
MISSION CONTROL CENTER
PAO
NASA

1
00:00:05,430 --> 00:00:03,110
all right now we're going to go to uh

2
00:00:07,269 --> 00:00:05,440
public affairs officer dan hewitt in

3
00:00:10,390 --> 00:00:07,279
mission control and he has a very

4
00:00:13,430 --> 00:00:10,400
special guest richard grodnick who is an

5
00:00:16,390 --> 00:00:13,440
ethos officer environmental and

6
00:00:18,550 --> 00:00:16,400
thermal operating systems officer so dan

7
00:00:20,630 --> 00:00:18,560
take it away hey thanks michael and hey

8
00:00:23,029 --> 00:00:20,640
everybody this is dan hewitt in mission

9
00:00:24,870 --> 00:00:23,039
control houston and like michael said

10
00:00:27,189 --> 00:00:24,880
i'm joined right now by richie garotnick

11
00:00:29,189 --> 00:00:27,199
he's one of our flight controllers here

12
00:00:31,269 --> 00:00:29,199
that helps to make sure our astronauts

13
00:00:32,950 --> 00:00:31,279

are always kept safe down safe on board

14
00:00:34,950 --> 00:00:32,960
the international space station and

15
00:00:36,549 --> 00:00:34,960
you're joining us right now this really

16
00:00:38,630 --> 00:00:36,559
is the nerve center this is where the

17
00:00:41,190 --> 00:00:38,640
international space station is flown

18
00:00:42,470 --> 00:00:41,200
controlled and all the people down here

19
00:00:44,389 --> 00:00:42,480
on the ground making sure all the

20
00:00:46,229 --> 00:00:44,399
systems are working appropriately

21
00:00:47,590 --> 00:00:46,239
so rich thanks so much for joining me

22
00:00:49,110 --> 00:00:47,600
here today i know they got a lot of

23
00:00:55,110 --> 00:00:49,120
great questions so why don't you guys go

24
00:01:00,150 --> 00:00:57,270
my name is dorian obey and i wanted to

25
00:01:02,549 --> 00:01:00,160
know if the astronauts that are in space

26
00:01:05,910 --> 00:01:02,559
can contact their family like they

27
00:01:07,910 --> 00:01:05,920
contact mission controls

28
00:01:08,789 --> 00:01:07,920
absolutely they can uh they can contact

29
00:01:10,710 --> 00:01:08,799
them

30
00:01:13,109 --> 00:01:10,720
either every night they have conferences

31
00:01:15,270 --> 00:01:13,119
with their family they have

32
00:01:16,870 --> 00:01:15,280
private family conferences where it's uh

33
00:01:18,310 --> 00:01:16,880
completely isolated from mission control

34
00:01:20,789 --> 00:01:18,320
they can talk to them as many times they

35
00:01:22,230 --> 00:01:20,799
want to especially on crew days off they

36
00:01:23,590 --> 00:01:22,240
can also spend a lot more time with them

37
00:01:25,109 --> 00:01:23,600
as well

38
00:01:26,710 --> 00:01:25,119

yeah i mean they kind of have it's

39
00:01:28,550 --> 00:01:26,720
almost like a skype setup where they

40
00:01:30,149 --> 00:01:28,560
they they can talk to their families

41
00:01:32,069 --> 00:01:30,159
directly almost anytime they want so it

42
00:01:33,749 --> 00:01:32,079
really helps you know removing a lot of

43
00:01:35,429 --> 00:01:33,759
those feelings of isolation and things

44
00:01:38,069 --> 00:01:35,439
like that that's right

45
00:01:40,149 --> 00:01:38,079
all right next question

46
00:01:42,789 --> 00:01:40,159
i'm joseph edwards and i wanted to know

47
00:01:46,310 --> 00:01:44,550
i wanted to know if

48
00:01:48,710 --> 00:01:46,320
since uh it's an international space

49
00:01:50,789 --> 00:01:48,720
station uh and different countries have

50
00:01:53,350 --> 00:01:50,799
to communicate is foreign language a

51
00:01:56,789 --> 00:01:53,360
part of astronaut training or do they

52
00:01:59,109 --> 00:01:56,799
all or do they all learn english

53
00:02:01,350 --> 00:01:59,119
another great question um

54
00:02:03,670 --> 00:02:01,360
for all the japanese and the european

55
00:02:05,190 --> 00:02:03,680
astronauts they all speak english

56
00:02:06,870 --> 00:02:05,200
for the russians however most of the

57
00:02:08,389 --> 00:02:06,880
time they all speak russian some of them

58
00:02:10,469 --> 00:02:08,399
do know english but we do have

59
00:02:12,309 --> 00:02:10,479
translators that are here both here and

60
00:02:13,990 --> 00:02:12,319
in russia that help to translate a lot

61
00:02:16,470 --> 00:02:14,000
of that communication down

62
00:02:18,630 --> 00:02:16,480
and i know a lot of our assets um all of

63
00:02:19,910 --> 00:02:18,640

our astronauts are launching on russian

64
00:02:22,070 --> 00:02:19,920
vehicles right now part of their

65
00:02:23,350 --> 00:02:22,080
mandatory training as they go through

66
00:02:24,790 --> 00:02:23,360
russian

67
00:02:27,190 --> 00:02:24,800
language courses and they actually go

68
00:02:29,030 --> 00:02:27,200
over and live with russian families

69
00:02:31,030 --> 00:02:29,040
while they're training so

70
00:02:32,550 --> 00:02:31,040
i think really the two main languages

71
00:02:34,070 --> 00:02:32,560
are english and russian right now on

72
00:02:34,830 --> 00:02:34,080
board the international space station

73
00:02:38,309 --> 00:02:34,840
that's

74
00:02:40,869 --> 00:02:38,319
right all right next question guys

75
00:02:42,390 --> 00:02:40,879
hello my name is nicholas delvaye and my

76
00:02:44,150 --> 00:02:42,400
question is what are the effects of

77
00:02:46,470 --> 00:02:44,160
being in space for such long periods of

78
00:02:48,150 --> 00:02:46,480
time and how does the astronaut how do

79
00:02:51,270 --> 00:02:48,160
the astronauts prevent or live with

80
00:02:54,390 --> 00:02:51,280
these effects

81
00:02:55,509 --> 00:02:54,400
okay um so uh there are a couple

82
00:02:57,030 --> 00:02:55,519
different effects for them living in

83
00:02:58,710 --> 00:02:57,040
space for a long time so remember that

84
00:03:00,949 --> 00:02:58,720
there's since there's uh very little

85
00:03:03,030 --> 00:03:00,959
gravity um when they're in low earth

86
00:03:04,630 --> 00:03:03,040
orbit so what they have to do is they

87
00:03:06,070 --> 00:03:04,640
have to exercise

88
00:03:07,830 --> 00:03:06,080

almost every day just because they

89
00:03:09,190 --> 00:03:07,840
experience some bone loss when they're

90
00:03:11,830 --> 00:03:09,200
there for a long time we're talking

91
00:03:13,430 --> 00:03:11,840
about a small amount here and uh but

92
00:03:16,070 --> 00:03:13,440
they exercise for hours a day just to

93
00:03:18,470 --> 00:03:16,080
make sure that they can combat that

94
00:03:20,070 --> 00:03:18,480
yeah i mean they have like treadmills

95
00:03:21,589 --> 00:03:20,080
and weightlifting devices on board the

96
00:03:23,350 --> 00:03:21,599
international space station not like you

97
00:03:24,789 --> 00:03:23,360
would think of here because i mean with

98
00:03:26,470 --> 00:03:24,799
that lack of gravity you can't really

99
00:03:28,390 --> 00:03:26,480
pick up a barbell and start lifting it

100
00:03:29,589 --> 00:03:28,400
and have it do anything that's right so

101
00:03:31,110 --> 00:03:29,599
they have they have a couple of

102
00:03:33,110 --> 00:03:31,120
different devices like on a treadmill

103
00:03:35,509 --> 00:03:33,120
they have a harness that actually pushes

104
00:03:37,589 --> 00:03:35,519
them down on it as they're exercising

105
00:03:40,149 --> 00:03:37,599
and like richie said they're exercising

106
00:03:41,509 --> 00:03:40,159
about two hours every single day so it's

107
00:03:43,750 --> 00:03:41,519
quite a lot of work just to stay in

108
00:03:47,830 --> 00:03:43,760
shape when you're up in space

109
00:03:51,910 --> 00:03:49,830
hi i'm shimon thomas i wanted to know

110
00:03:54,550 --> 00:03:51,920
how long does it take to prepare to go

111
00:03:56,229 --> 00:03:54,560
into space

112
00:03:58,550 --> 00:03:56,239
and hear that how long does it take to

113
00:04:00,390 --> 00:03:58,560

prepare to go into space ah that's a

114
00:04:01,910 --> 00:04:00,400
good question uh each astronaut actually

115
00:04:03,670 --> 00:04:01,920
trains for approximately two and a half

116
00:04:05,910 --> 00:04:03,680
years after they get into the astronaut

117
00:04:07,750 --> 00:04:05,920
candidate program um and that is

118
00:04:09,110 --> 00:04:07,760
completely scheduled and regimented out

119
00:04:11,110 --> 00:04:09,120
for that entire time including their

120
00:04:12,309 --> 00:04:11,120
vacation and everything else but uh

121
00:04:13,509 --> 00:04:12,319
they're either training here they're

122
00:04:15,190 --> 00:04:13,519
training in japan they're training in

123
00:04:16,390 --> 00:04:15,200
europe training in russia

124
00:04:18,229 --> 00:04:16,400
but it's a

125
00:04:19,670 --> 00:04:18,239
really solid schedule for the next two

126
00:04:21,590 --> 00:04:19,680
and a half years once they get in there

127
00:04:22,950 --> 00:04:21,600
yeah i hear they spend a lot of time on

128
00:04:24,469 --> 00:04:22,960
the road like you said they're they're

129
00:04:25,990 --> 00:04:24,479
in japan they're in russia they're in

130
00:04:27,590 --> 00:04:26,000
the united states they're kind of all

131
00:04:29,990 --> 00:04:27,600
over the place and it's two and a half

132
00:04:31,350 --> 00:04:30,000
years of prep for up to six months of

133
00:04:33,350 --> 00:04:31,360
time in space

134
00:04:34,870 --> 00:04:33,360
so you can almost think of a space

135
00:04:36,870 --> 00:04:34,880
flight almost takes up three years of

136
00:04:38,150 --> 00:04:36,880
your life so it's a lot of training

137
00:04:39,909 --> 00:04:38,160
because by the time they get up there

138
00:04:41,909 --> 00:04:39,919

and they need to be completely familiar

139
00:04:43,670 --> 00:04:41,919
with every single system on board the

140
00:04:45,270 --> 00:04:43,680
station so everything just kind of

141
00:04:46,390 --> 00:04:45,280
becomes reflex by the time they get up

142
00:04:48,469 --> 00:04:46,400
there they feel like they've already

143
00:04:51,749 --> 00:04:48,479
been there for two years

144
00:04:57,350 --> 00:04:54,230
my name is michael wally i want to know

145
00:05:01,990 --> 00:04:57,360
about how long you have to stay in bed

146
00:05:05,029 --> 00:05:03,670
so how long do you have to stay

147
00:05:11,430 --> 00:05:05,039
we didn't quite catch that could you ask

148
00:05:14,870 --> 00:05:13,029
i was asking how long do you have to

149
00:05:17,749 --> 00:05:14,880
stay in bed until you reach your

150
00:05:21,110 --> 00:05:19,510
how long do you have to stay in what i

151
00:05:22,390 --> 00:05:21,120
don't know

152
00:05:32,870 --> 00:05:22,400
sounds like you're saying how long do

153
00:05:36,870 --> 00:05:34,710
and i think he meant more in the space

154
00:05:39,189 --> 00:05:36,880
capsule they used to get up to the space

155
00:05:41,830 --> 00:05:39,199
station all right so about about how

156
00:05:45,189 --> 00:05:41,840
long so from when they launch how long

157
00:05:46,950 --> 00:05:45,199
does it take to get to the space station

158
00:05:48,629 --> 00:05:46,960
right so like how long they're saying

159
00:05:50,310 --> 00:05:48,639
when they're launching up okay so i mean

160
00:05:52,390 --> 00:05:50,320
that'll vary uh usually it only take a

161
00:05:54,310 --> 00:05:52,400
couple days even less

162
00:05:55,830 --> 00:05:54,320
the whole idea is that they're what

163
00:05:57,670 --> 00:05:55,840

takes a long time is that they have to

164
00:05:59,430 --> 00:05:57,680
try and get in orbit with the space

165
00:06:00,710 --> 00:05:59,440
station because the trip is very short

166
00:06:01,990 --> 00:06:00,720
it's only a couple hundred miles that

167
00:06:02,950 --> 00:06:02,000
they have to get up

168
00:06:04,550 --> 00:06:02,960
because they're launching from

169
00:06:06,550 --> 00:06:04,560
kazakhstan up to the station so that is

170
00:06:08,390 --> 00:06:06,560
a very very short but then they have to

171
00:06:09,749 --> 00:06:08,400
rendezvous with the station and they uh

172
00:06:11,350 --> 00:06:09,759
and they get in there so

173
00:06:13,510 --> 00:06:11,360
i mean even a day or less they're

174
00:06:15,350 --> 00:06:13,520
they're really there so about two days

175
00:06:17,990 --> 00:06:15,360
less than two days yes

176
00:06:18,830 --> 00:06:18,000
all right next question guys

177
00:06:20,070 --> 00:06:18,840
my name

178
00:06:21,670 --> 00:06:20,080
is and

179
00:06:24,870 --> 00:06:21,680
um how is the international space

180
00:06:26,390 --> 00:06:24,880
station beneficial to the earth

181
00:06:29,189 --> 00:06:26,400
how has it been how is the international

182
00:06:31,749 --> 00:06:29,199
space station beneficial to the earth ah

183
00:06:32,710 --> 00:06:31,759
i get that question a lot actually um

184
00:06:33,830 --> 00:06:32,720
so

185
00:06:35,270 --> 00:06:33,840
as you might or might not know the

186
00:06:36,150 --> 00:06:35,280
international space station does have a

187
00:06:38,710 --> 00:06:36,160
lot of

188
00:06:40,469 --> 00:06:38,720

crucial systems that are on board but uh

189
00:06:42,390 --> 00:06:40,479
on top of that they work on experiments

190
00:06:43,990 --> 00:06:42,400
every day so they're working on you know

191
00:06:45,430 --> 00:06:44,000
hundreds of different uh experiments

192
00:06:47,510 --> 00:06:45,440
that they're conducting that can only

193
00:06:48,390 --> 00:06:47,520
really be done in microgravity and if

194
00:06:49,909 --> 00:06:48,400
you look

195
00:06:53,189 --> 00:06:49,919
if you try to look on the web for a lot

196
00:06:55,350 --> 00:06:53,199
of the results they've come up with

197
00:06:57,430 --> 00:06:55,360
thousands of patents that are

198
00:07:00,070 --> 00:06:57,440
being generated from the from the

199
00:07:01,110 --> 00:07:00,080
station and it continues to produce more

200
00:07:03,350 --> 00:07:01,120
and more results that are really

201
00:07:05,430 --> 00:07:03,360
beneficial to us on the ground

202
00:07:07,189 --> 00:07:05,440
and i mean some of the ways like

203
00:07:09,510 --> 00:07:07,199
for example our astronauts on board the

204
00:07:12,390 --> 00:07:09,520
station have a recycling system that

205
00:07:14,469 --> 00:07:12,400
takes waste water even you know some

206
00:07:16,870 --> 00:07:14,479
some of the astronauts waste and it

207
00:07:19,430 --> 00:07:16,880
recycles everything to portable drinking

208
00:07:21,270 --> 00:07:19,440
water so one of their favorite quotes is

209
00:07:22,230 --> 00:07:21,280
today's water could be yesterday's

210
00:07:23,909 --> 00:07:22,240
coffee

211
00:07:26,309 --> 00:07:23,919
so something like that could have huge

212
00:07:28,230 --> 00:07:26,319
implications in places that are stricken

213
00:07:30,230 --> 00:07:28,240

by drought or don't have safe drinking

214
00:07:32,469 --> 00:07:30,240
water that's a technology that we

215
00:07:34,629 --> 00:07:32,479
develop just for space that we can then

216
00:07:44,070 --> 00:07:34,639
use down here on earth

217
00:07:47,990 --> 00:07:45,430
i'm sorry could you speak up a little

218
00:07:52,790 --> 00:07:50,309
uh my name is arshia and i wanted to

219
00:07:58,150 --> 00:07:52,800
know if you if ethos could be used to

220
00:08:03,110 --> 00:07:59,670
we heard yeah we heard something about

221
00:08:05,749 --> 00:08:03,120
colonizing another planet

222
00:08:07,189 --> 00:08:05,759
that's a good question um

223
00:08:09,430 --> 00:08:07,199
one more time real life just the first

224
00:08:12,150 --> 00:08:09,440
part real loud

225
00:08:15,110 --> 00:08:12,160
can ethos be used colonize another

226
00:08:19,189 --> 00:08:16,629
you can eat those so

227
00:08:20,629 --> 00:08:19,199
could you go colonize another planet

228
00:08:21,670 --> 00:08:20,639
by myself that would be very difficult

229
00:08:23,670 --> 00:08:21,680
to do

230
00:08:24,790 --> 00:08:23,680
i think in general

231
00:08:26,309 --> 00:08:24,800
for

232
00:08:27,589 --> 00:08:26,319
the international space station you know

233
00:08:29,589 --> 00:08:27,599
as part of our efforts to try and

234
00:08:31,110 --> 00:08:29,599
colonize another planet it's possible

235
00:08:32,469 --> 00:08:31,120
just because we're able to recycle a lot

236
00:08:35,190 --> 00:08:32,479
of our resources so when you were

237
00:08:37,750 --> 00:08:35,200
talking about uh transforming you know

238
00:08:39,269 --> 00:08:37,760

the yesterday's coffee in today's water

239
00:08:41,269 --> 00:08:39,279
it's the same thing so you know the next

240
00:08:43,430 --> 00:08:41,279
thing would be maybe to you know produce

241
00:08:44,790 --> 00:08:43,440
food with uh you know leftover carbon or

242
00:08:46,870 --> 00:08:44,800
anything like that but absolutely

243
00:08:48,389 --> 00:08:46,880
recycling our resources is what could

244
00:08:50,070 --> 00:08:48,399
bring us to the next step of uh

245
00:08:52,070 --> 00:08:50,080
colonizing another planet absolutely

246
00:08:53,990 --> 00:08:52,080
yeah i mean the the space station really

247
00:08:55,670 --> 00:08:54,000
is it's kind of serving us our test bed

248
00:08:57,590 --> 00:08:55,680
so we're still pretty close to earth so

249
00:08:59,430 --> 00:08:57,600
if anything goes wrong we can get back

250
00:09:00,949 --> 00:08:59,440
but we're using it to figure out a lot

251
00:09:02,710 --> 00:09:00,959
of the different technologies and

252
00:09:05,030 --> 00:09:02,720
methods that we would need if we're

253
00:09:07,910 --> 00:09:05,040
going to go to a place like mars or an

254
00:09:09,590 --> 00:09:07,920
asteroid or something like that so we're

255
00:09:11,350 --> 00:09:09,600
making the technologies now that we're

256
00:09:14,150 --> 00:09:11,360
going to use tomorrow

257
00:09:16,630 --> 00:09:14,160
all right next question guys

258
00:09:18,150 --> 00:09:16,640
my name is brandon and um what do you do

259
00:09:23,430 --> 00:09:18,160
for free time

260
00:09:24,630 --> 00:09:23,440
okay so although their uh schedule is

261
00:09:27,590 --> 00:09:24,640
pretty regimented throughout the day

262
00:09:28,949 --> 00:09:27,600
they do have time off they have uh

263
00:09:30,630 --> 00:09:28,959

time where they can either spend with

264
00:09:32,710 --> 00:09:30,640
their family as we talked about before

265
00:09:34,630 --> 00:09:32,720
they can also you know watch movies they

266
00:09:36,230 --> 00:09:34,640
can you know just stare out the window

267
00:09:39,110 --> 00:09:36,240
they have this one module called the

268
00:09:40,790 --> 00:09:39,120
cupola and they uh it's this giant

269
00:09:42,230 --> 00:09:40,800
view of earth and so they can stare down

270
00:09:44,070 --> 00:09:42,240
at that we find a lot of astronauts

271
00:09:45,590 --> 00:09:44,080
actually spend a lot of time looking

272
00:09:47,829 --> 00:09:45,600
down at earth and just kind of relaxing

273
00:09:49,750 --> 00:09:47,839
like that so although their day-to-day

274
00:09:51,190 --> 00:09:49,760
is very regimented with their exercise

275
00:09:54,470 --> 00:09:51,200
and with their experiments things like

276
00:09:57,750 --> 00:09:54,480
that they are spending some time off

277
00:10:02,230 --> 00:09:59,829
my question is do

278
00:10:04,389 --> 00:10:02,240
do your organs function differently in

279
00:10:06,310 --> 00:10:04,399
space

280
00:10:08,230 --> 00:10:06,320
so this was actually thought of a lot uh

281
00:10:09,670 --> 00:10:08,240
during the mercury gemini and apollo

282
00:10:11,910 --> 00:10:09,680
programs where the medical community

283
00:10:14,389 --> 00:10:11,920
didn't believe that astronauts could

284
00:10:16,470 --> 00:10:14,399
really survive in space but as it turns

285
00:10:18,550 --> 00:10:16,480
out you know all the organ function is

286
00:10:20,550 --> 00:10:18,560
almost exactly the same as we talked

287
00:10:22,069 --> 00:10:20,560
about before there was some small bone

288
00:10:23,990 --> 00:10:22,079

loss that occurs but that's why they try

289
00:10:26,470 --> 00:10:24,000
to combat it with exercise other than

290
00:10:28,949 --> 00:10:26,480
that bodily function is actually almost

291
00:10:31,030 --> 00:10:28,959
very similar to what is on earth

292
00:10:33,590 --> 00:10:31,040
all right next question guys that was a

293
00:10:35,590 --> 00:10:33,600
good one

294
00:10:38,069 --> 00:10:35,600
hi my name is nicole williams and i was

295
00:10:42,310 --> 00:10:38,079
wondering if have you ever had any

296
00:10:44,550 --> 00:10:42,320
emergency situations on the iss if so

297
00:10:46,550 --> 00:10:44,560
how did you fix this

298
00:10:48,470 --> 00:10:46,560
so if we had any emergencies on iss

299
00:10:49,990 --> 00:10:48,480
thankfully we have not had any real

300
00:10:52,470 --> 00:10:50,000
emergency on the international space

301
00:10:54,150 --> 00:10:52,480
station however that's something that i

302
00:10:55,590 --> 00:10:54,160
deal with a lot in training is trying to

303
00:10:57,990 --> 00:10:55,600
deal with the three big emergencies

304
00:11:00,230 --> 00:10:58,000
which is your fire your rapid depress

305
00:11:01,350 --> 00:11:00,240
and toxic atmosphere and what's rapid

306
00:11:03,750 --> 00:11:01,360
depression

307
00:11:05,030 --> 00:11:03,760
a rapid depress is when if you have like

308
00:11:06,470 --> 00:11:05,040
you know a hole in the station or

309
00:11:08,150 --> 00:11:06,480
something like that from like a small

310
00:11:09,750 --> 00:11:08,160
meteor hitting it or you know any

311
00:11:12,069 --> 00:11:09,760
anywhere where you're losing pressure

312
00:11:13,430 --> 00:11:12,079
from the station at a very fast rate uh

313
00:11:15,030 --> 00:11:13,440

so what we try to do is we try to

314
00:11:16,470 --> 00:11:15,040
isolate that and maybe patch it up if

315
00:11:17,750 --> 00:11:16,480
it's small enough and the same thing

316
00:11:19,509 --> 00:11:17,760
with the toxic atmosphere if there's

317
00:11:20,870 --> 00:11:19,519
ammonia that goes into the cabin or

318
00:11:22,389 --> 00:11:20,880
anything else that's a spill or

319
00:11:23,910 --> 00:11:22,399
something that can really be considered

320
00:11:25,990 --> 00:11:23,920
an emergency event but thankfully we

321
00:11:27,829 --> 00:11:26,000
have not had any emergencies on iss but

322
00:11:28,790 --> 00:11:27,839
we are prepared in case any of them were

323
00:11:30,389 --> 00:11:28,800
to happen

324
00:11:32,870 --> 00:11:30,399
that's right these these guys here at

325
00:11:34,389 --> 00:11:32,880
mission control train very extensively

326
00:11:36,069 --> 00:11:34,399
probably just as much if not more than

327
00:11:38,550 --> 00:11:36,079
these astronauts just to get ready to

328
00:11:39,990 --> 00:11:38,560
handle because everyone in this room is

329
00:11:41,670 --> 00:11:40,000
really controlling most of the stuff

330
00:11:43,509 --> 00:11:41,680
onboard the international space station

331
00:11:45,190 --> 00:11:43,519
so if something were to happen they're

332
00:11:46,949 --> 00:11:45,200
the ones responsible for making sure

333
00:11:48,470 --> 00:11:46,959
everything turns out okay that's right

334
00:11:50,069 --> 00:11:48,480
they're they're they're very ready and

335
00:11:52,949 --> 00:11:50,079
they're very prepared

336
00:11:54,629 --> 00:11:52,959
all right next question

337
00:11:56,230 --> 00:11:54,639
my name is nani vanket and i was

338
00:12:00,550 --> 00:11:56,240

wondering what kind of research is

339
00:12:03,990 --> 00:12:02,389
what kind of research is conducted

340
00:12:05,750 --> 00:12:04,000
onboard the international space station

341
00:12:07,110 --> 00:12:05,760
so there is a multitude of research

342
00:12:09,190 --> 00:12:07,120
that's uh being done on the space

343
00:12:11,110 --> 00:12:09,200
station when it comes to uh if they're

344
00:12:12,629 --> 00:12:11,120
trying to use combustion products or

345
00:12:15,030 --> 00:12:12,639
they're trying to you know figure out

346
00:12:16,150 --> 00:12:15,040
how uh insects survive in space or

347
00:12:17,350 --> 00:12:16,160
they're trying to figure out you know

348
00:12:18,629 --> 00:12:17,360
all kinds of things that they're trying

349
00:12:20,470 --> 00:12:18,639
to take advantage of the fact that

350
00:12:22,550 --> 00:12:20,480
they're in this microgravity uh

351
00:12:24,310 --> 00:12:22,560
environment but uh if you look on the

352
00:12:25,829 --> 00:12:24,320
web there are thousands of them that are

353
00:12:27,670 --> 00:12:25,839
being done at the same time i can't even

354
00:12:29,190 --> 00:12:27,680
start to think of you know really what

355
00:12:31,110 --> 00:12:29,200
they're what they're working on yeah

356
00:12:32,389 --> 00:12:31,120
just some of the stuff that uh we were

357
00:12:33,750 --> 00:12:32,399
just taking a look inside the

358
00:12:36,550 --> 00:12:33,760
international space station this is a

359
00:12:39,350 --> 00:12:36,560
live view of our nasa astronaut joe

360
00:12:41,110 --> 00:12:39,360
acaba and he was doing some combustion

361
00:12:43,910 --> 00:12:41,120
experiments so he was basically lighting

362
00:12:45,350 --> 00:12:43,920
things on fire earlier today and they're

363
00:12:47,269 --> 00:12:45,360

just trying to figure out because fire

364
00:12:49,670 --> 00:12:47,279
reacts very differently when you don't

365
00:12:52,069 --> 00:12:49,680
have gravity down here on earth so our

366
00:12:54,230 --> 00:12:52,079
scientists are finding out how it reacts

367
00:12:56,150 --> 00:12:54,240
and how they can you know suppress any

368
00:12:58,310 --> 00:12:56,160
fires

369
00:13:00,310 --> 00:12:58,320
they do a lot of biomedical experiments

370
00:13:02,150 --> 00:13:00,320
looking at how the body reacts to

371
00:13:04,629 --> 00:13:02,160
microgravity and also different things

372
00:13:06,710 --> 00:13:04,639
like stress and close environments and

373
00:13:08,790 --> 00:13:06,720
diets and things like that

374
00:13:10,550 --> 00:13:08,800
and then there's materials there's there

375
00:13:12,470 --> 00:13:10,560
really are thousands of studies that

376
00:13:16,629 --> 00:13:12,480
take place on board the station

377
00:13:22,150 --> 00:13:18,829
how do you um how do the astronauts

378
00:13:26,389 --> 00:13:24,629
how do they sleep okay so that's another

379
00:13:28,550 --> 00:13:26,399
good question in uh in one of the

380
00:13:30,069 --> 00:13:28,560
modules that's called node two what they

381
00:13:32,629 --> 00:13:30,079
do is they have these areas called the

382
00:13:34,629 --> 00:13:32,639
crew quarters and uh it's this kind of

383
00:13:36,310 --> 00:13:34,639
padded room where they're able to you

384
00:13:37,910 --> 00:13:36,320
know stand up they can strap themselves

385
00:13:40,069 --> 00:13:37,920
to the wall they have a fan that's in

386
00:13:41,990 --> 00:13:40,079
there and surprisingly they they find it

387
00:13:43,269 --> 00:13:42,000
very comfortable to be in that area so

388
00:13:44,629 --> 00:13:43,279

you'd think you know you need to be

389
00:13:45,750 --> 00:13:44,639
laying down you need to be in a bed

390
00:13:47,509 --> 00:13:45,760
something like that but those crew

391
00:13:49,189 --> 00:13:47,519
quarters are designed specifically for

392
00:13:51,110 --> 00:13:49,199
the astronauts to be able to sleep and

393
00:13:53,670 --> 00:13:51,120
they sleep you know almost eight hours

394
00:13:55,350 --> 00:13:53,680
every single night absolutely and they i

395
00:13:57,030 --> 00:13:55,360
mean even back on the shuttle when you

396
00:13:58,870 --> 00:13:57,040
don't really have your own little crew

397
00:14:00,710 --> 00:13:58,880
quarter they usually strap themselves

398
00:14:02,310 --> 00:14:00,720
down because i mean when you're in that

399
00:14:03,750 --> 00:14:02,320
microgravity environment when you're

400
00:14:05,590 --> 00:14:03,760
you're sleeping you could just float off

401
00:14:07,030 --> 00:14:05,600
and start bumping into things right so

402
00:14:09,189 --> 00:14:07,040
they kind of have like these sleeping

403
00:14:11,829 --> 00:14:09,199
bags that they can crawl into and strap

404
00:14:13,430 --> 00:14:11,839
themselves to a wall or something so you

405
00:14:15,110 --> 00:14:13,440
you don't really get that sensation of

406
00:14:16,710 --> 00:14:15,120
laying down but you can kind of stay in

407
00:14:17,990 --> 00:14:16,720
one place and make sure you don't float

408
00:14:19,590 --> 00:14:18,000
off and bump your head on something

409
00:14:22,069 --> 00:14:19,600
while you're sleeping

410
00:14:23,829 --> 00:14:22,079
all right next question guys

411
00:14:25,430 --> 00:14:23,839
that was the last question for my

412
00:14:27,030 --> 00:14:25,440
students but my name is tony williams

413
00:14:28,710 --> 00:14:27,040

i'm the program manager for the stem

414
00:14:31,910 --> 00:14:28,720
program so i have a question in regards

415
00:14:34,150 --> 00:14:31,920
to emergency situations with the crew

416
00:14:36,470 --> 00:14:34,160
have you had any and if you do how do

417
00:14:39,110 --> 00:14:36,480
you handle it

418
00:14:40,790 --> 00:14:39,120
any emergency situations with the crew

419
00:14:42,629 --> 00:14:40,800
have we had any

420
00:14:44,790 --> 00:14:42,639
with the crew on the iss

421
00:14:46,389 --> 00:14:44,800
so you're just talking emergencies with

422
00:14:49,350 --> 00:14:46,399
the crew members

423
00:14:50,710 --> 00:14:49,360
it could be medical things like that

424
00:14:52,230 --> 00:14:50,720
so as far as i know of there haven't

425
00:14:54,150 --> 00:14:52,240
been any that have been classified

426
00:14:56,310 --> 00:14:54,160
exactly as an emergency situation we

427
00:14:57,829 --> 00:14:56,320
have had a couple uh minor things that

428
00:14:58,710 --> 00:14:57,839
have happened with the crew but it's

429
00:15:00,069 --> 00:14:58,720
really

430
00:15:01,430 --> 00:15:00,079
you know very small things that have

431
00:15:03,990 --> 00:15:01,440
happened certainly nothing that would be

432
00:15:05,990 --> 00:15:04,000
constituted as an emergency uh which is

433
00:15:09,430 --> 00:15:06,000
which is we're very thankful for for

434
00:15:11,750 --> 00:15:09,440
happening so and i mean in case of and

435
00:15:14,389 --> 00:15:11,760
we we always plan for you know any

436
00:15:15,990 --> 00:15:14,399
scenario possible so let's say there's a

437
00:15:17,670 --> 00:15:16,000
medical emergency with one of the crew

438
00:15:18,949 --> 00:15:17,680

members on board

439
00:15:20,949 --> 00:15:18,959
each of the crew members as part of

440
00:15:23,030 --> 00:15:20,959
their training gets some proficiency as

441
00:15:25,189 --> 00:15:23,040
a medical officer and then there are

442
00:15:27,829 --> 00:15:25,199
always flight surgeons so people down

443
00:15:29,749 --> 00:15:27,839
here on the ground that can walk through

444
00:15:32,230 --> 00:15:29,759
the other crew members through any

445
00:15:33,670 --> 00:15:32,240
necessary treatment or things like that

446
00:15:35,350 --> 00:15:33,680
and it's actually

447
00:15:37,430 --> 00:15:35,360
another one of the technologies that

448
00:15:38,829 --> 00:15:37,440
nasa is proving onboard the

449
00:15:41,430 --> 00:15:38,839
international space station that's

450
00:15:42,870 --> 00:15:41,440
telemedicine they do regular checkups

451
00:15:44,949 --> 00:15:42,880
and things like that with the crew

452
00:15:46,949 --> 00:15:44,959
members and it's all you know for people

453
00:15:48,629 --> 00:15:46,959
down here on the ground a few hundred or

454
00:15:50,389 --> 00:15:48,639
a few thousand miles away depending on

455
00:15:53,030 --> 00:15:50,399
where the station is

456
00:15:55,590 --> 00:15:53,040
with these astronauts up in space and

457
00:15:58,310 --> 00:15:55,600
that's had direct implications in

458
00:16:00,470 --> 00:15:58,320
uh providing medicine to places in

459
00:16:02,230 --> 00:16:00,480
fairly isolated locations that may not

460
00:16:04,629 --> 00:16:02,240
have uh the

461
00:16:06,389 --> 00:16:04,639
you know doctors and people with the

462
00:16:08,389 --> 00:16:06,399
real technical knowledge but you have

463
00:16:11,189 --> 00:16:08,399

patients that have a need for that you

464
00:16:13,670 --> 00:16:11,199
can then have your doctors use what's

465
00:16:15,910 --> 00:16:13,680
called telemedicine so basically video

466
00:16:18,470 --> 00:16:15,920
audio communications to then treat

467
00:16:20,069 --> 00:16:18,480
people from a remote location

468
00:16:22,230 --> 00:16:20,079
so that would pretty much be how we

469
00:16:25,670 --> 00:16:22,240
handle any emergency situations with

470
00:16:28,870 --> 00:16:25,680
crew members on board the station

471
00:16:31,350 --> 00:16:28,880
any other questions from anybody else

472
00:16:36,710 --> 00:16:31,360
the other question the scope take about

473
00:16:53,189 --> 00:16:39,590
three more questions one two

474
00:16:57,110 --> 00:16:55,269
hello again my name is nicholas devine

475
00:17:00,790 --> 00:16:57,120
my question is um

476
00:17:03,189 --> 00:17:00,800
would the iss uh soon or in the you

477
00:17:06,549 --> 00:17:03,199
should be used as a transit talk

478
00:17:10,630 --> 00:17:06,559
for spacecraft um trying to discover new

479
00:17:13,350 --> 00:17:12,069
so it sounds like you want to know if

480
00:17:15,429 --> 00:17:13,360
it's going to be like the enterprise

481
00:17:17,829 --> 00:17:15,439
from star trek kind of is is the iss

482
00:17:20,630 --> 00:17:17,839
going to be used to discover new places

483
00:17:22,150 --> 00:17:20,640
well it does have the ability to

484
00:17:23,909 --> 00:17:22,160
thrust to different areas but we're

485
00:17:25,669 --> 00:17:23,919
talking about very small reboosts and

486
00:17:27,429 --> 00:17:25,679
things like that unfortunately it wasn't

487
00:17:29,350 --> 00:17:27,439
built really to

488
00:17:31,669 --> 00:17:29,360

explore another area just because of its

489
00:17:33,350 --> 00:17:31,679
uh you know the kind of thrusters that

490
00:17:35,110 --> 00:17:33,360
are on the side but there's always the

491
00:17:36,710 --> 00:17:35,120
capability that if we built any other

492
00:17:39,110 --> 00:17:36,720
ship in space or anything and we use the

493
00:17:40,870 --> 00:17:39,120
iss to do so that it's a possibility

494
00:17:44,789 --> 00:17:40,880
that we can go to other places

495
00:17:46,870 --> 00:17:44,799
and i mean your large future spacecraft

496
00:17:48,630 --> 00:17:46,880
are going to have things a lot like what

497
00:17:50,710 --> 00:17:48,640
the astronauts live in onboard the

498
00:17:53,110 --> 00:17:50,720
international space station kind of like

499
00:17:55,510 --> 00:17:53,120
these habitation modules so like when we

500
00:17:57,830 --> 00:17:55,520
eventually send people to mars they'll

501
00:17:59,669 --> 00:17:57,840
have big rockets that send cargo and

502
00:18:01,909 --> 00:17:59,679
things like that there but you'll also

503
00:18:04,390 --> 00:18:01,919
have these kind of modules that just

504
00:18:06,630 --> 00:18:04,400
look like big pods that the astronauts

505
00:18:08,549 --> 00:18:06,640
will live in on their journey out there

506
00:18:11,990 --> 00:18:08,559
and those will look very similar to

507
00:18:15,669 --> 00:18:12,000
what's on board the station right now

508
00:18:20,230 --> 00:18:17,830
uh yes my name is tahana washington i

509
00:18:25,830 --> 00:18:20,240
wanted to know about the new substances

510
00:18:30,950 --> 00:18:28,549
new substance new substances that they

511
00:18:32,390 --> 00:18:30,960
find in their missions

512
00:18:33,750 --> 00:18:32,400
that's a good question

513
00:18:36,310 --> 00:18:33,760

they're not really

514
00:18:37,590 --> 00:18:36,320
um out exploring you know far off

515
00:18:39,110 --> 00:18:37,600
planets or anything like that so they

516
00:18:41,270 --> 00:18:39,120
aren't really discovering new things

517
00:18:43,750 --> 00:18:41,280
they're discovering how substances that

518
00:18:46,310 --> 00:18:43,760
we already know of react differently in

519
00:18:48,230 --> 00:18:46,320
microgravity like a little while ago i

520
00:18:50,549 --> 00:18:48,240
talked about how joe acaba was lighting

521
00:18:52,549 --> 00:18:50,559
things on fire earlier today just to see

522
00:18:56,470 --> 00:18:52,559
how different fuel samples burn and then

523
00:18:58,470 --> 00:18:56,480
react in microgravity they also do

524
00:19:00,390 --> 00:18:58,480
different work with different material

525
00:19:05,750 --> 00:19:00,400
substances

526
00:19:08,150 --> 00:19:05,760
things like bacteria and enzymes react

527
00:19:09,990 --> 00:19:08,160
very differently in microgravity

528
00:19:11,750 --> 00:19:10,000
for example we've been working on

529
00:19:14,310 --> 00:19:11,760
developing a

530
00:19:15,669 --> 00:19:14,320
vaccine to food poisoning salmonella so

531
00:19:17,590 --> 00:19:15,679
if any of you have had food poisoning

532
00:19:19,110 --> 00:19:17,600
before you know just how awesome that

533
00:19:20,870 --> 00:19:19,120
would be to have a vaccine that would

534
00:19:22,710 --> 00:19:20,880
prevent that so we aren't really

535
00:19:25,350 --> 00:19:22,720
discovering anything new but we're

536
00:19:27,350 --> 00:19:25,360
discovering how substances we already

537
00:19:31,110 --> 00:19:27,360
know about how they react differently

538
00:19:33,830 --> 00:19:31,120

and what more we can learn about them

539
00:19:35,909 --> 00:19:33,840
all right next question

540
00:19:39,110 --> 00:19:35,919
um i'm teddy song

541
00:19:41,990 --> 00:19:39,120
and i got the food on board

542
00:19:43,350 --> 00:19:42,000
um is there like any differences with

543
00:19:45,350 --> 00:19:43,360
the food here i know it's all

544
00:19:50,230 --> 00:19:45,360
freeze-dried but it sounds kind of

545
00:19:53,830 --> 00:19:52,230
okay that's another good question so as

546
00:19:55,669 --> 00:19:53,840
far as space food goes you'll find that

547
00:19:57,029 --> 00:19:55,679
a lot of it is actually almost exactly

548
00:19:58,789 --> 00:19:57,039
the same that it is on earth the only

549
00:20:01,110 --> 00:19:58,799
difference is that it comes up actually

550
00:20:02,789 --> 00:20:01,120
completely dehydrated and they have to

551
00:20:04,950 --> 00:20:02,799
go to the potable water dispenser and

552
00:20:06,390 --> 00:20:04,960
they have to try and hydrate that uh

553
00:20:07,590 --> 00:20:06,400
that food so they can eat it and another

554
00:20:09,510 --> 00:20:07,600
thing that they find is that a lot of

555
00:20:10,549 --> 00:20:09,520
the food is actually very bland when

556
00:20:12,630 --> 00:20:10,559
they're up there so they have to be able

557
00:20:14,230 --> 00:20:12,640
to add spices and things like that one

558
00:20:16,070 --> 00:20:14,240
of the favorite foods that astronauts

559
00:20:17,909 --> 00:20:16,080
actually enjoy a lot now is shrimp

560
00:20:19,190 --> 00:20:17,919
cocktail so they really

561
00:20:20,870 --> 00:20:19,200
like having that you know that extra

562
00:20:22,310 --> 00:20:20,880
sauce and they like having

563
00:20:23,590 --> 00:20:22,320

certain things that can really activate

564
00:20:25,430 --> 00:20:23,600
their taste buds but you'll find a lot

565
00:20:27,590 --> 00:20:25,440
of the food is exactly the same

566
00:20:29,590 --> 00:20:27,600
yeah i mean they

567
00:20:31,350 --> 00:20:29,600
um our food scientists here at the

568
00:20:32,789 --> 00:20:31,360
johnson space center will actually go

569
00:20:34,950 --> 00:20:32,799
and buy a lot of the food that's flown

570
00:20:37,270 --> 00:20:34,960
up there just at local grocery stores

571
00:20:38,950 --> 00:20:37,280
but they have to do research and process

572
00:20:41,430 --> 00:20:38,960
the food and package it and like you

573
00:20:42,390 --> 00:20:41,440
said freeze dry it dehydrate it so they

574
00:20:44,310 --> 00:20:42,400
can

575
00:20:46,230 --> 00:20:44,320
preserve it for long periods of time on

576
00:20:49,350 --> 00:20:46,240
board the station

577
00:20:52,630 --> 00:20:49,360
all right any more questions

578
00:20:54,870 --> 00:20:52,640
i think that is it for us um on behalf

579
00:20:56,789 --> 00:20:54,880
of the students here at the stem

580
00:20:58,630 --> 00:20:56,799
acceleration experience program we want

581
00:21:06,470 --> 00:20:58,640
to thank you for your time let's give

582
00:21:10,549 --> 00:21:08,230
all right well thank you guys those are

583
00:21:13,350 --> 00:21:10,559
some fantastic questions

584
00:21:15,270 --> 00:21:13,360
that you've given us

585
00:21:18,950 --> 00:21:15,280
young people's knowledge in regards to

586
00:21:20,789 --> 00:21:18,960
space so again thank you very much

587
00:21:22,310 --> 00:21:20,799
all right well we always we always love

588
00:21:24,070 --> 00:21:22,320

taking questions thanks for coming in

589
00:21:25,750 --> 00:21:24,080
and visiting us here in mission control

590
00:21:27,350 --> 00:21:25,760
rich thanks for coming on and answering

591
00:21:29,750 --> 00:21:27,360
some questions with me thanks for having

592
00:21:30,390 --> 00:21:29,760
me real pleasure all right guys stay in

593
00:21:31,909 --> 00:21:30,400
school