
PAO

1
00:00:06,789 --> 00:00:04,309
well greetings everybody welcome to

2
00:00:08,549 --> 00:00:06,799
mission control houston this is the

3
00:00:11,430 --> 00:00:08,559
international space station's flight

4
00:00:13,270 --> 00:00:11,440
control room uh this is basically the

5
00:00:15,030 --> 00:00:13,280
nerve center for all the activities that

6
00:00:17,750 --> 00:00:15,040
go on aboard the international space

7
00:00:19,590 --> 00:00:17,760
station so a team of flight controllers

8
00:00:22,150 --> 00:00:19,600
here looks over all the systems around

9
00:00:24,150 --> 00:00:22,160
the clock of the crew members that are

10
00:00:24,790 --> 00:00:24,160
on board the international space station

11
00:00:27,109 --> 00:00:24,800
and

12
00:00:28,390 --> 00:00:27,119
each one of the positions in here

13
00:00:30,630 --> 00:00:28,400

monitors

14
00:00:32,229 --> 00:00:30,640
systems different systems to make sure

15
00:00:35,430 --> 00:00:32,239
they're operating well aboard the

16
00:00:38,229 --> 00:00:35,440
complex so we're real happy to

17
00:00:40,790 --> 00:00:38,239
have you guys in pennsylvania at the

18
00:00:42,950 --> 00:00:40,800
corpus christi school join us today here

19
00:00:44,709 --> 00:00:42,960
in mission control and also we have an

20
00:00:46,389 --> 00:00:44,719
expert in one of those systems joining

21
00:00:49,190 --> 00:00:46,399
us jeff baisley

22
00:00:50,950 --> 00:00:49,200
jeff is an expert in

23
00:00:52,869 --> 00:00:50,960
basically all of the systems associated

24
00:00:54,470 --> 00:00:52,879
with the environmental control the life

25
00:00:56,709 --> 00:00:54,480
support systems

26
00:00:59,189 --> 00:00:56,719
aboard the station so

27
00:01:00,869 --> 00:00:59,199
welcome to pennsylvania and also welcome

28
00:01:09,750 --> 00:01:00,879
jeff thanks for joining us and we're

29
00:01:14,870 --> 00:01:12,870
um my name's carson what are some of the

30
00:01:16,070 --> 00:01:14,880
decisions the flight director has to

31
00:01:17,510 --> 00:01:16,080
make

32
00:01:19,830 --> 00:01:17,520
well that's probably a good one for

33
00:01:22,390 --> 00:01:19,840
jesse because he works directly with the

34
00:01:23,990 --> 00:01:22,400
flight director all the time yes the

35
00:01:26,230 --> 00:01:24,000
flight director does have a very

36
00:01:28,789 --> 00:01:26,240
important job here as you know the the

37
00:01:30,230 --> 00:01:28,799
flight director is kind of the boss when

38
00:01:32,390 --> 00:01:30,240

we're in here

39
00:01:34,950 --> 00:01:32,400
one of the big things that he monitors

40
00:01:36,390 --> 00:01:34,960
is actually the

41
00:01:38,310 --> 00:01:36,400
timing of everything that happens

42
00:01:39,910 --> 00:01:38,320
onboard the space station so

43
00:01:42,310 --> 00:01:39,920
his job is to make sure that we're we're

44
00:01:43,990 --> 00:01:42,320
meeting the objectives of the day um

45
00:01:46,310 --> 00:01:44,000
sometimes you have to we prioritize

46
00:01:48,389 --> 00:01:46,320
things uh we never like when things go

47
00:01:49,830 --> 00:01:48,399
wrong but uh you know definitely

48
00:01:51,190 --> 00:01:49,840
sometimes maintenance doesn't go right

49
00:01:52,789 --> 00:01:51,200
and so then we need to reshuffle

50
00:01:54,789 --> 00:01:52,799
everything and make sure everything's

51
00:01:57,030 --> 00:01:54,799
correct and of course you know he's in

52
00:01:59,350 --> 00:01:57,040
charge if we get into a

53
00:02:00,389 --> 00:01:59,360
a bind with activities on the system

54
00:02:09,190 --> 00:02:00,399
side

55
00:02:14,229 --> 00:02:12,229
um my name is max and what do you think

56
00:02:16,550 --> 00:02:14,239
is the most important role in mission

57
00:02:17,510 --> 00:02:16,560
control and why

58
00:02:18,390 --> 00:02:17,520
ours

59
00:02:20,790 --> 00:02:18,400
yeah

60
00:02:22,390 --> 00:02:20,800
that's a great question um you know

61
00:02:25,030 --> 00:02:22,400
mission control is a team

62
00:02:26,710 --> 00:02:25,040
so it's hard to pick one wall um but and

63
00:02:28,309 --> 00:02:26,720

you know i'm a little biased but i think

64
00:02:31,030 --> 00:02:28,319
the systems controllers are the ones

65
00:02:32,470 --> 00:02:31,040
that have the most important job so of

66
00:02:33,990 --> 00:02:32,480
course we have

67
00:02:37,030 --> 00:02:34,000
all the different systems on board the

68
00:02:39,430 --> 00:02:37,040
thermal control power attitude control

69
00:02:41,509 --> 00:02:39,440
my system life support i've also got

70
00:02:43,990 --> 00:02:41,519
that command data handling and

71
00:02:45,750 --> 00:02:44,000
a way to communicate with the vehicle

72
00:02:47,670 --> 00:02:45,760
there's also the ground controller who

73
00:02:50,949 --> 00:02:47,680
kind of make sure that everything works

74
00:02:54,550 --> 00:02:50,959
from the vehicle down here and so the

75
00:02:55,350 --> 00:02:54,560
everybody on that list are here 24 7 365

76
00:03:09,830 --> 00:02:55,360
and

77
00:03:12,070 --> 00:03:09,840
before the iss program is over

78
00:03:13,750 --> 00:03:12,080
and that's a very good question um you

79
00:03:16,470 --> 00:03:13,760
know definitely something that we're

80
00:03:19,990 --> 00:03:16,480
thinking about here different habitats i

81
00:03:23,190 --> 00:03:20,000
know that the iss is definitely a big

82
00:03:25,110 --> 00:03:23,200
promoter of uh going forward to create a

83
00:03:26,630 --> 00:03:25,120
new habitat there's a lot of systems on

84
00:03:29,030 --> 00:03:26,640
board that we're testing

85
00:03:30,550 --> 00:03:29,040
um you know especially in my system life

86
00:03:32,710 --> 00:03:30,560
support you know we have a lot of water

87
00:03:34,309 --> 00:03:32,720
systems a lot of air regeneration

88
00:03:36,470 --> 00:03:34,319

systems and so by testing them in low

89
00:03:38,630 --> 00:03:36,480
earth or low earth orbit

90
00:03:40,869 --> 00:03:38,640
while we can actually fix things but

91
00:03:42,710 --> 00:03:40,879
before we go farther

92
00:03:44,470 --> 00:03:42,720
it's definitely a big priority and

93
00:03:49,350 --> 00:03:44,480
making sure that we get all the bugs out

94
00:03:53,350 --> 00:03:51,589
hi my name's spencer

95
00:03:55,429 --> 00:03:53,360
working in mission control must be

96
00:03:57,750 --> 00:03:55,439
stressful what do you do to help relieve

97
00:04:00,470 --> 00:03:57,760
your stress

98
00:04:03,270 --> 00:04:00,480
yeah that's a great question um you know

99
00:04:04,869 --> 00:04:03,280
it the the hours uh definitely play on

100
00:04:06,710 --> 00:04:04,879
us a lot as i mentioned uh system

101
00:04:08,869 --> 00:04:06,720
controllers we're here 36

102
00:04:10,789 --> 00:04:08,879
24 7 365 so

103
00:04:12,949 --> 00:04:10,799
um of course i'm not here all the time

104
00:04:15,030 --> 00:04:12,959
but uh you know different shifts and the

105
00:04:17,110 --> 00:04:15,040
night shift is a particularly tough one

106
00:04:19,509 --> 00:04:17,120
but to kind of relieve some of that

107
00:04:21,670 --> 00:04:19,519
stress you know a lot of people do

108
00:04:23,670 --> 00:04:21,680
exercise so i know people in my group

109
00:04:26,310 --> 00:04:23,680
some of them win marathons

110
00:04:28,150 --> 00:04:26,320
so they definitely love to exercise

111
00:04:29,590 --> 00:04:28,160
the big thing is just making sure that

112
00:04:31,990 --> 00:04:29,600
you have an activity outside of work

113
00:04:34,310 --> 00:04:32,000

that that you can do that

114
00:04:37,189 --> 00:04:34,320
is important and you can look forward to

115
00:04:39,830 --> 00:04:37,199
after work so for me um i'm on a canine

116
00:04:41,909 --> 00:04:39,840
search team with my dog and so we get to

117
00:04:43,830 --> 00:04:41,919
go out and do a lot of training

118
00:04:45,110 --> 00:04:43,840
and go out and do things and so

119
00:04:47,430 --> 00:04:45,120
definitely something i look forward to

120
00:04:49,270 --> 00:04:47,440
out at work i think yeah i think

121
00:04:51,189 --> 00:04:49,280
having a balanced lifestyle even for you

122
00:04:53,430 --> 00:04:51,199
guys you know when you're when you're

123
00:04:55,189 --> 00:04:53,440
done with school every day you you

124
00:04:56,790 --> 00:04:55,199
certainly don't think about school all

125
00:04:58,469 --> 00:04:56,800
the time but you do your homework and

126
00:05:00,950 --> 00:04:58,479
those type of things the same thing for

127
00:05:02,870 --> 00:05:00,960
folks in here is you know when you get

128
00:05:04,469 --> 00:05:02,880
off work you you try to get away from

129
00:05:05,510 --> 00:05:04,479
work for a little while and

130
00:05:15,189 --> 00:05:05,520
and

131
00:05:19,510 --> 00:05:17,590
hi i'm anna claire

132
00:05:21,510 --> 00:05:19,520
what was your most exciting moment in

133
00:05:23,110 --> 00:05:21,520
mission control

134
00:05:26,150 --> 00:05:23,120
well there's lots of exciting moments

135
00:05:28,150 --> 00:05:26,160
here um i know personally for me uh one

136
00:05:30,390 --> 00:05:28,160
of the most exciting ones was actually

137
00:05:32,390 --> 00:05:30,400
working control for the first time um

138
00:05:35,189 --> 00:05:32,400

you know the way that we train uh we

139
00:05:37,270 --> 00:05:35,199
start in the back room uh so not here in

140
00:05:38,629 --> 00:05:37,280
the bicker but in the back room and so

141
00:05:40,950 --> 00:05:38,639
sending your first command in a real

142
00:05:42,950 --> 00:05:40,960
vehicle it's quite a quite an exciting

143
00:05:44,310 --> 00:05:42,960
moment i actually have printed out my

144
00:05:45,590 --> 00:05:44,320
desk the first command i sent to the

145
00:05:47,670 --> 00:05:45,600
space station

146
00:05:49,270 --> 00:05:47,680
another exciting thing for me i was

147
00:05:51,990 --> 00:05:49,280
working my first shuttle mission here in

148
00:05:54,230 --> 00:05:52,000
the front room so i worked at sts-134

149
00:05:55,430 --> 00:05:54,240
that's the last flight of endeavor and i

150
00:05:57,510 --> 00:05:55,440
actually worked the orbit one shift

151
00:05:59,510 --> 00:05:57,520
which is the shift where um the shuttle

152
00:06:01,430 --> 00:05:59,520
was docking so it's cool you know

153
00:06:02,950 --> 00:06:01,440
looking up on the big boat and seeing

154
00:06:05,510 --> 00:06:02,960
seeing the shuttle come in for the last

155
00:06:06,469 --> 00:06:05,520
time for endeavor and you know watching

156
00:06:09,029 --> 00:06:06,479
all that

157
00:06:13,350 --> 00:06:09,039
it's definitely a real surreal feeling

158
00:06:18,950 --> 00:06:16,150
hi my name is clara and i would like to

159
00:06:20,390 --> 00:06:18,960
know what is capcom's most important job

160
00:06:23,029 --> 00:06:20,400
that they need to do

161
00:06:25,029 --> 00:06:23,039
well okay capcom as you know is uh is

162
00:06:27,270 --> 00:06:25,039
the only one that talks directly to the

163
00:06:28,870 --> 00:06:27,280

crew on a day-to-day basis so

164
00:06:30,469 --> 00:06:28,880
one of their most important jobs is

165
00:06:32,710 --> 00:06:30,479
actually translating what what i tell

166
00:06:34,629 --> 00:06:32,720
them into krewe speak

167
00:06:37,350 --> 00:06:34,639
so you know we talk on the loops with

168
00:06:39,029 --> 00:06:37,360
lots of acronyms lots of system uh

169
00:06:41,430 --> 00:06:39,039
issues that we're working and then

170
00:06:42,950 --> 00:06:41,440
capcom takes all those and packages it

171
00:06:45,909 --> 00:06:42,960
so the crew we only talk to the crew

172
00:06:47,590 --> 00:06:45,919
once about a certain issue but also

173
00:06:49,990 --> 00:06:47,600
making sure that it's clear it's clear

174
00:06:51,909 --> 00:06:50,000
for the crew you know sometimes

175
00:06:53,830 --> 00:06:51,919
sometimes we spit out a lot of words and

176
00:06:55,909 --> 00:06:53,840
they make sense to us but it may not

177
00:06:57,510 --> 00:06:55,919
make sense to the crew so

178
00:07:03,670 --> 00:06:57,520
that's definitely one of the probably

179
00:07:07,830 --> 00:07:05,510
hi i'm emma mauer

180
00:07:10,070 --> 00:07:07,840
and um my question is does mission

181
00:07:12,070 --> 00:07:10,080
control control everything or just

182
00:07:14,390 --> 00:07:12,080
control some things or do you control

183
00:07:17,189 --> 00:07:14,400
nothing or do you just

184
00:07:19,670 --> 00:07:17,199
and monitor all of the time well that's

185
00:07:20,710 --> 00:07:19,680
a good question because um

186
00:07:22,950 --> 00:07:20,720
obviously

187
00:07:25,670 --> 00:07:22,960
mission control is very integral to

188
00:07:28,070 --> 00:07:25,680

what's going on up in space and i think

189
00:07:30,550 --> 00:07:28,080
the crew relies heavily on that and then

190
00:07:32,230 --> 00:07:30,560
jesse can probably elaborate yeah you'd

191
00:07:34,230 --> 00:07:32,240
probably be amazed to learn that you

192
00:07:36,629 --> 00:07:34,240
know we send thousands of commands every

193
00:07:38,710 --> 00:07:36,639
day to the space station between us here

194
00:07:40,390 --> 00:07:38,720
as well as as well of our international

195
00:07:43,029 --> 00:07:40,400
partners around the world

196
00:07:46,230 --> 00:07:43,039
and so those those commands controller

197
00:07:48,629 --> 00:07:46,240
systems also in in marshall space flight

198
00:07:51,029 --> 00:07:48,639
center they say they send commands to do

199
00:07:53,029 --> 00:07:51,039
the payload operations so

200
00:07:55,029 --> 00:07:53,039
the advantage of doing that

201
00:07:55,909 --> 00:07:55,039
from the ground is it frees up the crew

202
00:07:58,309 --> 00:07:55,919
to

203
00:07:59,830 --> 00:07:58,319
do other activities that we can't do for

204
00:08:01,270 --> 00:07:59,840
instance payload ops which i think you

205
00:08:03,270 --> 00:08:01,280
see in the background

206
00:08:06,230 --> 00:08:03,280
dawn doing payloads

207
00:08:07,990 --> 00:08:06,240
they change out payloads all the time

208
00:08:09,670 --> 00:08:08,000
also any maintenance test so if

209
00:08:12,070 --> 00:08:09,680
something fails we need them to put

210
00:08:12,869 --> 00:08:12,080
their hands on the hardware and fix it

211
00:08:14,869 --> 00:08:12,879
so

212
00:08:17,350 --> 00:08:14,879
by controlling all the systems down here

213
00:08:19,350 --> 00:08:17,360

it gives gives the crew the ability to

214
00:08:23,670 --> 00:08:19,360
get more tasks done

215
00:08:26,390 --> 00:08:25,589
hi my name is rube

216
00:08:30,390 --> 00:08:26,400
and

217
00:08:32,550 --> 00:08:30,400
how long is the iss gonna be in space

218
00:08:34,790 --> 00:08:32,560
that's a great question yeah

219
00:08:36,949 --> 00:08:34,800
i think right now we're um we're

220
00:08:38,550 --> 00:08:36,959
approved to go through 2020

221
00:08:40,709 --> 00:08:38,560
so that's in

222
00:08:42,389 --> 00:08:40,719
eight years now um however we're

223
00:08:45,910 --> 00:08:42,399
currently working on extending that to

224
00:08:47,829 --> 00:08:45,920
2027 i believe um the the big

225
00:08:49,269 --> 00:08:47,839
long pole in that is obviously the the

226
00:08:50,550 --> 00:08:49,279
structure itself

227
00:08:53,509 --> 00:08:50,560
so iss

228
00:08:55,590 --> 00:08:53,519
first flew in 1998. so it's already been

229
00:08:57,750 --> 00:08:55,600
up there for for several years

230
00:09:00,790 --> 00:08:57,760
and a lot of the systems on board and

231
00:09:01,829 --> 00:09:00,800
the structure itself is getting old so

232
00:09:03,110 --> 00:09:01,839
that's one of the challenges we're

233
00:09:04,790 --> 00:09:03,120
looking at is

234
00:09:06,949 --> 00:09:04,800
seeing how much margin we still have to

235
00:09:08,710 --> 00:09:06,959
be able to get that far

236
00:09:10,630 --> 00:09:08,720
and of course all the all the spare

237
00:09:12,949 --> 00:09:10,640
parts you know we don't like it when

238
00:09:18,470 --> 00:09:12,959

things fail but things do fail so all

239
00:09:22,630 --> 00:09:21,110
hi my name is madeline cardinale what

240
00:09:25,350 --> 00:09:22,640
kind of qualities and previous

241
00:09:27,190 --> 00:09:25,360
experiences do you have that you feel

242
00:09:28,470 --> 00:09:27,200
really benefit your career working in

243
00:09:31,350 --> 00:09:28,480
mission control

244
00:09:33,350 --> 00:09:31,360
well my my back room background is as a

245
00:09:35,750 --> 00:09:33,360
chemical engineer so i received my

246
00:09:37,910 --> 00:09:35,760
bachelor's in chemical engineering

247
00:09:39,590 --> 00:09:37,920
and so an engineering math science

248
00:09:40,470 --> 00:09:39,600
background is very important to working

249
00:09:45,269 --> 00:09:40,480
here

250
00:09:47,350 --> 00:09:45,279
never never taking

251
00:09:48,470 --> 00:09:47,360
what's told to you for granted you know

252
00:09:51,509 --> 00:09:48,480
we always

253
00:09:53,910 --> 00:09:51,519
strive to understand the why and the

254
00:09:55,110 --> 00:09:53,920
what what is going on you know look at

255
00:09:58,470 --> 00:09:55,120
look deeper

256
00:10:00,870 --> 00:09:58,480
and that's all all on our own accord so

257
00:10:02,949 --> 00:10:00,880
definitely uh you need to be

258
00:10:05,269 --> 00:10:02,959
forward thinking you know always asking

259
00:10:07,269 --> 00:10:05,279
what's the next thing and

260
00:10:09,590 --> 00:10:07,279
delving deeper on your own into whatever

261
00:10:11,350 --> 00:10:09,600
you're looking at so um you know your

262
00:10:13,269 --> 00:10:11,360
science experiments in school uh you

263
00:10:15,269 --> 00:10:13,279

know definitely trying to understand

264
00:10:16,550 --> 00:10:15,279
understand it more uh it definitely

265
00:10:22,230 --> 00:10:16,560
helps

266
00:10:28,389 --> 00:10:25,750
hi my name is patrick and my question is

267
00:10:31,509 --> 00:10:28,399
who started mission control in what year

268
00:10:36,630 --> 00:10:34,230
that's a good question yeah um well it

269
00:10:38,790 --> 00:10:36,640
goes way back actually the very first

270
00:10:41,590 --> 00:10:38,800
mission control was not even here it was

271
00:10:44,069 --> 00:10:41,600
down in florida when uh the first united

272
00:10:46,389 --> 00:10:44,079
space astronauts were launched and then

273
00:10:48,470 --> 00:10:46,399
there was a decision made to build this

274
00:10:50,790 --> 00:10:48,480
facility this of course this room has

275
00:10:54,389 --> 00:10:50,800
been changed from what it was in the

276
00:10:56,949 --> 00:10:54,399
early uh gemini days gemini was when two

277
00:10:59,350 --> 00:10:56,959
astronauts flew on capsules and that was

278
00:11:03,590 --> 00:10:59,360
when it first opened it was back in this

279
00:11:05,190 --> 00:11:03,600
room back in 1964 65 time frame during

280
00:11:07,829 --> 00:11:05,200
the early days before we even went to

281
00:11:10,310 --> 00:11:07,839
the moon and it's transitioned a little

282
00:11:12,150 --> 00:11:10,320
bit for space shuttle and then now most

283
00:11:13,590 --> 00:11:12,160
recently to the room that you see here

284
00:11:15,829 --> 00:11:13,600
which is

285
00:11:19,110 --> 00:11:15,839
much more modernized with better

286
00:11:20,710 --> 00:11:19,120
technology in terms of the consoles and

287
00:11:22,069 --> 00:11:20,720
human factors were involved in that

288
00:11:23,509 --> 00:11:22,079

right jesse that

289
00:11:24,790 --> 00:11:23,519
you know they took that into account

290
00:11:26,230 --> 00:11:24,800
because they knew that flight

291
00:11:28,550 --> 00:11:26,240
controllers would be in here for long

292
00:11:30,630 --> 00:11:28,560
periods of time as opposed to what they

293
00:11:32,310 --> 00:11:30,640
were you know back in early days for

294
00:11:34,710 --> 00:11:32,320
long missions like this space station

295
00:11:37,269 --> 00:11:34,720
right yes that's that's true um you know

296
00:11:39,350 --> 00:11:37,279
we're also looking forward so we have in

297
00:11:41,110 --> 00:11:39,360
testing right now um the next mission

298
00:11:43,590 --> 00:11:41,120
control so what that's going to look

299
00:11:45,269 --> 00:11:43,600
like for the orion project

300
00:11:47,509 --> 00:11:45,279
and you know that's definitely

301
00:11:49,829 --> 00:11:47,519
continuing to modernize the system but

302
00:11:51,670 --> 00:11:49,839
also uh the human factors part of it and

303
00:11:53,750 --> 00:11:51,680
you know we've learned things

304
00:11:55,590 --> 00:11:53,760
here in picker one that you know we we

305
00:11:56,710 --> 00:11:55,600
can improve on and so we're improving

306
00:11:59,190 --> 00:11:56,720
those

307
00:12:00,710 --> 00:11:59,200
it's definitely changed over the years

308
00:12:02,230 --> 00:12:00,720
and it's amazing to look at the pictures

309
00:12:04,949 --> 00:12:02,240
around here what what it used to look

310
00:12:10,230 --> 00:12:04,959
like and what it now looks like yeah

311
00:12:16,230 --> 00:12:12,550
hi my name is elizabeth and what do you

312
00:12:18,790 --> 00:12:16,240
think is the coolest feature on the iss

313
00:12:21,190 --> 00:12:18,800

the the coolest feature um

314
00:12:23,190 --> 00:12:21,200
well i i definitely say from from the

315
00:12:25,990 --> 00:12:23,200
crew's perspective it's the cupola so

316
00:12:27,990 --> 00:12:26,000
the cupola is basically a bay of windows

317
00:12:29,430 --> 00:12:28,000
and it faces the earth so

318
00:12:31,509 --> 00:12:29,440
you've probably seen a lot of the really

319
00:12:33,190 --> 00:12:31,519
cool pictures that they've sent down

320
00:12:36,790 --> 00:12:33,200
also the cool video

321
00:12:38,389 --> 00:12:36,800
from sunrise sunset during the day

322
00:12:41,590 --> 00:12:38,399
even during the night they've

323
00:12:44,310 --> 00:12:41,600
taken video of night passes and so it's

324
00:12:47,430 --> 00:12:44,320
definitely cool looking out the window

325
00:12:50,150 --> 00:12:47,440
my perspective i'm a systems guy so

326
00:12:51,829 --> 00:12:50,160
i have interesting uh interesting

327
00:12:53,670 --> 00:12:51,839
modules with systems but that's

328
00:13:01,030 --> 00:12:53,680
obviously not something that other

329
00:13:05,990 --> 00:13:03,990
hi my name is kira and my question is

330
00:13:07,190 --> 00:13:06,000
about how many times a day does mission

331
00:13:09,750 --> 00:13:07,200
control

332
00:13:11,829 --> 00:13:09,760
lose connection with the iss

333
00:13:13,829 --> 00:13:11,839
that's actually a great question um we

334
00:13:16,949 --> 00:13:13,839
have an area called the zone of

335
00:13:19,110 --> 00:13:16,959
exclusion um and that's usually about

336
00:13:20,870 --> 00:13:19,120
every 90 minutes that we lose come calm

337
00:13:22,150 --> 00:13:20,880
the vehicle it's usually about 10

338
00:13:24,629 --> 00:13:22,160

minutes long

339
00:13:26,310 --> 00:13:24,639
that gives us a time to take a break

340
00:13:27,990 --> 00:13:26,320
while while the crew

341
00:13:28,790 --> 00:13:28,000
continues

342
00:13:32,629 --> 00:13:28,800
the

343
00:13:35,509 --> 00:13:32,639
close that gap if we need to

344
00:13:37,190 --> 00:13:35,519
so usually doing critical ops so

345
00:13:40,310 --> 00:13:37,200
say a vehicle's coming

346
00:13:42,870 --> 00:13:40,320
robotics ebas things like that we we can

347
00:13:45,189 --> 00:13:42,880
ask the network to give us more time and

348
00:13:47,030 --> 00:13:45,199
so at that time we usually have all the

349
00:13:48,230 --> 00:13:47,040
time that we want

350
00:13:50,310 --> 00:13:48,240
but we still have what's called a

351
00:13:52,790 --> 00:13:50,320
handover time which is about 20 seconds

352
00:13:54,629 --> 00:13:52,800
where our antennas need to go from one

353
00:13:56,550 --> 00:13:54,639
angle to another to pick up another

354
00:13:59,030 --> 00:13:56,560
satellite so those those are actually

355
00:14:05,110 --> 00:13:59,040
fairly common

356
00:14:11,829 --> 00:14:07,990
hello my name is anna carmina how do you

357
00:14:14,310 --> 00:14:11,839
get the medications to the astronauts

358
00:14:17,350 --> 00:14:14,320
that's that's a great question um the

359
00:14:19,430 --> 00:14:17,360
obviously the medication is provided

360
00:14:21,430 --> 00:14:19,440
via visiting vehicles so it's on board

361
00:14:22,629 --> 00:14:21,440
we don't in real time

362
00:14:24,389 --> 00:14:22,639
send it to them

363
00:14:25,670 --> 00:14:24,399

we do have a console called the surgeon

364
00:14:26,629 --> 00:14:25,680
console

365
00:14:32,230 --> 00:14:26,639
they

366
00:14:35,110 --> 00:14:32,240
worked with the crew for many years as

367
00:14:35,990 --> 00:14:35,120
they've gone through training and so

368
00:14:45,590 --> 00:14:36,000
they

369
00:14:49,670 --> 00:14:47,910
hi my name is kariel what kind of

370
00:14:51,350 --> 00:14:49,680
experiences have you had in mission

371
00:14:53,750 --> 00:14:51,360
control

372
00:14:54,870 --> 00:14:53,760
well yeah as i already mentioned uh you

373
00:14:57,509 --> 00:14:54,880
know i have to

374
00:15:00,150 --> 00:14:57,519
the i did come in in time to work a few

375
00:15:03,350 --> 00:15:00,160
shuttle flights um as a

376
00:15:06,069 --> 00:15:03,360
iss support um i you know the biggest

377
00:15:08,550 --> 00:15:06,079
thing now is just increment operations

378
00:15:10,949 --> 00:15:08,560
so i get to i get to support usually

379
00:15:13,350 --> 00:15:10,959
about one week every couple months

380
00:15:15,350 --> 00:15:13,360
that you know i come in here and and

381
00:15:16,629 --> 00:15:15,360
work with the crew

382
00:15:19,269 --> 00:15:16,639
and also

383
00:15:21,430 --> 00:15:19,279
um as increment lead as actually the

384
00:15:23,269 --> 00:15:21,440
increment lead for the last crew before

385
00:15:24,710 --> 00:15:23,279
dan burbank came home

386
00:15:27,350 --> 00:15:24,720
that's there's a lot of planning that

387
00:15:30,310 --> 00:15:27,360
goes into each of these flights and so

388
00:15:35,509 --> 00:15:30,320

it it's definitely an experience that

389
00:15:40,470 --> 00:15:38,230
hi my name is lauren how many

390
00:15:41,910 --> 00:15:40,480
how has mission control changed over the

391
00:15:43,430 --> 00:15:41,920
years

392
00:15:45,430 --> 00:15:43,440
that is a good question yeah that's kind

393
00:15:47,030 --> 00:15:45,440
of what we were talking about earlier so

394
00:15:49,350 --> 00:15:47,040
it's it's changed

395
00:15:52,069 --> 00:15:49,360
quite a bit from over the years

396
00:15:53,990 --> 00:15:52,079
from the early days of uh apollo even

397
00:15:55,990 --> 00:15:54,000
before that to what you're looking at

398
00:15:58,949 --> 00:15:56,000
now right yeah the interesting thing is

399
00:16:01,910 --> 00:15:58,959
uh right above us is called picker 2

400
00:16:04,870 --> 00:16:01,920
which is the old apollo picker that's

401
00:16:07,030 --> 00:16:04,880
preserved it's a historical site and so

402
00:16:08,790 --> 00:16:07,040
you get to get to take a view of what it

403
00:16:10,470 --> 00:16:08,800
used to look like and this room actually

404
00:16:11,829 --> 00:16:10,480
looked exactly like that

405
00:16:14,150 --> 00:16:11,839
before his transition over the space

406
00:16:16,389 --> 00:16:14,160
station and even space station we've had

407
00:16:18,310 --> 00:16:16,399
two flight control rooms so we used to

408
00:16:20,470 --> 00:16:18,320
be in what's called blue picker

409
00:16:22,389 --> 00:16:20,480
before we outgrew that as the station

410
00:16:23,189 --> 00:16:22,399
got bigger and then we transitioned over

411
00:16:24,949 --> 00:16:23,199
here

412
00:16:26,550 --> 00:16:24,959
yeah the mission control center is very

413
00:16:28,310 --> 00:16:26,560

very large you're looking at one room

414
00:16:30,629 --> 00:16:28,320
but there's a flight control room like

415
00:16:32,389 --> 00:16:30,639
jesse said above us there's one down the

416
00:16:34,069 --> 00:16:32,399
hall that was used for space shuttle and

417
00:16:35,910 --> 00:16:34,079
will probably transition to a future

418
00:16:38,150 --> 00:16:35,920
spacecraft like orion that jesse

419
00:16:40,870 --> 00:16:38,160
mentioned at the next generation of

420
00:16:43,829 --> 00:16:40,880
human space transport that the that

421
00:16:44,629 --> 00:16:43,839
nasa's helping develop or is developing

422
00:16:46,949 --> 00:16:44,639
so

423
00:16:49,430 --> 00:16:46,959
it's a very big building that

424
00:16:51,749 --> 00:16:49,440
houses very different kinds of flight

425
00:16:52,949 --> 00:16:51,759
control depending on what actually is

426
00:16:54,550 --> 00:16:52,959
going on and of course if there's

427
00:16:55,670 --> 00:16:54,560
training going on for another mission

428
00:16:58,389 --> 00:16:55,680
right you do you're always doing

429
00:17:00,550 --> 00:16:58,399
simulations for future flights as well

430
00:17:02,389 --> 00:17:00,560
yeah i'm actually in training uh to to

431
00:17:04,710 --> 00:17:02,399
learn another system so i'm learning our

432
00:17:06,470 --> 00:17:04,720
internal thermal control system so it's

433
00:17:08,949 --> 00:17:06,480
always evolving

434
00:17:10,470 --> 00:17:08,959
you get to grow and learn more things as

435
00:17:11,909 --> 00:17:10,480
you go through your career so here's a

436
00:17:13,669 --> 00:17:11,919
good example of somebody who's

437
00:17:15,590 --> 00:17:13,679
continuing to learn even though he's

438
00:17:25,829 --> 00:17:15,600

already out of school so you guys can

439
00:17:33,430 --> 00:17:28,230
how did orion

440
00:17:35,750 --> 00:17:33,440
well how will you get orion into space

441
00:17:37,909 --> 00:17:35,760
that's that's a good question um there's

442
00:17:40,710 --> 00:17:37,919
two vehicles right now that that we're

443
00:17:43,029 --> 00:17:40,720
working on so the original lions um so

444
00:17:44,870 --> 00:17:43,039
the first couple flights i believe well

445
00:17:47,350 --> 00:17:44,880
i should be flown on a commercial

446
00:17:50,150 --> 00:17:47,360
vehicle that's our the atlas

447
00:17:52,070 --> 00:17:50,160
launch vehicle as it transitions we're

448
00:17:53,350 --> 00:17:52,080
going to go to what's called a space

449
00:17:55,909 --> 00:17:53,360
launch system

450
00:17:58,310 --> 00:17:55,919
shuttle derived uses shuttle hardware

451
00:18:00,630 --> 00:17:58,320
and it's a new vehicle to allow us to go

452
00:18:16,710 --> 00:18:00,640
farther it's about the size or belief of

453
00:18:22,150 --> 00:18:21,110
what would you do if an astronaut um

454
00:18:24,470 --> 00:18:22,160
was like

455
00:18:25,990 --> 00:18:24,480
life-threatening

456
00:18:27,990 --> 00:18:26,000
sick

457
00:18:30,630 --> 00:18:28,000
yeah that's always um that's actually

458
00:18:33,669 --> 00:18:30,640
something that we uh that we are we had

459
00:18:36,549 --> 00:18:33,679
plans for um you know that on board the

460
00:18:38,789 --> 00:18:36,559
crew does have uh two of the return

461
00:18:39,669 --> 00:18:38,799
vehicles uh they're called the soyuz uh

462
00:18:41,270 --> 00:18:39,679
russian

463
00:18:43,510 --> 00:18:41,280

vehicle and you know if we had a crew

464
00:18:45,110 --> 00:18:43,520
member get critically ill we can always

465
00:18:48,070 --> 00:18:45,120
bring him home

466
00:18:50,470 --> 00:18:48,080
and land in russia and get them to more

467
00:18:52,390 --> 00:18:50,480
medical support of course his crewmates

468
00:18:54,070 --> 00:18:52,400
would need to come home with him

469
00:18:56,950 --> 00:18:54,080
because then we don't want to leave them

470
00:18:59,190 --> 00:18:56,960
with no escape vehicle so

471
00:19:02,549 --> 00:18:59,200
we do have that plan and we can execute

472
00:19:04,070 --> 00:19:02,559
it if if we needed to

473
00:19:09,190 --> 00:19:04,080
luckily we've never gotten there yet all

474
00:19:16,789 --> 00:19:12,789
how many times does the i

475
00:19:18,630 --> 00:19:16,799
s s go around the world in a day

476
00:19:21,190 --> 00:19:18,640
that's a good question um the iss

477
00:19:22,070 --> 00:19:21,200
actually orbits the earth every night 90

478
00:19:24,070 --> 00:19:22,080
minutes

479
00:19:25,510 --> 00:19:24,080
which i believe that equates to 15

480
00:19:27,990 --> 00:19:25,520
orbits in a day

481
00:19:31,110 --> 00:19:28,000
something about that um and so

482
00:19:33,029 --> 00:19:31,120
we we track it um and you know every day

483
00:19:34,150 --> 00:19:33,039
they they go around the earth every 90

484
00:19:35,430 --> 00:19:34,160
minutes to get the sunrise and the

485
00:19:37,510 --> 00:19:35,440
sunset so

486
00:19:39,669 --> 00:19:37,520
it's definitely different than what you

487
00:19:42,230 --> 00:19:39,679
have on the ground here yeah the space

488
00:19:44,549 --> 00:19:42,240

station is traveling about 17 000 miles

489
00:19:47,510 --> 00:19:44,559
per hour so that's about for you guys

490
00:19:50,150 --> 00:19:47,520
it's about five miles every second so it

491
00:19:52,789 --> 00:19:50,160
travels very fast at what's known as

492
00:19:54,870 --> 00:19:52,799
orbital velocity and and it's about 250

493
00:19:56,789 --> 00:19:54,880
miles above the earth right now so as

494
00:19:58,549 --> 00:19:56,799
jesse said you know once every hour and

495
00:20:10,390 --> 00:19:58,559
a half it's it goes all the way around

496
00:20:15,510 --> 00:20:12,950
hi my name is mara and i was wondering

497
00:20:17,270 --> 00:20:15,520
how someone got assigned to a council in

498
00:20:20,070 --> 00:20:17,280
mission control

499
00:20:23,190 --> 00:20:20,080
well um that's a great question um you

500
00:20:25,270 --> 00:20:23,200
know i i came in i was actually hired um

501
00:20:28,549 --> 00:20:25,280
as a nicholas uh so a life support

502
00:20:32,070 --> 00:20:28,559
officer um it used to be that uh you'd

503
00:20:35,029 --> 00:20:32,080
be hired within that group so a specific

504
00:20:36,630 --> 00:20:35,039
towards a specific console now we've

505
00:20:37,750 --> 00:20:36,640
actually transitioned more towards

506
00:20:39,590 --> 00:20:37,760
generic

507
00:20:42,149 --> 00:20:39,600
systems controllers so

508
00:20:43,750 --> 00:20:42,159
you when you get hired in here

509
00:20:44,950 --> 00:20:43,760
you get to experience each of the

510
00:20:46,870 --> 00:20:44,960
different groups

511
00:20:48,470 --> 00:20:46,880
and basically provide your

512
00:20:49,990 --> 00:20:48,480
recommendation of what what group you

513
00:20:52,070 --> 00:20:50,000

want to work for

514
00:20:53,029 --> 00:20:52,080
and you know sometimes that's not always

515
00:20:55,430 --> 00:20:53,039
possible

516
00:20:57,830 --> 00:20:55,440
but you know we definitely like to uh

517
00:21:00,230 --> 00:20:57,840
allow people to have the opportunity to

518
00:21:02,789 --> 00:21:00,240
work for whatever position they want

519
00:21:07,190 --> 00:21:02,799
which there's lots of them here

520
00:21:11,590 --> 00:21:09,590
hi my name is liam and i wanted to know

521
00:21:13,669 --> 00:21:11,600
what's the hardest task you ever had to

522
00:21:16,950 --> 00:21:13,679
face

523
00:21:19,350 --> 00:21:16,960
um

524
00:21:21,350 --> 00:21:19,360
you know they stimulated tasks

525
00:21:23,590 --> 00:21:21,360
which you always get get put to the

526
00:21:27,029 --> 00:21:23,600
ringer in a simulation

527
00:21:28,950 --> 00:21:27,039
but i think in real time

528
00:21:30,549 --> 00:21:28,960
i i think the hardest thing i had to do

529
00:21:32,230 --> 00:21:30,559
was actually come in

530
00:21:33,750 --> 00:21:32,240
i wasn't on call

531
00:21:36,310 --> 00:21:33,760
for a flight

532
00:21:37,029 --> 00:21:36,320
that we had russian computer problems

533
00:21:38,549 --> 00:21:37,039
that

534
00:21:40,230 --> 00:21:38,559
caused the rapid depress to be

535
00:21:42,149 --> 00:21:40,240
enunciated on board and this was

536
00:21:43,909 --> 00:21:42,159
actually why the crew was

537
00:21:46,950 --> 00:21:43,919
in what we call campout so they were in

538
00:21:49,029 --> 00:21:46,960

the airlock uh down at 10 2psi and so i

539
00:21:51,190 --> 00:21:49,039
was asked to come in uh to help the on

540
00:21:53,750 --> 00:21:51,200
console team uh basically reconfigure

541
00:21:55,590 --> 00:21:53,760
all systems after that and the challenge

542
00:21:57,590 --> 00:21:55,600
there was the mixed config we were in

543
00:21:59,669 --> 00:21:57,600
because as i mentioned the crew was at

544
00:22:02,070 --> 00:21:59,679
10 2 in the airlock so there were a lot

545
00:22:07,909 --> 00:22:02,080
of different things we had to consider

546
00:22:11,350 --> 00:22:09,669
um

547
00:22:13,909 --> 00:22:11,360
will there be

548
00:22:18,149 --> 00:22:13,919
other i mean have there been thoughts

549
00:22:20,070 --> 00:22:18,159
about other iss around orbiting other

550
00:22:22,230 --> 00:22:20,080
planets

551
00:22:25,510 --> 00:22:22,240
i believe there actually has been

552
00:22:28,149 --> 00:22:25,520
there currently talks about putting one

553
00:22:30,549 --> 00:22:28,159
i think it's past the moon as there's a

554
00:22:32,549 --> 00:22:30,559
gravity gradient spot that that actually

555
00:22:33,909 --> 00:22:32,559
works for putting a space station there

556
00:22:36,390 --> 00:22:33,919
it'll actually

557
00:22:40,390 --> 00:22:36,400
provide basically a destination

558
00:22:42,310 --> 00:22:40,400
for the orion on its way to deep space

559
00:22:45,909 --> 00:22:42,320
as far as the iss hardware i don't

560
00:22:48,070 --> 00:22:45,919
believe there's actually any plan for a

561
00:22:50,710 --> 00:22:48,080
similar 2d iss it would be an advanced

562
00:22:52,789 --> 00:22:50,720
version of the space station

563
00:22:54,390 --> 00:22:52,799

that's the beauty about the space

564
00:22:57,270 --> 00:22:54,400
station that we have now is that we're

565
00:22:58,870 --> 00:22:57,280
learning how to live long duration

566
00:23:00,789 --> 00:22:58,880
time periods

567
00:23:02,310 --> 00:23:00,799
at this altitude

568
00:23:03,669 --> 00:23:02,320
because when we go out further out

569
00:23:05,830 --> 00:23:03,679
obviously it means it's going to take

570
00:23:08,789 --> 00:23:05,840
longer to get back so you need to you

571
00:23:10,870 --> 00:23:08,799
definitely need to know uh how to live

572
00:23:12,870 --> 00:23:10,880
for long duration stays in space because

573
00:23:14,870 --> 00:23:12,880
you your trip will become much longer

574
00:23:16,310 --> 00:23:14,880
and that's that's one of the things

575
00:23:18,149 --> 00:23:16,320
we're doing at the international space

576
00:23:20,870 --> 00:23:18,159
station right now so those are great

577
00:23:23,750 --> 00:23:20,880
questions and we really enjoyed visiting

578
00:23:26,710 --> 00:23:23,760
with everybody today in pennsylvania and

579
00:23:27,830 --> 00:23:26,720
you guys keep studying hard and

580
00:23:30,149 --> 00:23:27,840
hopefully you'll make your way right

581
00:23:31,990 --> 00:23:30,159
here to this room and join jesse along

582
00:23:34,950 --> 00:23:32,000
with other flight controllers as part of

583
00:23:36,630 --> 00:23:34,960
the the team here in mission control so

584
00:23:38,310 --> 00:23:36,640
thanks a lot for joining us everybody we