
PAO

1
00:00:06,309 --> 00:00:03,990
well welcome to mission control at the

2
00:00:08,710 --> 00:00:06,319
johnson space center in houston i'm pat

3
00:00:10,950 --> 00:00:08,720
ryan i'm the public affairs officer on

4
00:00:13,270 --> 00:00:10,960
the orbit 2 shift here in mission

5
00:00:15,749 --> 00:00:13,280
control and we just got finished with

6
00:00:16,550 --> 00:00:15,759
our international space station update

7
00:00:18,150 --> 00:00:16,560
program

8
00:00:20,390 --> 00:00:18,160
now we're looking forward to the

9
00:00:22,310 --> 00:00:20,400
opportunity to talk with you and find

10
00:00:24,630 --> 00:00:22,320
out what's on your mind today i have

11
00:00:27,189 --> 00:00:24,640
invited along somebody who knows all of

12
00:00:29,669 --> 00:00:27,199
these things even better than i do

13
00:00:31,429 --> 00:00:29,679

tracy colwell dyson is a nasa astronaut

14
00:00:33,830 --> 00:00:31,439
who is selected for the astronaut

15
00:00:35,510 --> 00:00:33,840
program in 1998.

16
00:00:39,030 --> 00:00:35,520
she flew to the space station on space

17
00:00:40,950 --> 00:00:39,040
shuttle endeavour in 2007 and spent six

18
00:00:43,990 --> 00:00:40,960
months onboard the international space

19
00:00:47,910 --> 00:00:44,000
station as a member of expeditions 23

20
00:00:50,790 --> 00:00:47,920
and 24 in 2010 that was a trip back and

21
00:00:53,350 --> 00:00:50,800
forth on a russian soyuz spacecraft yes

22
00:00:55,510 --> 00:00:53,360
it was pretty cool it was very cool

23
00:00:57,189 --> 00:00:55,520
when before you made that flight i

24
00:00:59,029 --> 00:00:57,199
remember you telling me

25
00:01:01,029 --> 00:00:59,039
that you got excited about being an

26
00:01:03,029 --> 00:01:01,039
astronaut when you were in junior high

27
00:01:04,869 --> 00:01:03,039
school so we're about the same age as

28
00:01:07,109 --> 00:01:04,879
these as these folks what was it that

29
00:01:09,510 --> 00:01:07,119
got you excited at that age about being

30
00:01:12,070 --> 00:01:09,520
an astronaut well at that age i think it

31
00:01:14,469 --> 00:01:12,080
was all the trips that i took out into

32
00:01:16,870 --> 00:01:14,479
the desert with my family we would

33
00:01:19,350 --> 00:01:16,880
ride motorcycles and and out in the

34
00:01:21,990 --> 00:01:19,360
desert where there's no lights and a

35
00:01:24,550 --> 00:01:22,000
bunch of stars i would lay out on my

36
00:01:26,950 --> 00:01:24,560
motorcycle trailer at night and just

37
00:01:28,630 --> 00:01:26,960
dream about being up there and wondering

38
00:01:30,789 --> 00:01:28,640

what it was like and so i think that was

39
00:01:33,830 --> 00:01:30,799
really what inspired me to keep looking

40
00:01:35,910 --> 00:01:33,840
up into space and

41
00:01:37,670 --> 00:01:35,920
i think that's what always stuck with me

42
00:01:39,670 --> 00:01:37,680
as i went through school

43
00:01:42,710 --> 00:01:39,680
how did you do it then what what was the

44
00:01:45,109 --> 00:01:42,720
path for you that worked to get you from

45
00:01:47,670 --> 00:01:45,119
there to the astronaut well the path was

46
00:01:50,469 --> 00:01:47,680
very curvy and i wouldn't say that i had

47
00:01:51,350 --> 00:01:50,479
a plan going into it but

48
00:01:53,429 --> 00:01:51,360
i think

49
00:01:55,109 --> 00:01:53,439
when i decided for sure that i wanted to

50
00:01:56,709 --> 00:01:55,119
become an astronaut

51
00:01:58,709 --> 00:01:56,719
i had looked at a list of things that

52
00:02:01,590 --> 00:01:58,719
i'd written down that i enjoyed doing

53
00:02:04,550 --> 00:02:01,600
and all of these things included

54
00:02:06,389 --> 00:02:04,560
you know working with tools and and

55
00:02:08,229 --> 00:02:06,399
learning different languages and liking

56
00:02:09,990 --> 00:02:08,239
science and and i put those things

57
00:02:11,670 --> 00:02:10,000
together and thought after i learned

58
00:02:13,270 --> 00:02:11,680
about what astronauts did that's what i

59
00:02:15,430 --> 00:02:13,280
want to do but i had no idea how i was

60
00:02:17,190 --> 00:02:15,440
going to get there so my first uh step

61
00:02:19,510 --> 00:02:17,200
was to keep doing the things that i

62
00:02:21,910 --> 00:02:19,520
enjoyed doing i was really interested in

63
00:02:23,910 --> 00:02:21,920

science and so i think that's where

64
00:02:25,990 --> 00:02:23,920
i started to make the the official step

65
00:02:28,869 --> 00:02:26,000
was when i left high school i went to

66
00:02:30,630 --> 00:02:28,879
college i majored in chemistry and i

67
00:02:32,229 --> 00:02:30,640
just kept following

68
00:02:34,869 --> 00:02:32,239
my heart and doing the things that i

69
00:02:36,869 --> 00:02:34,879
really enjoyed doing and i'd say that if

70
00:02:37,830 --> 00:02:36,879
there was any path i took it was it was

71
00:02:38,630 --> 00:02:37,840
that

72
00:02:40,309 --> 00:02:38,640
great

73
00:02:42,070 --> 00:02:40,319
let's find out what's on their mind

74
00:02:45,990 --> 00:02:42,080
we're ready to take the questions from

75
00:02:48,710 --> 00:02:46,869
hi

76
00:02:50,790 --> 00:02:48,720
we all know that the

77
00:02:52,790 --> 00:02:50,800
computers play a big girl with the

78
00:02:54,630 --> 00:02:52,800
international space station

79
00:02:56,869 --> 00:02:54,640
so what do you do when a computer

80
00:02:59,350 --> 00:02:56,879
malfunctions and how do you fix the

81
00:03:02,869 --> 00:03:01,750
well when a computer malfunctions well

82
00:03:04,869 --> 00:03:02,879
we have several different types of

83
00:03:07,350 --> 00:03:04,879
computers onboard the space station we

84
00:03:08,869 --> 00:03:07,360
have the real serious ones that are the

85
00:03:10,390 --> 00:03:08,879
brains of the station and when one of

86
00:03:12,790 --> 00:03:10,400
those malfunctions

87
00:03:14,869 --> 00:03:12,800
everybody knows it and

88
00:03:16,790 --> 00:03:14,879

everybody takes action and i mean from

89
00:03:18,470 --> 00:03:16,800
from up on board the space station to

90
00:03:20,229 --> 00:03:18,480
here inside mission control

91
00:03:22,869 --> 00:03:20,239
and even beyond the walls of this very

92
00:03:24,309 --> 00:03:22,879
room so everybody pitches in to try to

93
00:03:26,630 --> 00:03:24,319
fix the problem plus the computers try

94
00:03:28,949 --> 00:03:26,640
to fix themselves as well we have a

95
00:03:30,630 --> 00:03:28,959
redundant computer so we have not just

96
00:03:32,149 --> 00:03:30,640
one but three and they all talk to one

97
00:03:33,830 --> 00:03:32,159
another the ones that control the

98
00:03:35,670 --> 00:03:33,840
station and so when one

99
00:03:37,589 --> 00:03:35,680
decides it's going to go its own way the

100
00:03:39,670 --> 00:03:37,599
other two kind of pitch in and help make

101
00:03:41,589 --> 00:03:39,680
decisions and so we rely on that

102
00:03:43,509 --> 00:03:41,599
redundancy we call it

103
00:03:44,949 --> 00:03:43,519
and then we also have laptops on board

104
00:03:46,309 --> 00:03:44,959
that

105
00:03:48,470 --> 00:03:46,319
don't run the space station but they

106
00:03:51,110 --> 00:03:48,480
help us do our our work up there and

107
00:03:53,910 --> 00:03:51,120
when one of those uh malfunctions or

108
00:03:55,830 --> 00:03:53,920
gets a glitch we do the old power cycle

109
00:03:58,229 --> 00:03:55,840
we turn it on and we turn it off we turn

110
00:03:59,990 --> 00:03:58,239
it off and we turn it on and if we can't

111
00:04:02,229 --> 00:04:00,000
seem to fix it

112
00:04:03,830 --> 00:04:02,239
by that method then we call our friends

113
00:04:05,589 --> 00:04:03,840

down here in mission control and then

114
00:04:07,910 --> 00:04:05,599
they walk us through some pretty uh

115
00:04:14,470 --> 00:04:07,920
elaborate steps to regain

116
00:04:18,150 --> 00:04:15,990
um

117
00:04:20,949 --> 00:04:18,160
how is the international space station

118
00:04:23,270 --> 00:04:20,959
built for example how was the

119
00:04:25,510 --> 00:04:23,280
international space station designed how

120
00:04:28,310 --> 00:04:25,520
are the science laboratories built

121
00:04:31,510 --> 00:04:28,320
and um how long did it take to build the

122
00:04:34,550 --> 00:04:31,520
international space station etc

123
00:04:36,790 --> 00:04:34,560
well it it took a little over a decade

124
00:04:39,270 --> 00:04:36,800
to to build the space station of

125
00:04:41,670 --> 00:04:39,280
actually flying pieces up but it took a

126
00:04:44,870 --> 00:04:41,680
lot a lot of time before that to get

127
00:04:46,150 --> 00:04:44,880
ready to do that absolutely and uh boy

128
00:04:48,150 --> 00:04:46,160
how many years and it must have been a

129
00:04:49,749 --> 00:04:48,160
decade before that if not longer please

130
00:04:53,510 --> 00:04:49,759
yes that we were designing the space

131
00:04:55,350 --> 00:04:53,520
station and uh the testing that it took

132
00:04:57,189 --> 00:04:55,360
to make sure all the parts that we were

133
00:04:59,189 --> 00:04:57,199
taking up there separately would work

134
00:05:01,830 --> 00:04:59,199
together once they were all put together

135
00:05:04,390 --> 00:05:01,840
in the vacuum of space and then all the

136
00:05:06,150 --> 00:05:04,400
hours that we spent up in space

137
00:05:07,909 --> 00:05:06,160
connecting everything using the robotic

138
00:05:09,909 --> 00:05:07,919

arms and the space walkers and all of

139
00:05:12,469 --> 00:05:09,919
the folks here on the ground that were

140
00:05:14,070 --> 00:05:12,479
supporting that it took a number of

141
00:05:16,230 --> 00:05:14,080
years and

142
00:05:17,990 --> 00:05:16,240
days and hours

143
00:05:19,990 --> 00:05:18,000
consecutively

144
00:05:22,629 --> 00:05:20,000
and um what was the other part of that

145
00:05:25,150 --> 00:05:22,639
question we started flying

146
00:05:28,189 --> 00:05:25,160
pieces of the space station in

147
00:05:32,230 --> 00:05:28,199
1998. yes the first the first piece was

148
00:05:36,830 --> 00:05:32,240
1998 and the last shuttle mission to fly

149
00:05:41,029 --> 00:05:39,430
so but the there have been crew members

150
00:05:44,950 --> 00:05:41,039
on board the station

151
00:05:47,270 --> 00:05:44,960
uh for just over 10 years now uh so it's

152
00:05:49,510 --> 00:05:47,280
and even before any of those flying

153
00:05:51,189 --> 00:05:49,520
anything flew in space there was a lot

154
00:05:54,310 --> 00:05:51,199
of designs and in the case of this

155
00:05:56,230 --> 00:05:54,320
project there were even redesigns as uh

156
00:05:58,629 --> 00:05:56,240
different partners were brought into the

157
00:06:03,510 --> 00:05:58,639
project so it's it took a long time to

158
00:06:08,629 --> 00:06:04,629
so

159
00:06:10,550 --> 00:06:08,639
or sleep cycles affected due to how the

160
00:06:12,790 --> 00:06:10,560
international international state space

161
00:06:15,270 --> 00:06:12,800
station goes around the earth

162
00:06:16,390 --> 00:06:15,280
absolutely and that's a big deal for us

163
00:06:19,270 --> 00:06:16,400

up there

164
00:06:20,390 --> 00:06:19,280
so the space station itself there are

165
00:06:21,830 --> 00:06:20,400
windows but

166
00:06:24,550 --> 00:06:21,840
they aren't everywhere in the space

167
00:06:26,710 --> 00:06:24,560
station so um you you can't you can't

168
00:06:28,469 --> 00:06:26,720
necessarily see the sun go up and down

169
00:06:30,230 --> 00:06:28,479
unless you go

170
00:06:32,390 --> 00:06:30,240
to the window and look

171
00:06:34,469 --> 00:06:32,400
but even if it did the the sun is rising

172
00:06:36,950 --> 00:06:34,479
and setting what is it uh

173
00:06:39,350 --> 00:06:36,960
16 times a day and and so that would

174
00:06:41,990 --> 00:06:39,360
kind of that kind of plays a role

175
00:06:44,070 --> 00:06:42,000
in um in your mind at least because you

176
00:06:45,909 --> 00:06:44,080
you know you're used to seeing uh dark

177
00:06:46,950 --> 00:06:45,919
and and light so inside the space

178
00:06:48,629 --> 00:06:46,960
station

179
00:06:50,710 --> 00:06:48,639
it's it's well lit during the day and

180
00:06:53,830 --> 00:06:50,720
then at night we turn off as many lights

181
00:06:56,070 --> 00:06:53,840
as we can to to help us

182
00:06:58,150 --> 00:06:56,080
to create a circadian rhythm but it is

183
00:07:00,070 --> 00:06:58,160
it is uh difficult at first when you get

184
00:07:01,110 --> 00:07:00,080
there to adapt to uh

185
00:07:01,909 --> 00:07:01,120
um

186
00:07:04,070 --> 00:07:01,919
to

187
00:07:05,830 --> 00:07:04,080
just living on board and being in that

188
00:07:08,230 --> 00:07:05,840

environment but yes your circadian

189
00:07:10,230 --> 00:07:08,240
rhythm um gets affected very much like

190
00:07:12,469 --> 00:07:10,240
when you travel abroad and and you go

191
00:07:21,270 --> 00:07:12,479
far away and um you're in a different

192
00:07:25,350 --> 00:07:23,670
if a spacesuit's exterior happened to

193
00:07:27,270 --> 00:07:25,360
become damaged in some way during a

194
00:07:29,350 --> 00:07:27,280
spacewalk how could it be fixed in the

195
00:07:31,189 --> 00:07:29,360
international space station

196
00:07:33,189 --> 00:07:31,199
now you did some space walks on the

197
00:07:34,469 --> 00:07:33,199
international space station what what

198
00:07:35,909 --> 00:07:34,479
what kind of training what would you

199
00:07:37,430 --> 00:07:35,919
what would you be prepared to do if one

200
00:07:40,390 --> 00:07:37,440
of your space if your suit became

201
00:07:42,629 --> 00:07:40,400
damaged during a spacewalk well if your

202
00:07:44,550 --> 00:07:42,639
food became damaged during a spacewalk i

203
00:07:47,830 --> 00:07:44,560
think the most important thing is to get

204
00:07:49,510 --> 00:07:47,840
back inside if if the damage is is

205
00:07:50,710 --> 00:07:49,520
significant

206
00:07:51,749 --> 00:07:50,720
and it doesn't take much for it to

207
00:07:53,909 --> 00:07:51,759
become that

208
00:07:55,110 --> 00:07:53,919
the the first job is to get inside

209
00:07:57,510 --> 00:07:55,120
there's there's no

210
00:07:58,869 --> 00:07:57,520
there's no fixing your suit

211
00:08:00,469 --> 00:07:58,879
especially if you

212
00:08:02,150 --> 00:08:00,479
got a hole in it

213
00:08:03,990 --> 00:08:02,160

time is of the essence and so you'd get

214
00:08:05,510 --> 00:08:04,000
back inside the space station

215
00:08:08,390 --> 00:08:05,520
and once you were inside the space

216
00:08:10,790 --> 00:08:08,400
station and safe then it would be a

217
00:08:13,830 --> 00:08:10,800
matter of inspection on the suit to see

218
00:08:15,510 --> 00:08:13,840
just how bad it was and so if you um if

219
00:08:17,110 --> 00:08:15,520
you went all the way through the suit

220
00:08:18,710 --> 00:08:17,120
well then um

221
00:08:19,830 --> 00:08:18,720
i don't know that we had the means to

222
00:08:21,909 --> 00:08:19,840
fix that on or but we do have

223
00:08:22,950 --> 00:08:21,919
replacement parts on board the space

224
00:08:24,790 --> 00:08:22,960
station

225
00:08:27,990 --> 00:08:24,800
but if it was just a piece of material

226
00:08:29,029 --> 00:08:28,000
that had had a a slice in it perhaps we

227
00:08:32,550 --> 00:08:29,039
could

228
00:08:35,430 --> 00:08:32,560
mend that but it would be a big project

229
00:08:37,269 --> 00:08:35,440
regardless between the crew up on orbit

230
00:08:43,110 --> 00:08:37,279
and the folks down here in mission

231
00:08:46,550 --> 00:08:44,070
um

232
00:08:48,870 --> 00:08:46,560
what do you miss most about earth when

233
00:08:50,150 --> 00:08:48,880
you are in space

234
00:08:52,389 --> 00:08:50,160
oh

235
00:08:54,070 --> 00:08:52,399
there's so much that you miss

236
00:08:55,030 --> 00:08:54,080
first and foremost is your family of

237
00:08:56,310 --> 00:08:55,040
course

238
00:08:58,470 --> 00:08:56,320

uh but of the

239
00:09:00,949 --> 00:08:58,480
of the necessities in life you'd really

240
00:09:02,150 --> 00:09:00,959
miss running water um

241
00:09:04,230 --> 00:09:02,160
boy when you're brushing your teeth

242
00:09:06,470 --> 00:09:04,240
there's just never take for granted the

243
00:09:08,949 --> 00:09:06,480
the water coming out of your faucet um

244
00:09:11,590 --> 00:09:08,959
when you have uh nothing else but a

245
00:09:13,590 --> 00:09:11,600
towel to spit it in

246
00:09:15,750 --> 00:09:13,600
you begin to wish you had some running

247
00:09:22,150 --> 00:09:15,760
water so i'd say that was probably the

248
00:09:28,310 --> 00:09:25,269
um what is melfi or the minus 80 degree

249
00:09:31,269 --> 00:09:28,320
laboratory for iss used for

250
00:09:34,230 --> 00:09:31,279
the melfi is a super duper freezer up on

251
00:09:35,670 --> 00:09:34,240
board and it gets things

252
00:09:38,550 --> 00:09:35,680
beyond cold

253
00:09:41,990 --> 00:09:38,560
we on orbit do a lot of experiments and

254
00:09:45,030 --> 00:09:42,000
those need to be preserved and the melfi

255
00:09:48,230 --> 00:09:45,040
is our primary means of preserving

256
00:09:49,829 --> 00:09:48,240
samples both um you know most biological

257
00:09:55,190 --> 00:09:49,839
samples

258
00:10:01,670 --> 00:09:55,200
that's that's primarily what it's used

259
00:10:05,829 --> 00:10:03,430
when you use the restroom in space where

260
00:10:10,069 --> 00:10:05,839
does the waste go oh that's a good

261
00:10:13,670 --> 00:10:11,829
this is such a touchy subject but i

262
00:10:15,190 --> 00:10:13,680
think i can describe it we collect it

263
00:10:16,790 --> 00:10:15,200

and we collect it in

264
00:10:20,230 --> 00:10:16,800
steel containers

265
00:10:22,949 --> 00:10:20,240
and the crude once uh once it gets

266
00:10:24,310 --> 00:10:22,959
collected crew doesn't ever have to

267
00:10:26,389 --> 00:10:24,320
directly

268
00:10:29,110 --> 00:10:26,399
interact with it it just gets collected

269
00:10:30,949 --> 00:10:29,120
in a big steel container that gets

270
00:10:33,190 --> 00:10:30,959
sealed up and we collect those

271
00:10:34,150 --> 00:10:33,200
containers until the next disposal

272
00:10:35,910 --> 00:10:34,160
vehicle

273
00:10:37,430 --> 00:10:35,920
is available and we load them on the

274
00:10:39,190 --> 00:10:37,440
disposal vehicle and then that's how we

275
00:10:41,910 --> 00:10:39,200
get them off the space station and

276
00:10:43,990 --> 00:10:41,920
that's goes into one of the vehicles

277
00:10:46,550 --> 00:10:44,000
that are destroyed as they're coming

278
00:10:48,710 --> 00:10:46,560
back exactly exactly and that's the

279
00:10:51,829 --> 00:10:48,720
solid waste the the

280
00:10:52,630 --> 00:10:51,839
liquid waste actually gets recycled back

281
00:10:54,550 --> 00:10:52,640
on

282
00:10:57,509 --> 00:10:54,560
we've got a really slick uh

283
00:10:59,590 --> 00:10:57,519
environmental control system that

284
00:11:02,710 --> 00:10:59,600
takes not just um

285
00:11:04,389 --> 00:11:02,720
urine but also condensate and sweat and

286
00:11:06,310 --> 00:11:04,399
and you know

287
00:11:07,509 --> 00:11:06,320
respiratory respiration takes the

288
00:11:10,230 --> 00:11:07,519

moisture out of the moisture out of the

289
00:11:10,949 --> 00:11:10,240
air yes thanks and and it uh takes it

290
00:11:13,990 --> 00:11:10,959
through

291
00:11:16,389 --> 00:11:14,000
a filtering system and then uh produces

292
00:11:17,990 --> 00:11:16,399
uh potable water from that and it's not

293
00:11:19,670 --> 00:11:18,000
bad which is which is really very

294
00:11:21,990 --> 00:11:19,680
important too because

295
00:11:23,030 --> 00:11:22,000
for future explorations you can't carry

296
00:11:24,150 --> 00:11:23,040
with you

297
00:11:26,470 --> 00:11:24,160
all of the water that you're going to

298
00:11:28,310 --> 00:11:26,480
need you've got to reuse absolutely yeah

299
00:11:30,230 --> 00:11:28,320
so it's very encouraging that we have so

300
00:11:32,310 --> 00:11:30,240
much success with it on on orbit right

301
00:11:34,870 --> 00:11:32,320
now and it tastes good it tastes good in

302
00:11:36,150 --> 00:11:34,880
fact you know i think most subtle folks

303
00:11:37,509 --> 00:11:36,160
would agree that it's better than the

304
00:11:44,949 --> 00:11:37,519
shuttle water

305
00:11:51,509 --> 00:11:48,470
what does it take to become an astronaut

306
00:11:53,030 --> 00:11:51,519
oh i don't know

307
00:11:56,389 --> 00:11:53,040
you know what it what it takes first and

308
00:11:58,790 --> 00:11:56,399
foremost is being is doing your best and

309
00:12:00,230 --> 00:11:58,800
and being your best and and uh to be

310
00:12:02,150 --> 00:12:00,240
your best and do your best you have to

311
00:12:05,829 --> 00:12:02,160
do the things that you that really

312
00:12:08,310 --> 00:12:05,839
motivate you and you enjoy and when when

313
00:12:10,069 --> 00:12:08,320

that's what you uh invest your time in

314
00:12:11,509 --> 00:12:10,079
you you invest more than your time you

315
00:12:13,829 --> 00:12:11,519
invest yourself

316
00:12:15,990 --> 00:12:13,839
and that brings the best out of you and

317
00:12:17,910 --> 00:12:16,000
that's you know i think the the way to

318
00:12:19,750 --> 00:12:17,920
become an astronaut now

319
00:12:22,310 --> 00:12:19,760
right now we're we're looking for folks

320
00:12:24,710 --> 00:12:22,320
who are really good in the stem areas so

321
00:12:26,230 --> 00:12:24,720
science technology

322
00:12:27,269 --> 00:12:26,240
engineering and math

323
00:12:28,310 --> 00:12:27,279
and

324
00:12:30,470 --> 00:12:28,320
also

325
00:12:32,310 --> 00:12:30,480
you know all the sciences biology

326
00:12:35,030 --> 00:12:32,320
physics chemistry those kind of things

327
00:12:36,310 --> 00:12:35,040
that's kind of where my background is

328
00:12:38,629 --> 00:12:36,320
but

329
00:12:40,470 --> 00:12:38,639
the exact path every single astronaut

330
00:12:43,750 --> 00:12:40,480
has a different story and so it's really

331
00:12:44,550 --> 00:12:43,760
hard to put that in a in a nutshell and

332
00:12:45,350 --> 00:12:44,560
um

333
00:12:47,990 --> 00:12:45,360
and

334
00:12:50,710 --> 00:12:48,000
give you any kind of direction but

335
00:12:53,030 --> 00:12:50,720
first and foremost it's uh strive to to

336
00:12:54,470 --> 00:12:53,040
be the best that whatever you invest

337
00:12:56,470 --> 00:12:54,480
yourself into

338
00:12:58,870 --> 00:12:56,480

the first astronauts that nasa ever had

339
00:13:01,190 --> 00:12:58,880
were all uh test pilots they were they

340
00:13:03,750 --> 00:13:01,200
were pilots and they flew aircraft that

341
00:13:06,550 --> 00:13:03,760
were being tested to see whether

342
00:13:09,269 --> 00:13:06,560
they were that were building aeronautics

343
00:13:11,509 --> 00:13:09,279
but since uh since then i've had

344
00:13:13,590 --> 00:13:11,519
astronauts who have come to

345
00:13:16,069 --> 00:13:13,600
the job with all kinds of different

346
00:13:19,110 --> 00:13:16,079
backgrounds chemistry biology we have

347
00:13:21,430 --> 00:13:19,120
doctors engineers

348
00:13:23,269 --> 00:13:21,440
veterinarians vegetarians that's right

349
00:13:24,389 --> 00:13:23,279
absolutely yes the backgrounds are all

350
00:13:26,629 --> 00:13:24,399
varied and

351
00:13:29,430 --> 00:13:26,639
and it seems that uh as we go further

352
00:13:32,629 --> 00:13:29,440
into exploration we'll there

353
00:13:36,150 --> 00:13:32,639
i'm sure the the um the possibilities

354
00:13:37,670 --> 00:13:36,160
are going to be even greater in terms of

355
00:13:45,189 --> 00:13:37,680
pathways to get here we'll need

356
00:13:50,150 --> 00:13:47,509
i'm will and my question is how does the

357
00:13:52,230 --> 00:13:50,160
iss communicate with er

358
00:13:54,870 --> 00:13:52,240
with earth and is it possible to use a

359
00:13:56,470 --> 00:13:54,880
cell phone while on board

360
00:13:58,389 --> 00:13:56,480
well well we

361
00:13:59,750 --> 00:13:58,399
communicate mainly through satellites we

362
00:14:01,990 --> 00:13:59,760
have uh

363
00:14:04,230 --> 00:14:02,000

satellite dishes on board the space

364
00:14:06,389 --> 00:14:04,240
station that send signals and receive

365
00:14:08,710 --> 00:14:06,399
signals to satellites that are uh

366
00:14:10,870 --> 00:14:08,720
deployed out in orbit with us

367
00:14:12,710 --> 00:14:10,880
and those beam the signals back down to

368
00:14:14,629 --> 00:14:12,720
the ground and that's that's mainly how

369
00:14:17,110 --> 00:14:14,639
we communicate

370
00:14:18,949 --> 00:14:17,120
we don't have cell phones on board and

371
00:14:20,550 --> 00:14:18,959
um if you brought your cell phone i

372
00:14:23,189 --> 00:14:20,560
don't think that you would uh have much

373
00:14:25,189 --> 00:14:23,199
luck with it i heard uh and i forget now

374
00:14:26,710 --> 00:14:25,199
is either chris hanfield or tom

375
00:14:28,470 --> 00:14:26,720
marshburn's a couple of days ago

376
00:14:31,509 --> 00:14:28,480
explained that we can't use cell phones

377
00:14:34,150 --> 00:14:31,519
because you're going too fast

378
00:14:36,710 --> 00:14:34,160
you're you are moving so fast that the

379
00:14:37,750 --> 00:14:36,720
signal can't get to cell phone towers it

380
00:14:39,590 --> 00:14:37,760
would

381
00:14:47,590 --> 00:14:39,600
you'd lose you'd lose the conversation

382
00:14:51,750 --> 00:14:49,750
my name is rebecca and what would happen

383
00:14:53,990 --> 00:14:51,760
if an astronaut got like sick or injured

384
00:14:55,430 --> 00:14:54,000
while they were on the space station

385
00:14:59,269 --> 00:14:55,440
well we take care of them that's for

386
00:15:01,750 --> 00:14:59,279
sure uh we have on each crew a person

387
00:15:03,829 --> 00:15:01,760
trained as the crew medical officer and

388
00:15:05,990 --> 00:15:03,839

we have supplies on board to take care

389
00:15:08,230 --> 00:15:06,000
of um you know

390
00:15:10,069 --> 00:15:08,240
someone that's ill and even

391
00:15:11,590 --> 00:15:10,079
with minor injuries

392
00:15:13,990 --> 00:15:11,600
if it was very serious we'd have to

393
00:15:16,790 --> 00:15:14,000
bring somebody home but uh we we are

394
00:15:18,230 --> 00:15:16,800
pretty well trained in fact uh those of

395
00:15:19,990 --> 00:15:18,240
us that are trained as the crew medical

396
00:15:21,509 --> 00:15:20,000
officers actually go and part of their

397
00:15:23,430 --> 00:15:21,519
training is to go into hospitals and

398
00:15:25,269 --> 00:15:23,440
emergency rooms and actually work on on

399
00:15:27,910 --> 00:15:25,279
patients there so we we take it

400
00:15:30,230 --> 00:15:27,920
seriously and and we get training to it

401
00:15:31,829 --> 00:15:30,240
to a degree that that prepares us for

402
00:15:33,670 --> 00:15:31,839
some of the um

403
00:15:35,269 --> 00:15:33,680
typical types of injuries that we would

404
00:15:36,949 --> 00:15:35,279
uh

405
00:15:39,829 --> 00:15:36,959
be susceptible to

406
00:15:47,829 --> 00:15:39,839
on board so cuts and sprains and and

407
00:15:52,069 --> 00:15:49,749
what is the hardest thing to adjust to

408
00:15:54,629 --> 00:15:52,079
in space

409
00:15:57,110 --> 00:15:54,639
oh the hardest thing well the the

410
00:16:00,150 --> 00:15:57,120
microgravity environment uh certainly

411
00:16:02,310 --> 00:16:00,160
does present a lot of challenges

412
00:16:04,389 --> 00:16:02,320
and i don't think anybody could dispute

413
00:16:06,310 --> 00:16:04,399

that learning how to go to the bathroom

414
00:16:11,749 --> 00:16:06,320
in space is probably one of the most

415
00:16:15,509 --> 00:16:13,030
you probably don't want me to describe

416
00:16:20,949 --> 00:16:17,509
hi i'm taylor and i was wondering how do

417
00:16:22,310 --> 00:16:20,959
astronauts keep the iss sanitary

418
00:16:23,590 --> 00:16:22,320
how did they oh how do they keep it

419
00:16:25,590 --> 00:16:23,600
sanitary

420
00:16:28,310 --> 00:16:25,600
good question uh that is so very

421
00:16:30,870 --> 00:16:28,320
important uh the way we keep it sanitary

422
00:16:32,389 --> 00:16:30,880
is by cleaning it and it's a job that we

423
00:16:33,430 --> 00:16:32,399
do every saturday

424
00:16:36,470 --> 00:16:33,440
and it

425
00:16:37,990 --> 00:16:36,480
involves vacuuming not just um not the

426
00:16:39,990 --> 00:16:38,000
typical kind of vacuuming that you do at

427
00:16:41,590 --> 00:16:40,000
home on the floor on the floor no we

428
00:16:43,509 --> 00:16:41,600
don't we don't do that what we do is

429
00:16:45,910 --> 00:16:43,519
that we have several vents and there's a

430
00:16:47,910 --> 00:16:45,920
lot of air circulating through the space

431
00:16:50,790 --> 00:16:47,920
station because things float

432
00:16:52,790 --> 00:16:50,800
they get picked up and then deposited

433
00:16:55,269 --> 00:16:52,800
onto filters and in order for us to

434
00:16:57,430 --> 00:16:55,279
maintain a good breathing quality we

435
00:16:59,350 --> 00:16:57,440
have to go and vacuum those off and it's

436
00:17:00,870 --> 00:16:59,360
much like the the vent in your dryer if

437
00:17:02,790 --> 00:17:00,880
you've ever cleaned lint off of there

438
00:17:05,990 --> 00:17:02,800

that's that's kind of the cleaning we do

439
00:17:07,750 --> 00:17:06,000
but also hand rails because on on orbit

440
00:17:09,669 --> 00:17:07,760
you float of course and you don't use

441
00:17:12,150 --> 00:17:09,679
your feet as much as you do here on the

442
00:17:14,069 --> 00:17:12,160
ground you use your hands and your hands

443
00:17:16,230 --> 00:17:14,079
are your way of moving around if you've

444
00:17:17,510 --> 00:17:16,240
ever seen video of astronauts on board

445
00:17:19,350 --> 00:17:17,520
the space station you see them moving

446
00:17:21,669 --> 00:17:19,360
around with their hands and we use our

447
00:17:23,270 --> 00:17:21,679
hands for everything and you know with

448
00:17:24,870 --> 00:17:23,280
the um

449
00:17:27,510 --> 00:17:24,880
you know touching our face eating our

450
00:17:29,350 --> 00:17:27,520
food doing our work and so

451
00:17:30,950 --> 00:17:29,360
we on a weekly basis make sure that all

452
00:17:34,870 --> 00:17:30,960
those hand rolls have been wiped down

453
00:17:34,880 --> 00:17:41,110
thank you

454
00:17:45,190 --> 00:17:43,270
how does the international space station

455
00:17:48,310 --> 00:17:45,200
stay in place and how does it have the

456
00:17:50,230 --> 00:17:48,320
ability to change its position in our

457
00:17:52,310 --> 00:17:50,240
in orbit

458
00:17:54,070 --> 00:17:52,320
well the way that we stay in place so i

459
00:17:55,990 --> 00:17:54,080
you know we're orbiting and and so how

460
00:17:58,789 --> 00:17:56,000
do we keep that that distance from the

461
00:18:01,190 --> 00:17:58,799
earth uh that is through a series of of

462
00:18:02,870 --> 00:18:01,200
we call them reboosts and

463
00:18:04,710 --> 00:18:02,880

so we have engines on board the space

464
00:18:06,789 --> 00:18:04,720
station as well as the vehicles that

465
00:18:09,430 --> 00:18:06,799
that do dock to it they have engines as

466
00:18:11,590 --> 00:18:09,440
well and sometimes we use those and we

467
00:18:13,510 --> 00:18:11,600
fire the engines for a precise amount of

468
00:18:15,909 --> 00:18:13,520
time and and

469
00:18:17,909 --> 00:18:15,919
in precise direction so that we can

470
00:18:19,430 --> 00:18:17,919
maintain the speed at which we're

471
00:18:21,270 --> 00:18:19,440
traveling around the earth and that's

472
00:18:24,230 --> 00:18:21,280
what helps keep us

473
00:18:26,390 --> 00:18:24,240
in place and uh we do that on a routine

474
00:18:27,669 --> 00:18:26,400
basis we call it a reboost

475
00:18:30,470 --> 00:18:27,679
and

476
00:18:32,710 --> 00:18:30,480
you get to that position because of the

477
00:18:35,270 --> 00:18:32,720
rocket that you launch on yes that get

478
00:18:37,909 --> 00:18:35,280
it has enough power from the launch that

479
00:18:40,070 --> 00:18:37,919
gets you to a point above the earth

480
00:18:43,669 --> 00:18:40,080
where the speed that you're going allows

481
00:18:45,909 --> 00:18:43,679
you to in essence just fall

482
00:18:47,909 --> 00:18:45,919
the space station is not going around

483
00:18:50,390 --> 00:18:47,919
the earth because it has an engine

484
00:18:52,789 --> 00:18:50,400
that's pushing it it's just falling in

485
00:18:53,909 --> 00:18:52,799
space but because it's it's at an

486
00:18:54,710 --> 00:18:53,919
altitude

487
00:18:56,710 --> 00:18:54,720
where

488
00:18:59,190 --> 00:18:56,720

the gravity of the earth doesn't pull it

489
00:19:01,270 --> 00:18:59,200
down at least not enough to to bring it

490
00:19:02,710 --> 00:19:01,280
down but it does come down slightly yeah

491
00:19:04,710 --> 00:19:02,720
and that's why you've got to reboost it

492
00:19:09,430 --> 00:19:04,720
to get it back up so that as it falls

493
00:19:09,440 --> 00:19:15,430
thank you

494
00:19:18,789 --> 00:19:17,270
um what was the worst problem

495
00:19:20,870 --> 00:19:18,799
encountered on the international

496
00:19:24,630 --> 00:19:20,880
international space station and how did

497
00:19:26,950 --> 00:19:24,640
the mission control team solve it

498
00:19:29,270 --> 00:19:26,960
well during the time i was there i would

499
00:19:30,789 --> 00:19:29,280
say that the worst was when our pump

500
00:19:33,270 --> 00:19:30,799
module failed

501
00:19:35,669 --> 00:19:33,280
this is a a piece of equipment that is

502
00:19:37,990 --> 00:19:35,679
located outside the space station on our

503
00:19:41,990 --> 00:19:38,000
on our what's called the truss segment

504
00:19:43,590 --> 00:19:42,000
and it circulates ammonia uh through the

505
00:19:45,350 --> 00:19:43,600
through lines that go into the space

506
00:19:47,830 --> 00:19:45,360
state or go around the space station and

507
00:19:49,669 --> 00:19:47,840
it helps to keep the space station

508
00:19:51,110 --> 00:19:49,679
cool and and all the equipment that we

509
00:19:53,750 --> 00:19:51,120
have there generates a lot of heat so

510
00:19:55,669 --> 00:19:53,760
this is very very important one of those

511
00:19:58,549 --> 00:19:55,679
broke on board the space station and

512
00:20:00,710 --> 00:19:58,559
that's why myself and my my partner doug

513
00:20:03,350 --> 00:20:00,720

wheelock had to go outside and do a

514
00:20:05,750 --> 00:20:03,360
couple of space walks to

515
00:20:07,990 --> 00:20:05,760
remove it and put in place a brand new

516
00:20:10,470 --> 00:20:08,000
pump module and uh

517
00:20:12,710 --> 00:20:10,480
i think that was by far the

518
00:20:14,870 --> 00:20:12,720
the worst thing that that happened i i'd

519
00:20:16,710 --> 00:20:14,880
agree from our from from our point of

520
00:20:18,870 --> 00:20:16,720
view down here yeah that was that was

521
00:20:20,789 --> 00:20:18,880
the most dramatic thing that that

522
00:20:22,789 --> 00:20:20,799
occurred during your time up there that

523
00:20:24,950 --> 00:20:22,799
uh caused a response

524
00:20:27,270 --> 00:20:24,960
on the ground from a lot of people who

525
00:20:29,350 --> 00:20:27,280
first had to realize what had happened

526
00:20:31,350 --> 00:20:29,360
and then second realized what needed to

527
00:20:33,830 --> 00:20:31,360
be do to fix what needed to be done to

528
00:20:35,830 --> 00:20:33,840
fix it and then plan the spacewalk for

529
00:20:38,549 --> 00:20:35,840
tracy and doug to go out and make those

530
00:20:42,549 --> 00:20:38,559
repairs so it uh it was it was exciting

531
00:20:42,559 --> 00:20:47,750
thank you

532
00:20:53,750 --> 00:20:49,669
how can the iss be used for

533
00:20:56,950 --> 00:20:54,549
well

534
00:20:59,190 --> 00:20:56,960
because the space station stays in in

535
00:21:01,110 --> 00:20:59,200
one place in orbit uh we wouldn't be

536
00:21:03,430 --> 00:21:01,120
taking it to another planet but

537
00:21:05,110 --> 00:21:03,440
certainly the way it can be used is all

538
00:21:07,110 --> 00:21:05,120

of the science that we're doing on board

539
00:21:08,870 --> 00:21:07,120
and not just science but the operations

540
00:21:10,630 --> 00:21:08,880
and the coordinating that we're doing

541
00:21:12,470 --> 00:21:10,640
not just here with this mission control

542
00:21:15,190 --> 00:21:12,480
but all the mission controls

543
00:21:17,909 --> 00:21:15,200
are is teaching us how to go beyond low

544
00:21:19,510 --> 00:21:17,919
earth orbit to other planets and so i

545
00:21:22,070 --> 00:21:19,520
would say that

546
00:21:24,950 --> 00:21:22,080
that's how we're using it is we're using

547
00:21:26,789 --> 00:21:24,960
it to learn about space

548
00:21:28,789 --> 00:21:26,799
living in space which is what we'll have

549
00:21:31,669 --> 00:21:28,799
to do when we go

550
00:21:33,990 --> 00:21:31,679
to other planets and uh how we can adapt

551
00:21:35,190 --> 00:21:34,000
and how we can get back safely i would

552
00:21:37,590 --> 00:21:35,200
say

553
00:21:39,190 --> 00:21:37,600
you could push it out of orbit and and

554
00:21:41,110 --> 00:21:39,200
head it off in a direction but it's not

555
00:21:42,870 --> 00:21:41,120
designed for any trip like that and it

556
00:21:45,029 --> 00:21:42,880
wouldn't be very wouldn't be a very good

557
00:21:47,750 --> 00:21:45,039
way to make the trip but it is helping

558
00:21:50,789 --> 00:21:47,760
us learn how to design spacecraft that

559
00:21:53,190 --> 00:21:50,799
can make that trip yeah and components

560
00:21:54,950 --> 00:21:53,200
of the spacecraft in fact one of the

561
00:21:57,270 --> 00:21:54,960
science experiments i remember doing on

562
00:21:58,870 --> 00:21:57,280
orbit was looking at

563
00:21:59,830 --> 00:21:58,880

fuel tank designs

564
00:22:01,350 --> 00:21:59,840
because

565
00:22:04,470 --> 00:22:01,360
you know it's not like here on earth

566
00:22:05,669 --> 00:22:04,480
where you can rely on gravity to pull

567
00:22:07,029 --> 00:22:05,679
fuel

568
00:22:09,590 --> 00:22:07,039
into the engine

569
00:22:11,830 --> 00:22:09,600
it takes a little bit of cleverness and

570
00:22:13,909 --> 00:22:11,840
so we we use the space station to learn

571
00:22:16,230 --> 00:22:13,919
what what is the best design for a fuel

572
00:22:16,240 --> 00:22:21,669
one more question

573
00:22:25,350 --> 00:22:23,830
hi um do astronauts require more food

574
00:22:28,070 --> 00:22:25,360
well in space and about how many pounds

575
00:22:29,350 --> 00:22:28,080
of food is on the iss

576
00:22:31,430 --> 00:22:29,360
what was the first part of that question

577
00:22:33,430 --> 00:22:31,440
do astronauts require more food while

578
00:22:34,390 --> 00:22:33,440
we're in space

579
00:22:36,149 --> 00:22:34,400
oh

580
00:22:37,510 --> 00:22:36,159
you know i think that varies with each

581
00:22:39,510 --> 00:22:37,520
crew member

582
00:22:42,070 --> 00:22:39,520
i would say that yes i mean just like it

583
00:22:43,430 --> 00:22:42,080
does here on the ground and uh i would

584
00:22:44,950 --> 00:22:43,440
say that

585
00:22:46,470 --> 00:22:44,960
when you first get there you might not

586
00:22:48,310 --> 00:22:46,480
be so hungry but when you start to get

587
00:22:50,549 --> 00:22:48,320
into the swing of things then your

588
00:22:51,990 --> 00:22:50,559

appetite certainly is uh is pretty

589
00:22:53,510 --> 00:22:52,000
normal

590
00:22:54,470 --> 00:22:53,520
so i would say for the most part people

591
00:22:56,070 --> 00:22:54,480
don't don't

592
00:22:58,710 --> 00:22:56,080
tend to eat more but

593
00:23:00,950 --> 00:22:58,720
we're all different and how many pounds

594
00:23:02,710 --> 00:23:00,960
of food are up there i i do not know

595
00:23:03,510 --> 00:23:02,720
what that number is but what i can tell

596
00:23:07,270 --> 00:23:03,520
you

597
00:23:09,830 --> 00:23:07,280
is that each each crew stays on orbit

598
00:23:10,789 --> 00:23:09,840
just a couple weeks shy of six months

599
00:23:12,870 --> 00:23:10,799
and

600
00:23:15,590 --> 00:23:12,880
there's enough food for them to eat not

601
00:23:17,750 --> 00:23:15,600
only breakfast lunch and dinner every

602
00:23:19,990 --> 00:23:17,760
single day but there's also snacks up

603
00:23:24,070 --> 00:23:20,000
there and drinks and and that's not just

604
00:23:26,070 --> 00:23:24,080
for the the crew that's on orbit at this

605
00:23:28,230 --> 00:23:26,080
time but we also state we call it

606
00:23:29,990 --> 00:23:28,240
staging food we put food in place for

607
00:23:31,590 --> 00:23:30,000
the next increment so that it's there

608
00:23:33,750 --> 00:23:31,600
well in advance of them showing up so i

609
00:23:35,430 --> 00:23:33,760
would say there is a lot of food there's

610
00:23:37,510 --> 00:23:35,440
hundreds and hundreds of pounds of it

611
00:23:40,149 --> 00:23:37,520
and there are and there's more launching

612
00:23:42,230 --> 00:23:40,159
tomorrow morning there's a cargo ship

613
00:23:44,310 --> 00:23:42,240

that's launching from florida uh just

614
00:23:47,110 --> 00:23:44,320
after nine o'clock houston time tomorrow

615
00:23:49,669 --> 00:23:47,120
morning and it's got 1200 pounds of

616
00:23:52,710 --> 00:23:49,679
supplies and a big piece of that is food

617
00:23:54,870 --> 00:23:52,720
food's very important on orbit

618
00:23:57,029 --> 00:23:54,880
well thank you so much for joining us

619
00:23:58,310 --> 00:23:57,039
and of today and we appreciate it