
MISSION CONTROL CENTER
PAO
POSN 4732

1
00:00:03,590 --> 00:00:02,070
hi everybody josh byerly here in mission

2
00:00:05,670 --> 00:00:03,600
control houston i'm joined by my friend

3
00:00:08,070 --> 00:00:05,680
ed powers who is a flight surgeon here

4
00:00:09,589 --> 00:00:08,080
at nasa and you know we talk a lot about

5
00:00:11,270 --> 00:00:09,599
uh experiment work and what the crew is

6
00:00:12,789 --> 00:00:11,280
doing they do quite a bit of human

7
00:00:14,310 --> 00:00:12,799
research and things like that on their

8
00:00:15,669 --> 00:00:14,320
own bodies while they're up there but

9
00:00:17,189 --> 00:00:15,679
figured you know a good chance to get a

10
00:00:19,269 --> 00:00:17,199
flight surgeon in here and actually

11
00:00:20,390 --> 00:00:19,279
talk about you know what you do first of

12
00:00:21,590 --> 00:00:20,400
all as a flight surgeon because it's a

13
00:00:23,590 --> 00:00:21,600

whole lot more than i think what people

14
00:00:25,109 --> 00:00:23,600
realize and also you know what are some

15
00:00:27,109 --> 00:00:25,119
of the difficulties of dealing with a

16
00:00:28,230 --> 00:00:27,119
crew member who's not here on earth so

17
00:00:30,790 --> 00:00:28,240
first of all welcome thank you for

18
00:00:33,430 --> 00:00:30,800
joining us talk just a minute about what

19
00:00:35,270 --> 00:00:33,440
you do on a just a daily basis okay well

20
00:00:36,709 --> 00:00:35,280
uh flight surgeons are

21
00:00:38,790 --> 00:00:36,719
kind of critical to

22
00:00:40,229 --> 00:00:38,800
maintaining the you know the status

23
00:00:42,549 --> 00:00:40,239
health status of the crew members by

24
00:00:45,270 --> 00:00:42,559
monitoring them basically

25
00:00:47,110 --> 00:00:45,280
every day we um

26
00:00:48,389 --> 00:00:47,120
the folks who are assigned to crew

27
00:00:50,470 --> 00:00:48,399
members to

28
00:00:52,470 --> 00:00:50,480
look out for them and um on a weekly

29
00:00:53,910 --> 00:00:52,480
basis we interview them and make sure

30
00:00:55,990 --> 00:00:53,920
for about 15 minutes at a time make sure

31
00:00:57,670 --> 00:00:56,000
they're doing well in orbit but really

32
00:00:58,709 --> 00:00:57,680
begins about two years before they

33
00:01:00,549 --> 00:00:58,719
launch

34
00:01:02,389 --> 00:01:00,559
the flight surgeons who are assigned to

35
00:01:04,149 --> 00:01:02,399
an astronaut basically get to know them

36
00:01:05,509 --> 00:01:04,159
very well and help in their training so

37
00:01:07,670 --> 00:01:05,519
that they know what to do in a medical

38
00:01:09,270 --> 00:01:07,680

emergency on board the space station i

39
00:01:12,230 --> 00:01:09,280
think with various training sessions

40
00:01:13,590 --> 00:01:12,240
including running cardiac resuscitation

41
00:01:15,030 --> 00:01:13,600
and uh and go through various

42
00:01:16,710 --> 00:01:15,040
simulations

43
00:01:18,149 --> 00:01:16,720
and uh so this allows us to get to know

44
00:01:19,830 --> 00:01:18,159
the crew members very well and we

45
00:01:21,429 --> 00:01:19,840
develop a relationship a very good

46
00:01:23,510 --> 00:01:21,439
working relationship with them an amount

47
00:01:24,310 --> 00:01:23,520
of trust you know that goes along with

48
00:01:25,510 --> 00:01:24,320
that

49
00:01:27,190 --> 00:01:25,520
what do they what do they have up on

50
00:01:28,469 --> 00:01:27,200
orbit i mean they got you know the crew

51
00:01:30,230 --> 00:01:28,479
healthcare basically what amounts to a

52
00:01:31,670 --> 00:01:30,240
mini hospital on board but talk about i

53
00:01:33,590 --> 00:01:31,680
mean because you can't just run down to

54
00:01:35,109 --> 00:01:33,600
the drugstore and get you know

55
00:01:36,710 --> 00:01:35,119
get some ibuprofen or something if you

56
00:01:38,390 --> 00:01:36,720
need it so how well are they stocked

57
00:01:40,069 --> 00:01:38,400
what do they have up there well they

58
00:01:41,910 --> 00:01:40,079
have a variety of commonly used

59
00:01:45,109 --> 00:01:41,920
medicines you know tylenol and various

60
00:01:46,630 --> 00:01:45,119
other things are there but we also have

61
00:01:48,870 --> 00:01:46,640
medicines that we think

62
00:01:50,389 --> 00:01:48,880
could be useful in case some potential

63
00:01:51,030 --> 00:01:50,399

emergencies could occur you know we have

64
00:01:52,149 --> 00:01:51,040
the

65
00:01:53,910 --> 00:01:52,159
advanced cardiac life support

66
00:01:55,190 --> 00:01:53,920
medications on board they're trained

67
00:01:57,030 --> 00:01:55,200
with and

68
00:01:59,190 --> 00:01:57,040
in various antibiotics and things that

69
00:02:01,030 --> 00:01:59,200
we think might be necessary if something

70
00:02:02,950 --> 00:02:01,040
were to happen up there

71
00:02:05,429 --> 00:02:02,960
so talk as a doctor how you know doctors

72
00:02:06,870 --> 00:02:05,439
use a lot of their their senses their

73
00:02:09,190 --> 00:02:06,880
sight their hearing they listen you know

74
00:02:10,550 --> 00:02:09,200
the dutch you don't have any of that

75
00:02:13,030 --> 00:02:10,560
really you know one of your crew members

76
00:02:14,070 --> 00:02:13,040
250 miles up in space going around the

77
00:02:15,750 --> 00:02:14,080
earth so

78
00:02:17,110 --> 00:02:15,760
how difficult is that what what kind of

79
00:02:18,869 --> 00:02:17,120
challenges do you have well there's a

80
00:02:20,070 --> 00:02:18,879
bit of a challenge and that's part of

81
00:02:21,510 --> 00:02:20,080
part of the reason why we developed such

82
00:02:23,910 --> 00:02:21,520
a close relationship with them in this

83
00:02:26,630 --> 00:02:23,920
pre-launch time frame in the training is

84
00:02:29,110 --> 00:02:26,640
because uh we get to know sort of

85
00:02:30,869 --> 00:02:29,120
what they're capable of of doing and how

86
00:02:33,030 --> 00:02:30,879
and what their experience level is and

87
00:02:35,670 --> 00:02:33,040
how they approach a problem when it

88
00:02:37,110 --> 00:02:35,680

comes to medical issues and so so it is

89
00:02:39,030 --> 00:02:37,120
a little bit of a challenge but at the

90
00:02:41,830 --> 00:02:39,040
same time as we get to know them very

91
00:02:43,030 --> 00:02:41,840
closely we're able to to trust their

92
00:02:44,949 --> 00:02:43,040
eyes and ears

93
00:02:46,630 --> 00:02:44,959
and uh work with them to try to diagnose

94
00:02:48,309 --> 00:02:46,640
any issues that go unfortunately they

95
00:02:50,630 --> 00:02:48,319
tend to be extremely healthy when we

96
00:02:52,229 --> 00:02:50,640
launch them which is very helpful

97
00:02:54,070 --> 00:02:52,239
but occasionally something will come

98
00:02:55,190 --> 00:02:54,080
come about and of course we have the

99
00:02:57,190 --> 00:02:55,200
luxury once in a while having a

100
00:02:59,110 --> 00:02:57,200
physician astronaut on board right and

101
00:03:00,070 --> 00:02:59,120
uh that makes our jobs quite a bit

102
00:03:02,309 --> 00:03:00,080
easier

103
00:03:04,070 --> 00:03:02,319
so let's talk about we were out i guess

104
00:03:05,430 --> 00:03:04,080
it was a couple weeks ago out at the

105
00:03:06,470 --> 00:03:05,440
national space biomedical research

106
00:03:08,070 --> 00:03:06,480
institute here in houston they just

107
00:03:09,509 --> 00:03:08,080
opened up a brand new facility here and

108
00:03:12,149 --> 00:03:09,519
there's a lot of scientists there and

109
00:03:14,149 --> 00:03:12,159
and doctors and these phds talking about

110
00:03:15,830 --> 00:03:14,159
miniaturization and

111
00:03:17,350 --> 00:03:15,840
you know from what i understand that we

112
00:03:18,790 --> 00:03:17,360
used to have a very large ultrasound

113
00:03:20,869 --> 00:03:18,800

cart onboard the station that took up an

114
00:03:22,630 --> 00:03:20,879
entire rack and now we've got things

115
00:03:23,670 --> 00:03:22,640
down to basically the size of a laptop

116
00:03:25,190 --> 00:03:23,680
so

117
00:03:27,270 --> 00:03:25,200
talk a little bit about how the space

118
00:03:28,789 --> 00:03:27,280
station and you know you know we sort of

119
00:03:30,390 --> 00:03:28,799
force ourselves to go small and go

120
00:03:31,910 --> 00:03:30,400
efficient how does that lead to better

121
00:03:34,550 --> 00:03:31,920
stuff here on earth for for hospitals

122
00:03:36,229 --> 00:03:34,560
and things like that well uh of course

123
00:03:37,750 --> 00:03:36,239
smaller is better when it comes as long

124
00:03:41,270 --> 00:03:37,760
as you can keep the same fidelity

125
00:03:42,949 --> 00:03:41,280
smaller is better and uh and as far as

126
00:03:44,789 --> 00:03:42,959
keeping track of inventory and launching

127
00:03:46,630 --> 00:03:44,799
into orbit that sort of thing from our

128
00:03:48,149 --> 00:03:46,640
standpoint is very helpful

129
00:03:49,509 --> 00:03:48,159
but there are remote applications as

130
00:03:51,030 --> 00:03:49,519
well you know there are places in the

131
00:03:52,070 --> 00:03:51,040
world where you just can't get medical

132
00:03:53,589 --> 00:03:52,080
care

133
00:03:55,589 --> 00:03:53,599
at the level that you would see say in

134
00:03:57,110 --> 00:03:55,599
houston right so to have a remote

135
00:03:59,429 --> 00:03:57,120
capability of something small and

136
00:04:01,270 --> 00:03:59,439
transportable is very helpful when you

137
00:04:03,509 --> 00:04:01,280
get out away from civilization a bit

138
00:04:04,869 --> 00:04:03,519

yeah how much do the crew members do uh

139
00:04:06,470 --> 00:04:04,879
you know basically finding out about how

140
00:04:07,910 --> 00:04:06,480
their own bodies react to being in space

141
00:04:10,149 --> 00:04:07,920
and and what is that going to teach us

142
00:04:11,509 --> 00:04:10,159
going on i mean you know is it the more

143
00:04:12,869 --> 00:04:11,519
that we investigate it the more we learn

144
00:04:14,390 --> 00:04:12,879
i mean is there more mysteries because

145
00:04:15,509 --> 00:04:14,400
you know we've talked about how we've

146
00:04:17,110 --> 00:04:15,519
even learned that the immune system

147
00:04:18,949 --> 00:04:17,120
reacts differently being up there with

148
00:04:20,629 --> 00:04:18,959
no gravity so what what do we learn

149
00:04:21,909 --> 00:04:20,639
that's true there's a number of

150
00:04:23,670 --> 00:04:21,919
research

151
00:04:25,189 --> 00:04:23,680
studies going on associated with

152
00:04:26,390 --> 00:04:25,199
universities that are looking at the

153
00:04:27,909 --> 00:04:26,400
immune system and there's a little bit

154
00:04:30,150 --> 00:04:27,919
of a decreased immune response when you

155
00:04:31,909 --> 00:04:30,160
get on orbit you know tendency to to

156
00:04:33,350 --> 00:04:31,919
maybe be a little bit more susceptible

157
00:04:35,830 --> 00:04:33,360
to getting a cold or something along

158
00:04:36,710 --> 00:04:35,840
those lines there are also bone density

159
00:04:38,390 --> 00:04:36,720
issues you know as you go in

160
00:04:39,909 --> 00:04:38,400
microgravity

161
00:04:41,430 --> 00:04:39,919
gravity is not pulling down on the bones

162
00:04:44,310 --> 00:04:41,440
it's not the stimulation there to keep

163
00:04:47,030 --> 00:04:44,320

bones healthy so we have learned how to

164
00:04:50,150 --> 00:04:47,040
supplement that by doing daily exercise

165
00:04:52,469 --> 00:04:50,160
both aerobic and resistive exercise that

166
00:04:54,310 --> 00:04:52,479
seems to be helping to mediate that

167
00:04:56,310 --> 00:04:54,320
problem with bone density and muscle

168
00:04:58,310 --> 00:04:56,320
weakness

169
00:05:00,550 --> 00:04:58,320
and then of course we recently have come

170
00:05:02,390 --> 00:05:00,560
across an issue with eyes and vision

171
00:05:03,990 --> 00:05:02,400
changes in space that

172
00:05:05,909 --> 00:05:04,000
we have gotten a little bit more detail

173
00:05:07,670 --> 00:05:05,919
understanding what's going on there as

174
00:05:09,749 --> 00:05:07,680
far as fluid shifting towards the

175
00:05:11,510 --> 00:05:09,759
towards the head when gravity is not

176
00:05:13,830 --> 00:05:11,520
pulling it down anymore it

177
00:05:14,790 --> 00:05:13,840
seems to affect the fine structures of

178
00:05:17,350 --> 00:05:14,800
the eye

179
00:05:19,270 --> 00:05:17,360
and produce potentially

180
00:05:20,790 --> 00:05:19,280
permanent changes in the vision and so

181
00:05:22,150 --> 00:05:20,800
we've been using some instrumentation up

182
00:05:23,189 --> 00:05:22,160
there now that hasn't been up there

183
00:05:25,189 --> 00:05:23,199
before

184
00:05:28,469 --> 00:05:25,199
small size ultrasonography look at the

185
00:05:29,670 --> 00:05:28,479
eye there's also a very high level

186
00:05:31,430 --> 00:05:29,680
optical camera that we're going to be

187
00:05:33,029 --> 00:05:31,440
flying soon that will be able to take a

188
00:05:35,270 --> 00:05:33,039

really good look at the back of the eye

189
00:05:37,510 --> 00:05:35,280
and try to assess the issues there we

190
00:05:39,590 --> 00:05:37,520
think it could be

191
00:05:41,590 --> 00:05:39,600
could be related to fluid shifting along

192
00:05:43,029 --> 00:05:41,600
with high salt diet that happens to be

193
00:05:44,790 --> 00:05:43,039
on the space station due to the fact

194
00:05:46,790 --> 00:05:44,800
that the food has to be

195
00:05:49,029 --> 00:05:46,800
preserved for a long time up there and

196
00:05:50,230 --> 00:05:49,039
uh maybe carbon dioxide levels may have

197
00:05:51,510 --> 00:05:50,240
something to do with this we try to keep

198
00:05:52,870 --> 00:05:51,520
the carbon dioxide levels down there are

199
00:05:54,950 --> 00:05:52,880
a number of factors that we're looking

200
00:05:56,629 --> 00:05:54,960
at up there that may affect

201
00:05:58,710 --> 00:05:56,639
certain situations here on earth you

202
00:05:59,830 --> 00:05:58,720
mentioned exercise uh have you guys seen

203
00:06:01,430 --> 00:05:59,840
a difference in you know the crew

204
00:06:03,029 --> 00:06:01,440
members coming back i mean it's one of

205
00:06:05,350 --> 00:06:03,039
the people that goes over to russian

206
00:06:07,749 --> 00:06:05,360
kazakhstan we spent many an hour on uh

207
00:06:09,189 --> 00:06:07,759
helicopters helicopters and airplanes

208
00:06:10,870 --> 00:06:09,199
going over there but have you guys seen

209
00:06:12,230 --> 00:06:10,880
a difference in

210
00:06:13,430 --> 00:06:12,240
now that you've got sort of a variety of

211
00:06:15,510 --> 00:06:13,440
different exercise equipment up there

212
00:06:16,790 --> 00:06:15,520
the crew members exercise quite a bit

213
00:06:18,550 --> 00:06:16,800

during the day do you see a difference

214
00:06:20,390 --> 00:06:18,560
now whenever they're coming back and how

215
00:06:22,309 --> 00:06:20,400
their body's reacting yes definitely

216
00:06:23,590 --> 00:06:22,319
they're many of them are coming back and

217
00:06:25,110 --> 00:06:23,600
even a little bit better shape than when

218
00:06:27,430 --> 00:06:25,120
they launched because they get a little

219
00:06:28,790 --> 00:06:27,440
distracted the first i mean the last

220
00:06:30,390 --> 00:06:28,800
month or so before they launch and

221
00:06:31,590 --> 00:06:30,400
sometimes exercise falls off so when

222
00:06:33,350 --> 00:06:31,600
they get up there

223
00:06:36,070 --> 00:06:33,360
and they have a concentrated exercise

224
00:06:37,909 --> 00:06:36,080
program daily exercise program you know

225
00:06:39,749 --> 00:06:37,919
at least an hour of resistive exercise

226
00:06:42,790 --> 00:06:39,759
at least an hour of cardiovascular

227
00:06:44,070 --> 00:06:42,800
workout every day then sometimes uh they

228
00:06:46,469 --> 00:06:44,080
they actually come back in a little bit

229
00:06:48,390 --> 00:06:46,479
better shape now i think we finally over

230
00:06:50,390 --> 00:06:48,400
the years and many crews i think we

231
00:06:52,230 --> 00:06:50,400
finally have got the right approach to

232
00:06:53,510 --> 00:06:52,240
this and uh we've got the right exercise

233
00:06:55,589 --> 00:06:53,520
equipment on board and they're actually

234
00:06:56,950 --> 00:06:55,599
doing very well that's good so talk a

235
00:06:57,909 --> 00:06:56,960
bit about your background i mean we get

236
00:06:59,830 --> 00:06:57,919
this question all the time how did you

237
00:07:02,230 --> 00:06:59,840
get the job at nasa so how do you go

238
00:07:04,150 --> 00:07:02,240

from medical school into being being a

239
00:07:06,550 --> 00:07:04,160
flight surgeon well i grew up in the

240
00:07:08,710 --> 00:07:06,560
chicago area and so i went to medical

241
00:07:10,469 --> 00:07:08,720
school at rush university in chicago and

242
00:07:12,790 --> 00:07:10,479
i was very interested in surgery and

243
00:07:14,870 --> 00:07:12,800
emergency medicine and so i did a

244
00:07:16,790 --> 00:07:14,880
post-graduate training program first

245
00:07:18,230 --> 00:07:16,800
general surgery internship

246
00:07:19,510 --> 00:07:18,240
and then two additional years of

247
00:07:21,670 --> 00:07:19,520
emergency medicine and became an

248
00:07:23,909 --> 00:07:21,680
emergency medicine specialist and it

249
00:07:25,589 --> 00:07:23,919
just so happens i've always had the

250
00:07:27,990 --> 00:07:25,599
fondness of flying i started flying when

251
00:07:30,629 --> 00:07:28,000
i was 15 yeah with a friend's airplane

252
00:07:32,550 --> 00:07:30,639
and so i was trying to combine those

253
00:07:34,950 --> 00:07:32,560
different interests emergency medicine

254
00:07:37,510 --> 00:07:34,960
and flying and space program and i

255
00:07:39,589 --> 00:07:37,520
wound up doing another residency program

256
00:07:41,110 --> 00:07:39,599
in aerospace medicine two-year program

257
00:07:43,990 --> 00:07:41,120
in dayton ohio

258
00:07:45,589 --> 00:07:44,000
and uh eventually wound up in nasa so

259
00:07:47,189 --> 00:07:45,599
i've been working as an emergency

260
00:07:49,350 --> 00:07:47,199
physician and an aerospace medicine

261
00:07:51,510 --> 00:07:49,360
physician for uh much of the last 10 or

262
00:07:54,390 --> 00:07:51,520
15 years it's still fascinating to you

263
00:07:55,909 --> 00:07:54,400

oh yes very much so lots to learn yeah

264
00:07:57,749 --> 00:07:55,919
well thanks for joining us it's dr ed

265
00:07:58,950 --> 00:07:57,759
powers one of the flight surges here at

266
00:08:00,390 --> 00:07:58,960
nasa if you would like to learn more

267
00:08:01,670 --> 00:08:00,400
about all these different types of

268
00:08:03,430 --> 00:08:01,680
experiments that the the crew is

269
00:08:04,469 --> 00:08:03,440
actually doing on a daily basis about

270
00:08:06,070 --> 00:08:04,479
you know with their own bodies and how

271
00:08:07,350 --> 00:08:06,080
the human body reacts to being in space

272
00:08:11,749 --> 00:08:07,360
you can always log on to the nasa

273
00:08:15,110 --> 00:08:13,589
station just click on research and take