35
00:01:24,149 --> 00:01:21,600
bunch of stars i would lay out on my

36
00:01:26,550 --> 00:01:24,159
motorcycle trailer at night and just

37
00:01:28,310 --> 00:01:26,560
dream about being up there and wondering

38
00:01:30,390 --> 00:01:28,320

what it was like and so i think that was

39
00:01:32,630 --> 00:01:30,400
really what inspired me to keep looking

40
00:01:33,510 --> 00:01:32,640
up into space

41
00:01:35,510 --> 00:01:33,520
and

42
00:01:37,270 --> 00:01:35,520
i think that's what always stuck with me

43
00:01:39,429 --> 00:01:37,280
as i went through school

44
00:01:42,310 --> 00:01:39,439
how did you do it then what what was the

45
00:01:44,789 --> 00:01:42,320
path for you that worked to get you from

46
00:01:47,270 --> 00:01:44,799
there to the astronaut well the path was

47
00:01:50,069 --> 00:01:47,280
very curvy and i wouldn't say that i had

48
00:01:51,030 --> 00:01:50,079
a plan going into it but

49
00:01:53,030 --> 00:01:51,040
i think

50
00:01:54,710 --> 00:01:53,040
when i decided for sure that i wanted to

51
00:01:56,389 --> 00:01:54,720
become an astronaut

52
00:01:58,310 --> 00:01:56,399
i had looked at a list of things that

53
00:02:01,190 --> 00:01:58,320
i'd written down that i enjoyed doing

54
00:02:04,230 --> 00:02:01,200
and all of these things included

55
00:02:05,990 --> 00:02:04,240
you know working with tools and and

56
00:02:07,910 --> 00:02:06,000
learning different languages and liking

57
00:02:09,589 --> 00:02:07,920
science and and i put those things

58
00:02:11,270 --> 00:02:09,599
together and thought after i learned

59
00:02:12,949 --> 00:02:11,280
about what astronauts did that's what i

60
00:02:15,350 --> 00:02:12,959
want to do but i had no idea how i was

61
00:02:17,190 --> 00:02:15,360
going to get there so my first step was

62
00:02:19,589 --> 00:02:17,200
to keep doing the things that i enjoyed

63
00:02:21,510 --> 00:02:19,599

doing i was really interested in science

64
00:02:23,510 --> 00:02:21,520
and so i think that's where

65
00:02:25,589 --> 00:02:23,520
i started to make the the official step

66
00:02:28,550 --> 00:02:25,599
was when i left high school i went to

67
00:02:30,309 --> 00:02:28,560
college i majored in chemistry and i

68
00:02:31,830 --> 00:02:30,319
just kept following

69
00:02:34,550 --> 00:02:31,840
my heart and doing the things that i

70
00:02:36,470 --> 00:02:34,560
really enjoyed doing and i'd say that if

71
00:02:37,430 --> 00:02:36,480
there was any path i took it was it was

72
00:02:38,309 --> 00:02:37,440
that

73
00:02:39,990 --> 00:02:38,319
great

74
00:02:41,670 --> 00:02:40,000
let's find out what's on their mind

75
00:02:45,670 --> 00:02:41,680
we're ready to take the questions from

76
00:02:48,309 --> 00:02:46,470
hi

77
00:02:50,390 --> 00:02:48,319
we all know that the

78
00:02:52,949 --> 00:02:50,400
computers play a big role with the

79
00:02:55,670 --> 00:02:52,959
international space station so what do

80
00:02:58,949 --> 00:02:55,680
you do when a computer malfunctions and

81
00:03:02,550 --> 00:03:01,350
well when a computer malfunctions well

82
00:03:04,470 --> 00:03:02,560
we have several different types of

83
00:03:05,270 --> 00:03:04,480
computers onboard the space station we

84
00:03:06,949 --> 00:03:05,280
have

85
00:03:08,550 --> 00:03:06,959
the real serious ones that are the

86
00:03:09,990 --> 00:03:08,560
brains of the station and when one of

87
00:03:12,470 --> 00:03:10,000
those malfunctions

88
00:03:14,550 --> 00:03:12,480

everybody knows it and

89
00:03:16,390 --> 00:03:14,560
everybody takes action and i mean from

90
00:03:18,470 --> 00:03:16,400
from up on board the space station to

91
00:03:20,949 --> 00:03:18,480
here inside mission control and even

92
00:03:22,790 --> 00:03:20,959
beyond the walls of this very room so

93
00:03:24,309 --> 00:03:22,800
everybody pitches in to try to fix the

94
00:03:26,869 --> 00:03:24,319
problem plus the computers try to fix

95
00:03:29,030 --> 00:03:26,879
themselves as well we have uh redundant

96
00:03:30,789 --> 00:03:29,040
computers so we have not just one but

97
00:03:32,390 --> 00:03:30,799
three and they all talk to one another

98
00:03:33,509 --> 00:03:32,400
the ones that control the station and so

99
00:03:35,350 --> 00:03:33,519
when one

100
00:03:37,190 --> 00:03:35,360
decides it's going to go its own way the

101
00:03:39,270 --> 00:03:37,200
other two kind of pitch in and help make

102
00:03:41,190 --> 00:03:39,280
decisions and so we rely on that

103
00:03:43,190 --> 00:03:41,200
redundancy we call it

104
00:03:44,550 --> 00:03:43,200
and then we also have laptops on board

105
00:03:45,910 --> 00:03:44,560
that

106
00:03:48,070 --> 00:03:45,920
don't run the space station but they

107
00:03:50,710 --> 00:03:48,080
help us do our our work up there and

108
00:03:53,509 --> 00:03:50,720
when one of those uh malfunctions or

109
00:03:55,429 --> 00:03:53,519
gets a glitch we do the old power cycle

110
00:03:57,910 --> 00:03:55,439
we turn it on and we turn it off we turn

111
00:03:59,589 --> 00:03:57,920
it off and we turn it on and if we can't

112
00:04:01,830 --> 00:03:59,599
seem to fix it

113
00:04:03,429 --> 00:04:01,840

by that method then we call our friends

114
00:04:05,270 --> 00:04:03,439
down here in mission control and then

115
00:04:07,589 --> 00:04:05,280
they walk us through some pretty

116
00:04:14,149 --> 00:04:07,599
elaborate steps to regain

117
00:04:17,749 --> 00:04:15,589
um

118
00:04:20,550 --> 00:04:17,759
how is the international space station

119
00:04:22,870 --> 00:04:20,560
built for example how was the

120
00:04:25,110 --> 00:04:22,880
international space station designed how

121
00:04:27,909 --> 00:04:25,120
are the science laboratories built

122
00:04:31,110 --> 00:04:27,919
and um how long did it take to build the

123
00:04:34,230 --> 00:04:31,120
international space station etc

124
00:04:36,390 --> 00:04:34,240
well it it took a little over a decade

125
00:04:38,870 --> 00:04:36,400
to to build the space station of

126
00:04:41,270 --> 00:04:38,880
actually flying pieces up but it took a

127
00:04:44,550 --> 00:04:41,280
lot a lot of time before that to get

128
00:04:45,670 --> 00:04:44,560
ready to do that absolutely and uh boy

129
00:04:47,270 --> 00:04:45,680
how many years i mean it must have been

130
00:04:49,030 --> 00:04:47,280
a decade before that if not longer

131
00:04:52,230 --> 00:04:49,040
please yes that we were designing the

132
00:04:53,189 --> 00:04:52,240
space station and uh the testing that it

133
00:04:54,950 --> 00:04:53,199
took

134
00:04:56,790 --> 00:04:54,960
to make sure all the parts that we were

135
00:04:58,790 --> 00:04:56,800
taking up there separately would work

136
00:05:01,510 --> 00:04:58,800
together once they were all put together

137
00:05:03,990 --> 00:05:01,520
in the vacuum of space and then all the

138
00:05:05,749 --> 00:05:04,000

hours that we spent up in space

139
00:05:07,510 --> 00:05:05,759
connecting everything using the robotic

140
00:05:09,590 --> 00:05:07,520
arms and the space walkers and all of

141
00:05:12,070 --> 00:05:09,600
the folks here on the ground that were

142
00:05:15,909 --> 00:05:12,080
supporting that it took a number of

143
00:05:17,670 --> 00:05:15,919
years and and days and hours

144
00:05:19,670 --> 00:05:17,680
consecutively

145
00:05:20,469 --> 00:05:19,680
and um what was the other part of that

146
00:05:23,189 --> 00:05:20,479
question

147
00:05:24,830 --> 00:05:23,199
we started flying uh pieces of the space

148
00:05:26,550 --> 00:05:24,840
station in

149
00:05:29,430 --> 00:05:26,560
1998.

150
00:05:32,629 --> 00:05:29,440
the first the first piece was 1998 and

151
00:05:35,830 --> 00:05:32,639
the last shuttle mission to fly to it

152
00:05:37,350 --> 00:05:35,840
was in 2012.

153
00:05:39,189 --> 00:05:37,360
so

154
00:05:41,029 --> 00:05:39,199
but there have been crew members on

155
00:05:43,590 --> 00:05:41,039
board the station

156
00:05:46,310 --> 00:05:43,600
for just over 10 years now

157
00:05:48,950 --> 00:05:46,320
so it's and even before any of those

158
00:05:50,870 --> 00:05:48,960
flying anything flew in space there was

159
00:05:53,990 --> 00:05:50,880
a lot of designs and in the case of this

160
00:05:55,830 --> 00:05:54,000
project there were even redesigns as

161
00:05:58,390 --> 00:05:55,840
different partners were brought into the

162
00:06:03,110 --> 00:05:58,400
project so it it took a long time to get

163
00:06:08,309 --> 00:06:04,230

so

164
00:06:10,150 --> 00:06:08,319
or sleep cycles affected due to how the

165
00:06:12,390 --> 00:06:10,160
international international space

166
00:06:14,870 --> 00:06:12,400
station goes around the earth

167
00:06:15,990 --> 00:06:14,880
absolutely and that's a big deal for us

168
00:06:18,870 --> 00:06:16,000
up there

169
00:06:21,029 --> 00:06:18,880
so the space station itself there are

170
00:06:23,909 --> 00:06:21,039
windows but they aren't everywhere in

171
00:06:26,150 --> 00:06:23,919
the space station so um you can't you

172
00:06:28,150 --> 00:06:26,160
can't necessarily see the sun go up and

173
00:06:29,830 --> 00:06:28,160
down unless you go

174
00:06:32,070 --> 00:06:29,840
to the window and look

175
00:06:35,510 --> 00:06:32,080
but even if it did the the sun is rising

176
00:06:37,590 --> 00:06:35,520
and setting what is it uh 16 times a day

177
00:06:40,629 --> 00:06:37,600
and and so that would kind of that kind

178
00:06:42,309 --> 00:06:40,639
of plays a role um in um in your mind at

179
00:06:44,790 --> 00:06:42,319
least because you you know you're used

180
00:06:46,629 --> 00:06:44,800
to seeing uh dark and and light so

181
00:06:48,309 --> 00:06:46,639
inside the space station

182
00:06:50,309 --> 00:06:48,319
it's it's well lit during the day and

183
00:06:53,430 --> 00:06:50,319
then at night we turn off as many lights

184
00:06:55,670 --> 00:06:53,440
as we can to to help us

185
00:06:57,830 --> 00:06:55,680
to create a circadian rhythm but it is

186
00:07:00,710 --> 00:06:57,840
it is uh difficult at first when you get

187
00:07:01,510 --> 00:07:00,720
there to adapt to

188
00:07:03,670 --> 00:07:01,520

to

189
00:07:05,430 --> 00:07:03,680
just living on board and being in that

190
00:07:07,909 --> 00:07:05,440
environment but yes your circadian

191
00:07:10,070 --> 00:07:07,919
rhythm um gets affected very much like

192
00:07:12,309 --> 00:07:10,080
when you travel abroad and you go far

193
00:07:20,870 --> 00:07:12,319
away and um you're in a different time

194
00:07:25,029 --> 00:07:23,270
if a spacesuit's exterior happened to

195
00:07:26,950 --> 00:07:25,039
become damaged in some way during a

196
00:07:28,950 --> 00:07:26,960
spacewalk how could it be fixed in the

197
00:07:30,790 --> 00:07:28,960
international space station

198
00:07:32,790 --> 00:07:30,800
now you did some space walks on the

199
00:07:34,230 --> 00:07:32,800
international space station what what

200
00:07:35,589 --> 00:07:34,240
what kind of training what would what

201
00:07:37,830 --> 00:07:35,599
would you be prepared to do if one of

202
00:07:39,990 --> 00:07:37,840
your space if your suit became damaged

203
00:07:42,150 --> 00:07:40,000
during a space walk well if if your

204
00:07:43,990 --> 00:07:42,160
spook became damaged during a spacewalk

205
00:07:47,430 --> 00:07:44,000
i think the most important thing is to

206
00:07:49,110 --> 00:07:47,440
get back inside if if the damage is is

207
00:07:50,309 --> 00:07:49,120
significant

208
00:07:51,350 --> 00:07:50,319
and it doesn't take much for it to

209
00:07:53,589 --> 00:07:51,360
become that

210
00:07:55,510 --> 00:07:53,599
the the first job is to get inside

211
00:07:57,110 --> 00:07:55,520
there's there's no there's no fixing

212
00:07:58,550 --> 00:07:57,120
your suit

213
00:08:00,070 --> 00:07:58,560

especially if you

214
00:08:01,749 --> 00:08:00,080
got a hole in it

215
00:08:03,670 --> 00:08:01,759
time is of the essence and so you'd get

216
00:08:05,189 --> 00:08:03,680
back inside the space station

217
00:08:07,990 --> 00:08:05,199
and once you were inside the space

218
00:08:10,469 --> 00:08:08,000
station and safe then it would be a

219
00:08:13,430 --> 00:08:10,479
matter of inspection on the suit to see

220
00:08:15,189 --> 00:08:13,440
just how bad it was and so if you um if

221
00:08:16,790 --> 00:08:15,199
you went all the way through the suit

222
00:08:18,309 --> 00:08:16,800
well then um

223
00:08:19,510 --> 00:08:18,319
i don't know that we had the means to

224
00:08:21,510 --> 00:08:19,520
fix that on or but we do have

225
00:08:22,550 --> 00:08:21,520
replacement parts on board the space

226
00:08:24,390 --> 00:08:22,560
station

227
00:08:27,670 --> 00:08:24,400
but if it was just a piece of material

228
00:08:28,629 --> 00:08:27,680
that had had a a slice in it perhaps we

229
00:08:29,670 --> 00:08:28,639
could

230
00:08:31,029 --> 00:08:29,680
mend that

231
00:08:33,829 --> 00:08:31,039
but it would be

232
00:08:36,469 --> 00:08:33,839
a big project regardless between the

233
00:08:42,709 --> 00:08:36,479
crew up on orbit and the folks down here

234
00:08:46,150 --> 00:08:43,750
um

235
00:08:48,550 --> 00:08:46,160
what do you miss most about earth when

236
00:08:49,829 --> 00:08:48,560
you are in space

237
00:08:51,990 --> 00:08:49,839
oh

238
00:08:53,670 --> 00:08:52,000

there's so much that you miss

239
00:08:54,870 --> 00:08:53,680
first and foremost is your family of

240
00:08:55,910 --> 00:08:54,880
course

241
00:08:58,070 --> 00:08:55,920
but of the

242
00:09:00,550 --> 00:08:58,080
of the necessities in life you'd really

243
00:09:01,829 --> 00:09:00,560
miss running water

244
00:09:03,829 --> 00:09:01,839
boy when you're brushing your teeth

245
00:09:06,070 --> 00:09:03,839
there's just never take for granted the

246
00:09:07,750 --> 00:09:06,080
the water coming out of your faucet

247
00:09:11,269 --> 00:09:07,760
when you have

248
00:09:13,269 --> 00:09:11,279
nothing else but a towel to spit it in

249
00:09:15,350 --> 00:09:13,279
you begin to wish you had some running

250
00:09:22,070 --> 00:09:15,360
water so i'd say that was probably the

251
00:09:27,910 --> 00:09:24,949
what is melfi or the minus 80 degree

252
00:09:30,949 --> 00:09:27,920
laboratory for iss used for

253
00:09:33,829 --> 00:09:30,959
the melfi is a super duper freezer up on

254
00:09:35,350 --> 00:09:33,839
board and it gets things

255
00:09:38,230 --> 00:09:35,360
beyond cold

256
00:09:41,670 --> 00:09:38,240
we on orbit do a lot of experiments and

257
00:09:44,630 --> 00:09:41,680
those need to be preserved and the melfi

258
00:09:47,829 --> 00:09:44,640
is our primary means of preserving

259
00:09:50,150 --> 00:09:47,839
samples both um you know most biological

260
00:09:52,389 --> 00:09:50,160
samples blood samples blood samples

261
00:09:53,190 --> 00:09:52,399
urine samples as well as plant samples

262
00:09:54,790 --> 00:09:53,200
and

263
00:10:01,269 --> 00:09:54,800

that's that's primarily what it's used

264
00:10:04,470 --> 00:10:03,030
when you use the restroom in space where

265
00:10:09,670 --> 00:10:04,480
does the waste go

266
00:10:13,269 --> 00:10:11,430
this is such a touchy subject but i

267
00:10:14,790 --> 00:10:13,279
think i can describe it we collect it

268
00:10:16,389 --> 00:10:14,800
and we collect it in

269
00:10:19,910 --> 00:10:16,399
steel containers

270
00:10:22,550 --> 00:10:19,920
and uh the crew once uh once it gets

271
00:10:25,269 --> 00:10:22,560
collected crew doesn't ever have to um

272
00:10:27,269 --> 00:10:25,279
directly um interact with it it just

273
00:10:29,670 --> 00:10:27,279
gets collected in a in a big

274
00:10:31,829 --> 00:10:29,680
steel container that gets sealed up and

275
00:10:33,750 --> 00:10:31,839
we collect those containers until the

276
00:10:35,590 --> 00:10:33,760
next disposal vehicle

277
00:10:37,030 --> 00:10:35,600
is available and we load them on the

278
00:10:38,790 --> 00:10:37,040
disposal vehicle and then that's how we

279
00:10:41,590 --> 00:10:38,800
get them off the space station and

280
00:10:43,590 --> 00:10:41,600
that's goes into one of the vehicles

281
00:10:46,150 --> 00:10:43,600
that are destroyed as they're coming

282
00:10:49,269 --> 00:10:46,160
back exactly exactly and that's the

283
00:10:52,550 --> 00:10:49,279
solid waste the the liquid waste

284
00:10:54,230 --> 00:10:52,560
actually gets recycled back on we've got

285
00:10:57,190 --> 00:10:54,240
a really slick

286
00:10:59,269 --> 00:10:57,200
environmental control system that

287
00:11:02,310 --> 00:10:59,279
takes not just

288
00:11:03,990 --> 00:11:02,320

urine but also condensate and sweat and

289
00:11:05,910 --> 00:11:04,000
and you know rest

290
00:11:07,110 --> 00:11:05,920
respiratory respiration takes the

291
00:11:09,829 --> 00:11:07,120
moisture out of the moisture out of the

292
00:11:10,550 --> 00:11:09,839
air yes thanks and and it uh takes it

293
00:11:14,069 --> 00:11:10,560
through

294
00:11:16,389 --> 00:11:14,079
a filtering system and then produces uh

295
00:11:18,069 --> 00:11:16,399
potable water from that and it's not bad

296
00:11:19,350 --> 00:11:18,079
which is which is really very important

297
00:11:21,590 --> 00:11:19,360
too because

298
00:11:22,630 --> 00:11:21,600
for future explorations you can't carry

299
00:11:23,750 --> 00:11:22,640
with you

300
00:11:26,230 --> 00:11:23,760
all of the water that you're going to

301
00:11:27,910 --> 00:11:26,240
need you got to reuse absolutely yeah so

302
00:11:29,829 --> 00:11:27,920
it's very encouraging that we have so

303
00:11:31,910 --> 00:11:29,839
much success with it on on orbit right

304
00:11:34,470 --> 00:11:31,920
now and it tastes good it tastes good in

305
00:11:35,750 --> 00:11:34,480
fact you know i think most subtle folks

306
00:11:37,110 --> 00:11:35,760
would agree that it's better than the

307
00:11:44,550 --> 00:11:37,120
shuttle water

308
00:11:51,110 --> 00:11:48,150
what does it take to become an astronaut

309
00:11:52,710 --> 00:11:51,120
oh i don't know

310
00:11:55,670 --> 00:11:52,720
you know what it what it takes first and

311
00:11:58,389 --> 00:11:55,680
foremost is being is doing your best

312
00:11:59,829 --> 00:11:58,399
and and being your best and and uh to be

313
00:12:01,829 --> 00:11:59,839

your best and do your best you have to

314
00:12:05,430 --> 00:12:01,839
do the things that you that really

315
00:12:07,990 --> 00:12:05,440
motivate you and you enjoy and when when

316
00:12:09,670 --> 00:12:08,000
that's what you uh invest your time in

317
00:12:11,110 --> 00:12:09,680
you you invest more than your time you

318
00:12:13,430 --> 00:12:11,120
invest yourself

319
00:12:15,590 --> 00:12:13,440
and that brings the best out of you and

320
00:12:17,509 --> 00:12:15,600
that's you know i think the the way to

321
00:12:19,350 --> 00:12:17,519
become an astronaut now

322
00:12:21,990 --> 00:12:19,360
right now we're we're looking for folks

323
00:12:24,310 --> 00:12:22,000
who are really good in the stem areas so

324
00:12:26,870 --> 00:12:24,320
science technology

325
00:12:27,910 --> 00:12:26,880
engineering and math and

326
00:12:30,150 --> 00:12:27,920
also

327
00:12:31,910 --> 00:12:30,160
you know all the sciences biology

328
00:12:34,629 --> 00:12:31,920
physics chemistry those kind of things

329
00:12:35,910 --> 00:12:34,639
that's kind of where my background is

330
00:12:38,230 --> 00:12:35,920
but

331
00:12:40,069 --> 00:12:38,240
the exact path every single astronaut

332
00:12:41,590 --> 00:12:40,079
has a different story and so it's really

333
00:12:44,150 --> 00:12:41,600
hard to put that

334
00:12:44,949 --> 00:12:44,160
in a in a nutshell and

335
00:12:47,590 --> 00:12:44,959
and

336
00:12:50,389 --> 00:12:47,600
give you any kind of direction but

337
00:12:52,710 --> 00:12:50,399
first and foremost it's a strive to to

338
00:12:54,150 --> 00:12:52,720

be the best that whatever you invest

339
00:12:56,150 --> 00:12:54,160
yourself into

340
00:12:58,470 --> 00:12:56,160
the first astronauts that nasa ever had

341
00:13:00,069 --> 00:12:58,480
were all uh test pilots they were they

342
00:13:02,389 --> 00:13:00,079
were pilots and they flew

343
00:13:03,350 --> 00:13:02,399
aircraft that were being tested to see

344
00:13:06,150 --> 00:13:03,360
whether

345
00:13:08,870 --> 00:13:06,160
that were that were building aeronautics

346
00:13:11,190 --> 00:13:08,880
but since uh since then i've had

347
00:13:13,190 --> 00:13:11,200
astronauts who have come to

348
00:13:15,750 --> 00:13:13,200
the job with all kind of different

349
00:13:16,790 --> 00:13:15,760
backgrounds chemistry biology we have

350
00:13:18,829 --> 00:13:16,800
doctors

351
00:13:21,030 --> 00:13:18,839
engineers

352
00:13:22,870 --> 00:13:21,040
veterinarians vegetarians that's right

353
00:13:24,069 --> 00:13:22,880
absolutely yes the backgrounds are all

354
00:13:26,230 --> 00:13:24,079
varied and

355
00:13:29,110 --> 00:13:26,240
and it seems that uh as we go further

356
00:13:32,230 --> 00:13:29,120
into exploration well there

357
00:13:35,829 --> 00:13:32,240
i'm sure the the um the possibilities

358
00:13:37,350 --> 00:13:35,839
are going to be even greater in terms of

359
00:13:44,870 --> 00:13:37,360
pathways to get here we'll need

360
00:13:49,750 --> 00:13:47,189
i'm will and my question is how does the

361
00:13:51,910 --> 00:13:49,760
iss communicate with or

362
00:13:54,470 --> 00:13:51,920
with earth and is it possible to use a

363
00:13:56,069 --> 00:13:54,480

cell phone while on board

364
00:13:58,069 --> 00:13:56,079
well we

365
00:13:59,350 --> 00:13:58,079
communicate mainly through satellites we

366
00:14:01,590 --> 00:13:59,360
have

367
00:14:03,829 --> 00:14:01,600
satellite dishes on board the space

368
00:14:05,990 --> 00:14:03,839
station that send signals and receive

369
00:14:08,310 --> 00:14:06,000
signals to satellites that are

370
00:14:10,550 --> 00:14:08,320
deployed out in orbit with us

371
00:14:12,310 --> 00:14:10,560
and those beam the signals back down to

372
00:14:14,310 --> 00:14:12,320
the ground and that's that's mainly how

373
00:14:16,710 --> 00:14:14,320
we communicate

374
00:14:18,550 --> 00:14:16,720
we don't have cell phones on board and

375
00:14:20,150 --> 00:14:18,560
um if you brought your cell phone i

376
00:14:22,790 --> 00:14:20,160
don't think that you would uh have much

377
00:14:24,790 --> 00:14:22,800
luck with it i heard uh and i forget now

378
00:14:26,310 --> 00:14:24,800
is either chris hanfield or tom

379
00:14:28,069 --> 00:14:26,320
marshburn just a couple of days ago

380
00:14:31,110 --> 00:14:28,079
explained that we can't use cell phones

381
00:14:33,750 --> 00:14:31,120
because you're going too fast

382
00:14:36,310 --> 00:14:33,760
you're you are moving so fast that the

383
00:14:37,430 --> 00:14:36,320
signal can't get to cell phone towers it

384
00:14:39,189 --> 00:14:37,440
would

385
00:14:47,189 --> 00:14:39,199
you'd lose you'd lose the conversation

386
00:14:51,430 --> 00:14:49,350
my name is rebecca and what would happen

387
00:14:53,670 --> 00:14:51,440
if an astronaut got like sick or injured

388
00:14:55,110 --> 00:14:53,680

while they were on the space station

389
00:14:56,949 --> 00:14:55,120
well we take care of them that's for

390
00:14:59,829 --> 00:14:56,959
sure uh we have

391
00:15:01,990 --> 00:14:59,839
on each crew a person trained as the

392
00:15:04,790 --> 00:15:02,000
crew medical officer and we have

393
00:15:05,670 --> 00:15:04,800
supplies on board to take care of

394
00:15:07,910 --> 00:15:05,680
you know

395
00:15:10,470 --> 00:15:07,920
someone that's ill and even

396
00:15:12,230 --> 00:15:10,480
with minor injuries if it was very

397
00:15:14,629 --> 00:15:12,240
serious we'd have to bring somebody home

398
00:15:17,269 --> 00:15:14,639
but we we are pretty well trained in

399
00:15:19,030 --> 00:15:17,279
fact uh those of us that are trained as

400
00:15:20,550 --> 00:15:19,040
the crew medical officers actually go

401
00:15:22,069 --> 00:15:20,560
and part of their training is to go into

402
00:15:24,389 --> 00:15:22,079
hospitals and emergency rooms and

403
00:15:26,310 --> 00:15:24,399
actually work on on patients there so we

404
00:15:28,790 --> 00:15:26,320
we take it seriously and and we get

405
00:15:31,430 --> 00:15:28,800
training to it to a degree that that

406
00:15:33,269 --> 00:15:31,440
prepares us for some of the

407
00:15:34,870 --> 00:15:33,279
typical types of injuries that we would

408
00:15:36,550 --> 00:15:34,880
uh

409
00:15:39,509 --> 00:15:36,560
be susceptible to

410
00:15:47,430 --> 00:15:39,519
on board so cuts and sprains and and

411
00:15:51,670 --> 00:15:49,350
what is the hardest thing to adjust to

412
00:15:54,230 --> 00:15:51,680
in space

413
00:15:56,710 --> 00:15:54,240

oh the hardest thing well the the

414
00:15:59,829 --> 00:15:56,720
microgravity environment uh certainly

415
00:16:01,910 --> 00:15:59,839
does present a lot of challenges

416
00:16:04,069 --> 00:16:01,920
and i don't think anybody could dispute

417
00:16:05,990 --> 00:16:04,079
that learning how to go to the bathroom

418
00:16:11,350 --> 00:16:06,000
in space is probably one of the most

419
00:16:15,189 --> 00:16:12,710
you probably don't want me to describe

420
00:16:20,550 --> 00:16:17,189
hi i'm taylor and i was wondering how do

421
00:16:21,910 --> 00:16:20,560
astronauts keep the iss sanitary

422
00:16:23,189 --> 00:16:21,920
how did they oh how do they keep it

423
00:16:25,189 --> 00:16:23,199
sanitary

424
00:16:27,990 --> 00:16:25,199
good question uh that is so very

425
00:16:30,470 --> 00:16:28,000
important uh the way we keep it sanitary

426
00:16:32,069 --> 00:16:30,480
is by cleaning it and it's a job that we

427
00:16:33,110 --> 00:16:32,079
do every saturday

428
00:16:36,150 --> 00:16:33,120
and it

429
00:16:37,590 --> 00:16:36,160
involves vacuuming not just um not the

430
00:16:39,670 --> 00:16:37,600
typical kind of vacuuming that you do at

431
00:16:41,269 --> 00:16:39,680
home on the floor on the floor no we

432
00:16:43,110 --> 00:16:41,279
don't we don't do that what we do is

433
00:16:45,269 --> 00:16:43,120
that we have several vents and there's a

434
00:16:47,590 --> 00:16:45,279
lot of air circulating through the the

435
00:16:50,470 --> 00:16:47,600
space station because things float

436
00:16:52,389 --> 00:16:50,480
they get picked up and uh then deposited

437
00:16:54,949 --> 00:16:52,399
onto filters and in order for us to

438
00:16:57,030 --> 00:16:54,959

maintain a good breathing quality we

439
00:16:58,949 --> 00:16:57,040
have to go and vacuum those off and it's

440
00:17:00,470 --> 00:16:58,959
much like the vent in your dryer if

441
00:17:02,389 --> 00:17:00,480
you've ever cleaned lint off of there

442
00:17:05,669 --> 00:17:02,399
that's that's kind of the cleaning we do

443
00:17:07,350 --> 00:17:05,679
but also handrails because on on orbit

444
00:17:09,350 --> 00:17:07,360
you float of course and you don't use

445
00:17:11,750 --> 00:17:09,360
your feet as much as you do here on the

446
00:17:13,510 --> 00:17:11,760
ground you use your hands and your hands

447
00:17:15,590 --> 00:17:13,520
are your way of of moving around if

448
00:17:16,870 --> 00:17:15,600
you've ever seen video of astronauts on

449
00:17:18,710 --> 00:17:16,880
board the space station you see them

450
00:17:20,789 --> 00:17:18,720
moving around with their hands and we

451
00:17:22,949 --> 00:17:20,799
use our hands for everything and you

452
00:17:24,470 --> 00:17:22,959
know with the um

453
00:17:26,150 --> 00:17:24,480
you know touching our face eating our

454
00:17:28,710 --> 00:17:26,160
food doing our work

455
00:17:29,909 --> 00:17:28,720
and so we on a weekly basis make sure

456
00:17:34,549 --> 00:17:29,919
that all those hand rolls have been

457
00:17:34,559 --> 00:17:40,710
thank you

458
00:17:44,789 --> 00:17:42,870
how does the international space station

459
00:17:47,909 --> 00:17:44,799
stay in place and how does it have the

460
00:17:49,830 --> 00:17:47,919
ability to change its position in our

461
00:17:51,909 --> 00:17:49,840
in orbit

462
00:17:53,669 --> 00:17:51,919
well the way that we stay in place so

463
00:17:55,669 --> 00:17:53,679

you know we're orbiting and and so how

464
00:17:58,470 --> 00:17:55,679
do we keep that that distance from the

465
00:18:00,789 --> 00:17:58,480
earth uh that is through a series of

466
00:18:02,470 --> 00:18:00,799
we call them reboosts and

467
00:18:04,390 --> 00:18:02,480
so we have engines on board the space

468
00:18:06,390 --> 00:18:04,400
station as well as the vehicles that

469
00:18:08,310 --> 00:18:06,400
that do dock to it they have engines as

470
00:18:10,870 --> 00:18:08,320
well and sometimes we use those

471
00:18:13,110 --> 00:18:10,880
and we fire the engines for a precise

472
00:18:15,590 --> 00:18:13,120
amount of time and and

473
00:18:17,510 --> 00:18:15,600
in precise direction so that we can

474
00:18:19,110 --> 00:18:17,520
maintain the speed at which we're

475
00:18:20,870 --> 00:18:19,120
traveling around the earth and that's

476
00:18:23,909 --> 00:18:20,880
what helps keep us

477
00:18:27,350 --> 00:18:23,919
in place and uh we do that on a routine

478
00:18:30,070 --> 00:18:27,360
basis we call it a reboost

479
00:18:32,310 --> 00:18:30,080
you get to that position because of the

480
00:18:34,870 --> 00:18:32,320
rocket that you launch on yes that get

481
00:18:37,590 --> 00:18:34,880
it has enough power from the launch that

482
00:18:39,669 --> 00:18:37,600
gets you to a point above the earth

483
00:18:43,350 --> 00:18:39,679
where the speed that you're going allows

484
00:18:45,510 --> 00:18:43,360
you to in essence just fall

485
00:18:47,590 --> 00:18:45,520
the space station is not going around

486
00:18:50,070 --> 00:18:47,600
the earth because it has an engine

487
00:18:52,390 --> 00:18:50,080
that's pushing it it's just falling in

488
00:18:53,510 --> 00:18:52,400

space but because it's it's at an

489
00:18:54,390 --> 00:18:53,520
altitude

490
00:18:56,390 --> 00:18:54,400
where

491
00:18:58,789 --> 00:18:56,400
the gravity of the earth doesn't pull it

492
00:19:00,870 --> 00:18:58,799
down at least not enough to to bring it

493
00:19:02,310 --> 00:19:00,880
down but it does come down slightly yeah

494
00:19:04,310 --> 00:19:02,320
and that's why you've got to reboost it

495
00:19:09,110 --> 00:19:04,320
to get it back up so that as it falls

496
00:19:09,120 --> 00:19:15,110
thank you

497
00:19:18,470 --> 00:19:16,870
um what was the worst problem

498
00:19:20,470 --> 00:19:18,480
encountered on the international

499
00:19:22,830 --> 00:19:20,480
international space station and how did

500
00:19:26,390 --> 00:19:22,840
the mission control team solve

501
00:19:28,630 --> 00:19:26,400
it well during the time i was there i

502
00:19:31,830 --> 00:19:28,640
would say that the worst was when our

503
00:19:34,230 --> 00:19:31,840
pump module failed this is a a piece of

504
00:19:35,909 --> 00:19:34,240
equipment that is located outside the

505
00:19:37,590 --> 00:19:35,919
space station on our on our what's

506
00:19:40,470 --> 00:19:37,600
called the truss segment

507
00:19:42,789 --> 00:19:40,480
and it circulates ammonia

508
00:19:44,549 --> 00:19:42,799
through the through lines that go into

509
00:19:46,230 --> 00:19:44,559
the space state or go around the space

510
00:19:47,430 --> 00:19:46,240
station and it helps to keep the space

511
00:19:49,350 --> 00:19:47,440
station

512
00:19:50,710 --> 00:19:49,360
cool and and all the equipment that we

513
00:19:52,390 --> 00:19:50,720

have there generates a lot of heat so

514
00:19:54,789 --> 00:19:52,400
this is very very important

515
00:19:57,350 --> 00:19:54,799
one of those broke on board the space

516
00:19:59,909 --> 00:19:57,360
station and that's why myself and my my

517
00:20:02,950 --> 00:19:59,919
partner doug wheelock had to go outside

518
00:20:05,350 --> 00:20:02,960
and do a couple of space walks to

519
00:20:07,590 --> 00:20:05,360
remove it and put in place a brand new

520
00:20:10,070 --> 00:20:07,600
pump module and uh

521
00:20:12,950 --> 00:20:10,080
i think that was by far the

522
00:20:14,789 --> 00:20:12,960
the worst thing that that happened

523
00:20:16,470 --> 00:20:14,799
from our from from our point of view

524
00:20:18,870 --> 00:20:16,480
down here yeah that was that was the

525
00:20:20,870 --> 00:20:18,880
most dramatic thing that that occurred

526
00:20:22,470 --> 00:20:20,880
during your time up there that

527
00:20:24,549 --> 00:20:22,480
caused a response

528
00:20:27,110 --> 00:20:24,559
on the ground from a lot of people who

529
00:20:29,110 --> 00:20:27,120
first had realized what had happened and

530
00:20:31,270 --> 00:20:29,120
then second realized what needed to be

531
00:20:33,990 --> 00:20:31,280
do to fix what needed to be done to fix

532
00:20:35,510 --> 00:20:34,000
it and then plan the spacewalk for tracy

533
00:20:36,870 --> 00:20:35,520
and doug to go out and make those

534
00:20:39,110 --> 00:20:36,880
repairs so it

535
00:20:42,230 --> 00:20:39,120
it was it was exciting it was a big deal

536
00:20:42,240 --> 00:20:47,350
thank you

537
00:20:53,350 --> 00:20:49,350
how can the iss be used for

538
00:20:56,549 --> 00:20:54,149

well

539
00:20:58,870 --> 00:20:56,559
because the space station stays in in

540
00:21:00,710 --> 00:20:58,880
one place in orbit uh we wouldn't be

541
00:21:03,029 --> 00:21:00,720
taking it to another planet but

542
00:21:04,789 --> 00:21:03,039
certainly the way it can be used is all

543
00:21:06,710 --> 00:21:04,799
of the science that we're doing on board

544
00:21:08,470 --> 00:21:06,720
and not just science but the operations

545
00:21:10,230 --> 00:21:08,480
and the coordinating that we're doing

546
00:21:12,630 --> 00:21:10,240
not just here with this mission control

547
00:21:15,110 --> 00:21:12,640
but all the mission controls are is

548
00:21:17,750 --> 00:21:15,120
teaching us how to go beyond low earth

549
00:21:19,190 --> 00:21:17,760
orbit to other planets and so i would

550
00:21:21,350 --> 00:21:19,200
say that

551
00:21:24,630 --> 00:21:21,360
that's how we're using it is we're

552
00:21:26,390 --> 00:21:24,640
using it to learn about space

553
00:21:28,470 --> 00:21:26,400
living in space which is what we'll have

554
00:21:31,270 --> 00:21:28,480
to do when we go

555
00:21:33,590 --> 00:21:31,280
to other planets and uh how we can adapt

556
00:21:34,789 --> 00:21:33,600
and how we can get back safely i would

557
00:21:37,190 --> 00:21:34,799
say

558
00:21:38,789 --> 00:21:37,200
you could push it out of orbit and and

559
00:21:40,789 --> 00:21:38,799
head it off in a direction but it's not

560
00:21:42,310 --> 00:21:40,799
designed for any trip like that and it

561
00:21:44,310 --> 00:21:42,320
wouldn't be very uh wouldn't be a very

562
00:21:46,310 --> 00:21:44,320
good way to make the trip but it is

563
00:21:49,430 --> 00:21:46,320

helping us learn how to design

564
00:21:52,310 --> 00:21:49,440
spacecraft that can make that trip yeah

565
00:21:53,830 --> 00:21:52,320
and components of the spacecraft in fact

566
00:21:56,870 --> 00:21:53,840
one of the science experiments i

567
00:21:58,549 --> 00:21:56,880
remember doing on orbit was looking at

568
00:22:00,549 --> 00:21:58,559
fuel tank designs

569
00:22:02,870 --> 00:22:00,559
because uh you know it's not like here

570
00:22:04,070 --> 00:22:02,880
on earth where you can rely on gravity

571
00:22:06,630 --> 00:22:04,080
to pull

572
00:22:08,549 --> 00:22:06,640
fuel um into the engine

573
00:22:10,310 --> 00:22:08,559
it uh it takes a little bit of

574
00:22:12,710 --> 00:22:10,320
cleverness and so we we use the space

575
00:22:15,830 --> 00:22:12,720
station to learn what what is the best

576
00:22:21,350 --> 00:22:15,840
design for a fuel tank

577
00:22:24,950 --> 00:22:23,430
hi um do astronauts require more food

578
00:22:27,669 --> 00:22:24,960
while in space and about how many pounds

579
00:22:28,950 --> 00:22:27,679
of food is on the iss

580
00:22:31,430 --> 00:22:28,960
what was the first part of that question

581
00:22:33,029 --> 00:22:31,440
do astronauts require more food more in

582
00:22:34,070 --> 00:22:33,039
space

583
00:22:35,750 --> 00:22:34,080
oh

584
00:22:37,110 --> 00:22:35,760
you know i think that varies with each

585
00:22:39,190 --> 00:22:37,120
crew member

586
00:22:41,750 --> 00:22:39,200
i would say that yes i mean just like it

587
00:22:42,710 --> 00:22:41,760
does here on the ground and uh i would

588
00:22:44,390 --> 00:22:42,720

say that

589
00:22:45,909 --> 00:22:44,400
um when you first get there you might

590
00:22:47,909 --> 00:22:45,919
not be so hungry but when you start to

591
00:22:50,230 --> 00:22:47,919
get into the swing of things then your

592
00:22:51,350 --> 00:22:50,240
appetite certainly is uh is pretty

593
00:22:52,870 --> 00:22:51,360
normal

594
00:22:55,669 --> 00:22:52,880
uh so i would say for the most part

595
00:22:58,310 --> 00:22:55,679
people don't don't tend to eat more but

596
00:23:00,549 --> 00:22:58,320
we're all different and how many pounds

597
00:23:02,310 --> 00:23:00,559
of food are up there i i do not know

598
00:23:03,110 --> 00:23:02,320
what that number is but what i can tell

599
00:23:06,870 --> 00:23:03,120
you

600
00:23:09,510 --> 00:23:06,880
is that each each crew stays on orbit

601
00:23:10,390 --> 00:23:09,520
just a couple weeks shy of six months

602
00:23:12,549 --> 00:23:10,400
and

603
00:23:15,190 --> 00:23:12,559
there's enough food for them to eat not

604
00:23:17,430 --> 00:23:15,200
only breakfast lunch and dinner every

605
00:23:19,669 --> 00:23:17,440
single day but there's also snacks up

606
00:23:20,830 --> 00:23:19,679
there and drinks and and that's not just

607
00:23:23,990 --> 00:23:20,840
for the

608
00:23:26,230 --> 00:23:24,000
the crew that's on orbit at this time

609
00:23:28,230 --> 00:23:26,240
but we also state we call it staging

610
00:23:29,909 --> 00:23:28,240
food we put food in place for the next

611
00:23:31,270 --> 00:23:29,919
increments so that it's there well in

612
00:23:33,430 --> 00:23:31,280
advance of them showing up so i would

613
00:23:35,110 --> 00:23:33,440

say there is a lot of food there's

614
00:23:37,190 --> 00:23:35,120
hundreds and hundreds of pounds of it

615
00:23:39,750 --> 00:23:37,200
and there are and there's more launching

616
00:23:41,909 --> 00:23:39,760
tomorrow morning there's a cargo ship

617
00:23:43,909 --> 00:23:41,919
that's launching from florida uh just

618
00:23:46,549 --> 00:23:43,919
after nine o'clock houston time tomorrow

619
00:23:48,549 --> 00:23:46,559
morning and it's got 1200 pounds

620
00:23:52,390 --> 00:23:48,559
of supplies and a big piece of that is

621
00:23:54,470 --> 00:23:52,400
food food's very important on orbit

622
00:23:56,630 --> 00:23:54,480
well thank you so much for joining us

623
00:23:57,909 --> 00:23:56,640
and of today and we appreciate it

624
00:24:01,909 --> 00:23:57,919
centennial middle school would you like