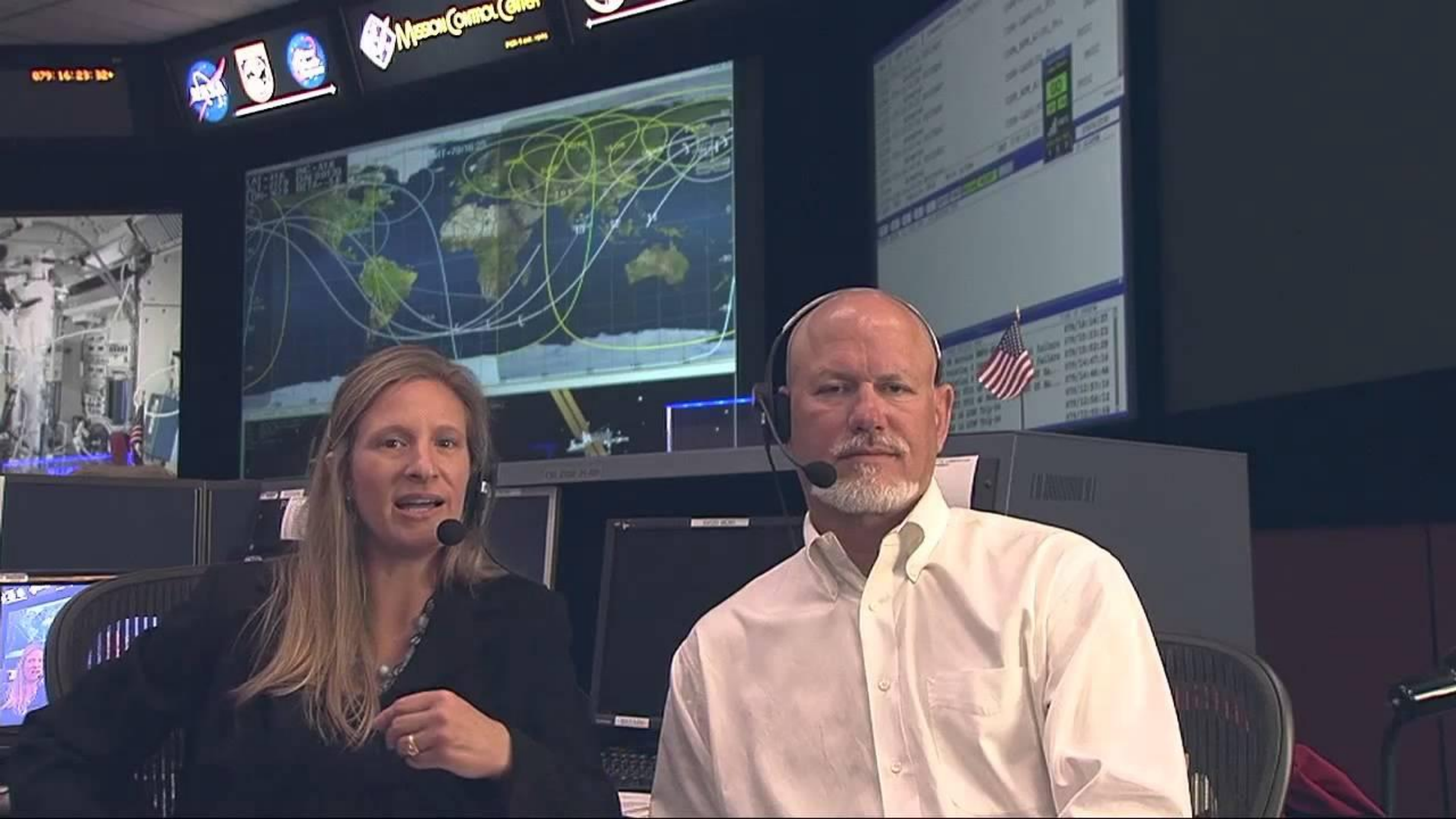
MISSION CONTROL CENTER

1
00:00:05,749 --> 00:00:03,750
hi i'm kelly humphries in mission

2
00:00:08,150 --> 00:00:05,759
control houston and i've got a special

3
00:00:20,390 --> 00:00:08,160
guest christy sauer here with me

4
00:00:23,429 --> 00:00:21,750
and so we're ready for your questions

5
00:00:25,910 --> 00:00:23,439
whenever you want to go

6
00:00:28,310 --> 00:00:25,920
okay oh my name is true lee and i want

7
00:00:30,070 --> 00:00:28,320
to ask a question do astronaut have

8
00:00:37,350 --> 00:00:30,080
trouble walking when they return to

9
00:00:40,709 --> 00:00:39,190
and the question was do astronauts have

10
00:00:51,430 --> 00:00:40,719
trouble walking when they return to

11
00:00:54,470 --> 00:00:52,470
thank you

12
00:00:56,150 --> 00:00:54,480
good morning great question

13
00:00:58,869 --> 00:00:56,160

yes it can be challenging for the

14
00:01:01,029 --> 00:00:58,879
astronauts once they get back to earth

15
00:01:03,990 --> 00:01:01,039
feeling gravity again after being away

16
00:01:05,830 --> 00:01:04,000
for it for so long but you know they do

17
00:01:07,990 --> 00:01:05,840
so much exercise while they're up there

18
00:01:10,070 --> 00:01:08,000
to keep their muscles and bones strong

19
00:01:11,670 --> 00:01:10,080
that it really does help to reduce that

20
00:01:13,429 --> 00:01:11,680
that effect and they do bounce back

21
00:01:15,429 --> 00:01:13,439
pretty quickly but um you'll even see in

22
00:01:17,109 --> 00:01:15,439
some of the photos as the crew get back

23
00:01:18,310 --> 00:01:17,119
uh folks standing on either side of them

24
00:01:19,990 --> 00:01:18,320
helping them

25
00:01:21,990 --> 00:01:20,000
to walk when they first get back and and

26
00:01:23,030 --> 00:01:22,000
to make sure that they don't stumble at

27
00:01:29,510 --> 00:01:23,040
all but

28
00:01:35,270 --> 00:01:31,590
what future leader has another question

29
00:01:35,280 --> 00:01:38,950
hi my name

30
00:01:48,710 --> 00:01:42,630
do is ever seem to have an emotion and

31
00:01:51,350 --> 00:01:49,910
okay we're having a little trouble

32
00:01:53,350 --> 00:01:51,360
hearing if you can speak up that would

33
00:01:57,429 --> 00:01:53,360
be great uh but well i think we've got

34
00:02:03,270 --> 00:02:00,469
do astronauts ever have

35
00:02:07,350 --> 00:02:03,280
to have a mixed emotions and feeling of

36
00:02:10,550 --> 00:02:08,469
all right and if you didn't quite hear

37
00:02:13,350 --> 00:02:10,560
that one um she was asking do you

38
00:02:16,309 --> 00:02:13,360

actually ever talk a little bit about

39
00:02:19,030 --> 00:02:16,319
yeah do crew members ever struggle uh

40
00:02:20,630 --> 00:02:19,040
psychologically while being up there so

41
00:02:22,710 --> 00:02:20,640
you know let me tell you that the the

42
00:02:24,470 --> 00:02:22,720
crew members have very packed schedules

43
00:02:26,630 --> 00:02:24,480
while they're up there there's a lot of

44
00:02:27,910 --> 00:02:26,640
maintenance a lot of experiments and

45
00:02:29,589 --> 00:02:27,920
science and technology that needs to be

46
00:02:31,430 --> 00:02:29,599
done while they're up there so first of

47
00:02:33,110 --> 00:02:31,440
all that's going to keep them very busy

48
00:02:34,229 --> 00:02:33,120
to keep their minds off of being away

49
00:02:36,470 --> 00:02:34,239
from home and things like that but at

50
00:02:39,910 --> 00:02:36,480
the same time nasa very much

51
00:02:41,990 --> 00:02:39,920
acknowledges the challenges of um

52
00:02:43,990 --> 00:02:42,000
of being away from family being in a

53
00:02:46,390 --> 00:02:44,000
remote location and so there are a lot

54
00:02:48,949 --> 00:02:46,400
of things also in place to make that

55
00:02:51,350 --> 00:02:48,959
experience easier for example being able

56
00:02:52,470 --> 00:02:51,360
to communicate with family via email and

57
00:02:54,470 --> 00:02:52,480
calls

58
00:02:56,150 --> 00:02:54,480
also having some time for entertainment

59
00:02:57,990 --> 00:02:56,160
you know they get to exercise have to

60
00:02:58,790 --> 00:02:58,000
exercise regularly to keep their bodies

61
00:03:00,550 --> 00:02:58,800
fit

62
00:03:02,309 --> 00:03:00,560
and that gives again a chance to

63
00:03:04,070 --> 00:03:02,319

rejuvenate

64
00:03:06,070 --> 00:03:04,080
and you know those times where they get

65
00:03:08,470 --> 00:03:06,080
to look out the window and just look

66
00:03:10,149 --> 00:03:08,480
back at earth and look at the stars um i

67
00:03:12,309 --> 00:03:10,159
i know that is so cherished by the crew

68
00:03:13,750 --> 00:03:12,319
and again helps them psychologically

69
00:03:16,390 --> 00:03:13,760
with those challenges of being up there

70
00:03:17,750 --> 00:03:16,400
so for the most part um uh don't hear

71
00:03:19,589 --> 00:03:17,760
much about that and and you know

72
00:03:20,869 --> 00:03:19,599
honestly a lot of crew members will will

73
00:03:22,630 --> 00:03:20,879
keep that to themselves a little bit

74
00:03:24,470 --> 00:03:22,640
even if they do feel something wanting

75
00:03:26,309 --> 00:03:24,480
to push through with their uh you know

76
00:03:28,149 --> 00:03:26,319
they're very motivated people very

77
00:03:29,430 --> 00:03:28,159
driven and not going to let that stuff

78
00:03:30,789 --> 00:03:29,440
get in their way

79
00:03:32,149 --> 00:03:30,799
and just to add a little bit to that you

80
00:03:34,070 --> 00:03:32,159
know they have christy mentioned the

81
00:03:36,309 --> 00:03:34,080
different communications methods they

82
00:03:37,830 --> 00:03:36,319
actually have a internet telephone that

83
00:03:39,750 --> 00:03:37,840
they can call down to their friends and

84
00:03:41,750 --> 00:03:39,760
family on the earth to talk to them

85
00:03:44,070 --> 00:03:41,760
anytime they want to really

86
00:03:45,670 --> 00:03:44,080
they have email they have the internet

87
00:03:47,350 --> 00:03:45,680
on board the space station so they go

88
00:03:49,509 --> 00:03:47,360

look something up or order flowers for

89
00:03:51,350 --> 00:03:49,519
their kids when it's their graduation

90
00:03:54,630 --> 00:03:51,360
day or whatever and we send them up

91
00:03:56,470 --> 00:03:54,640
movies and sometimes sporting events

92
00:03:59,350 --> 00:03:56,480
and videotape of their friends and

93
00:04:01,429 --> 00:03:59,360
family as they're doing different things

94
00:04:03,350 --> 00:04:01,439
on the earth to help them keep

95
00:04:05,589 --> 00:04:03,360
involved with what's going on back here

96
00:04:07,509 --> 00:04:05,599
at home and so there's a lot of effort

97
00:04:08,949 --> 00:04:07,519
put into making sure that they don't get

98
00:04:11,270 --> 00:04:08,959
to that point and

99
00:04:13,670 --> 00:04:11,280
they also have a periodic talk with

100
00:04:15,429 --> 00:04:13,680
their doctor on the ground so that

101
00:04:17,430 --> 00:04:15,439
the doctor can help them keep a look out

102
00:04:19,030 --> 00:04:17,440
for any symptoms that they not might not

103
00:04:20,150 --> 00:04:19,040
be understanding

104
00:04:23,430 --> 00:04:20,160
that would indicate that they were

105
00:04:25,909 --> 00:04:23,440
having that kind of a problem

106
00:04:27,510 --> 00:04:25,919
and for the ann richards school a quick

107
00:04:29,830 --> 00:04:27,520
question i was just wondering do you

108
00:04:30,629 --> 00:04:29,840
guys have an external microphone and if

109
00:04:32,550 --> 00:04:30,639
so

110
00:04:34,950 --> 00:04:32,560
would you be able to move it even closer

111
00:04:36,550 --> 00:04:34,960
to the students if you don't then have

112
00:04:38,070 --> 00:04:36,560
the students get closer to the computer

113
00:04:39,110 --> 00:04:38,080

so we can definitely hear their next

114
00:04:41,670 --> 00:04:39,120
question

115
00:04:44,070 --> 00:04:41,680
okay um let's try bella's to get closer

116
00:04:46,150 --> 00:04:44,080
the microphone won't isn't plugging in

117
00:04:47,670 --> 00:04:46,160
um

118
00:04:50,950 --> 00:04:47,680
and let's just tell her where you can

119
00:04:52,230 --> 00:04:50,960
see it is right here good

120
00:04:59,990 --> 00:04:52,240
that's great

121
00:05:06,550 --> 00:05:02,710
does the space food taste exactly the

122
00:05:08,310 --> 00:05:06,560
same as the regular food on earth

123
00:05:10,710 --> 00:05:08,320
okay does space food take the taste the

124
00:05:12,070 --> 00:05:10,720
same as regular food on earth

125
00:05:13,110 --> 00:05:12,080
great question

126
00:05:14,469 --> 00:05:13,120
so

127
00:05:17,510 --> 00:05:14,479
one thing that's very interesting that

128
00:05:19,270 --> 00:05:17,520
happens in space is that your taste buds

129
00:05:22,070 --> 00:05:19,280
do not sense things the same as they do

130
00:05:24,790 --> 00:05:22,080
on earth and so things that would have

131
00:05:26,469 --> 00:05:24,800
some spice or saltiness to it here often

132
00:05:27,830 --> 00:05:26,479
will taste very bland up there so it's a

133
00:05:29,749 --> 00:05:27,840
very common thing for the crew members

134
00:05:31,590 --> 00:05:29,759
to take their uh

135
00:05:34,390 --> 00:05:31,600
their extra salt and tabasco and things

136
00:05:35,189 --> 00:05:34,400
like that to to liven things up

137
00:05:36,950 --> 00:05:35,199
as

138
00:05:40,150 --> 00:05:36,960

in addition to that you know

139
00:05:42,629 --> 00:05:40,160
the food on up in space needs to last

140
00:05:44,710 --> 00:05:42,639
longer than it would have to here on

141
00:05:48,469 --> 00:05:44,720
earth and so our food does go through a

142
00:05:50,870 --> 00:05:48,479
special space lab here at jsc where it

143
00:05:54,310 --> 00:05:50,880
was formulated especially for space and

144
00:05:55,670 --> 00:05:54,320
so what we do leading up to a mission is

145
00:05:56,950 --> 00:05:55,680
there will be

146
00:05:59,350 --> 00:05:56,960
lots of

147
00:06:03,029 --> 00:05:59,360
creations of new foods and taste testing

148
00:06:05,029 --> 00:06:03,039
by the food lab and and others i've been

149
00:06:06,550 --> 00:06:05,039
blessed over the years to be able to try

150
00:06:09,270 --> 00:06:06,560
out some of the foods before they go up

151
00:06:11,189 --> 00:06:09,280
in space to help them get them

152
00:06:12,150 --> 00:06:11,199
you know in just the right shape before

153
00:06:14,070 --> 00:06:12,160
they

154
00:06:15,110 --> 00:06:14,080
send them to a crew member so

155
00:06:19,510 --> 00:06:15,120
so you're right it's a different

156
00:06:22,870 --> 00:06:21,430
and i know that makes it all the better

157
00:06:24,790 --> 00:06:22,880
when they get back on earth to enjoy

158
00:06:26,309 --> 00:06:24,800
their favorites back here again yeah you

159
00:06:28,390 --> 00:06:26,319
know one of the favorite items on board

160
00:06:30,390 --> 00:06:28,400
the space station is taco sauce the

161
00:06:32,150 --> 00:06:30,400
little packets they use those a lot

162
00:06:34,070 --> 00:06:32,160
because as christie says

163
00:06:35,670 --> 00:06:34,080

the food can taste a little bit blander

164
00:06:36,950 --> 00:06:35,680
it's the same flavor but it just tastes

165
00:06:39,189 --> 00:06:36,960
a little blander

166
00:06:40,950 --> 00:06:39,199
and another interesting tidbit is uh you

167
00:06:42,550 --> 00:06:40,960
might not think about it but in

168
00:06:44,150 --> 00:06:42,560
microgravity everything would tend to

169
00:06:45,990 --> 00:06:44,160
float around and so that salt and pepper

170
00:06:47,430 --> 00:06:46,000
she's talking about are not the same

171
00:06:49,029 --> 00:06:47,440
kind of salt and pepper we use on our

172
00:06:52,150 --> 00:06:49,039
tables they're actually salt and pepper

173
00:06:54,309 --> 00:06:52,160
that's mixed in oil or in water so that

174
00:06:55,830 --> 00:06:54,319
it doesn't fly off and get in your eye

175
00:06:57,189 --> 00:06:55,840
and cause a problem because you know if

176
00:06:59,510 --> 00:06:57,199
anybody's had pepper in there i know

177
00:07:00,550 --> 00:06:59,520
that's not a lot of fun and so they use

178
00:07:03,350 --> 00:07:00,560
oil and

179
00:07:04,469 --> 00:07:03,360
suspended pepper and water suspended

180
00:07:25,430 --> 00:07:04,479
salt

181
00:07:31,430 --> 00:07:27,510
what would happen if an astronaut got

182
00:07:33,189 --> 00:07:31,440
really sick while living on the island

183
00:07:34,790 --> 00:07:33,199
okay what would happen if national got

184
00:07:36,150 --> 00:07:34,800
really sick while living on the space

185
00:07:38,469 --> 00:07:36,160
station

186
00:07:40,390 --> 00:07:38,479
good question so you know first of all

187
00:07:43,029 --> 00:07:40,400
we plan for those types of emergencies

188
00:07:45,510 --> 00:07:43,039

um there's all kinds of medications and

189
00:07:46,309 --> 00:07:45,520
um you know medical supplies on board

190
00:07:50,230 --> 00:07:46,319
and

191
00:07:51,990 --> 00:07:50,240
methods for for helping sick uh

192
00:07:53,510 --> 00:07:52,000
astronauts so for you know first of all

193
00:07:55,350 --> 00:07:53,520
you would try to deal with it on board

194
00:07:57,270 --> 00:07:55,360
but if truly it became to the point

195
00:07:58,469 --> 00:07:57,280
where you needed to get them back to

196
00:08:00,070 --> 00:07:58,479
earth in a hurry

197
00:08:02,150 --> 00:08:00,080
on the space station we have that

198
00:08:03,990 --> 00:08:02,160
ability we always will have a soyuz

199
00:08:06,790 --> 00:08:04,000
spacecraft ready to bring the whole crew

200
00:08:08,629 --> 00:08:06,800
home um should that need to happen so

201
00:08:10,390 --> 00:08:08,639
you're never stranded and and that's

202
00:08:12,550 --> 00:08:10,400
always an option but um we really

203
00:08:13,670 --> 00:08:12,560
haven't had to do that today uh thank

204
00:08:14,710 --> 00:08:13,680
goodness

205
00:08:17,110 --> 00:08:14,720
yeah you know and that's one of the

206
00:08:18,869 --> 00:08:17,120
reasons again they have periodic talks

207
00:08:20,309 --> 00:08:18,879
with their doctor so that they can be

208
00:08:22,150 --> 00:08:20,319
open and let them know if they're having

209
00:08:25,670 --> 00:08:22,160
anything that the doctor might see as a

210
00:08:27,830 --> 00:08:25,680
symptom of a problem uh and so we do try

211
00:08:29,430 --> 00:08:27,840
to make sure that happen and uh there's

212
00:08:31,990 --> 00:08:29,440
all sorts of medical equipment as

213
00:08:33,750 --> 00:08:32,000

christie mentioned uh there is uh uh you

214
00:08:34,790 --> 00:08:33,760
know they can do blood tests on orbit

215
00:08:38,870 --> 00:08:34,800
they can

216
00:08:40,070 --> 00:08:38,880
actually look inside their bodies uh

217
00:08:42,230 --> 00:08:40,080
like you might have done at your

218
00:08:44,310 --> 00:08:42,240
doctor's office or like your mom may

219
00:08:46,310 --> 00:08:44,320
have had done when you were inside of

220
00:08:47,430 --> 00:08:46,320
her and they had an ultrasound picture

221
00:08:49,269 --> 00:08:47,440
that you might have seen of yourself

222
00:08:51,030 --> 00:08:49,279
when you're real little so they can

223
00:08:52,550 --> 00:08:51,040
actually look inside and one of the

224
00:08:54,949 --> 00:08:52,560
things they look at more than things

225
00:08:57,509 --> 00:08:54,959
they've discovered recently is that the

226
00:08:59,430 --> 00:08:57,519
shape of your eye changes when you're in

227
00:09:00,790 --> 00:08:59,440
microgravity for a long period of time

228
00:09:02,389 --> 00:09:00,800
and sometimes it doesn't change all the

229
00:09:04,070 --> 00:09:02,399
way back when you come back down to the

230
00:09:05,990 --> 00:09:04,080
ground because and they're actually

231
00:09:08,150 --> 00:09:06,000
working on developing a special

232
00:09:10,150 --> 00:09:08,160
ultrasound device that would allow them

233
00:09:11,829 --> 00:09:10,160
to do specific examinations of their

234
00:09:13,750 --> 00:09:11,839
eyes so they can try and understand that

235
00:09:15,750 --> 00:09:13,760
problem better because when people start

236
00:09:17,590 --> 00:09:15,760
going places on the orion spacecraft

237
00:09:19,030 --> 00:09:17,600
that chrissy's working on they're going

238
00:09:21,350 --> 00:09:19,040

to be a lot farther away and it's going

239
00:09:23,750 --> 00:09:21,360
to be a lot more important even to have

240
00:09:26,070 --> 00:09:23,760
really good vision through a long trip

241
00:09:27,829 --> 00:09:26,080
to mars or an asteroid

242
00:09:29,590 --> 00:09:27,839
and so we want to learn more about that

243
00:09:31,590 --> 00:09:29,600
particular effect that we're learning

244
00:09:33,750 --> 00:09:31,600
about right and that's an area actually

245
00:09:34,710 --> 00:09:33,760
my team is working on

246
00:09:36,630 --> 00:09:34,720
you know

247
00:09:38,310 --> 00:09:36,640
the issues with the eye is that that

248
00:09:40,550 --> 00:09:38,320
feeds all the way back to the design of

249
00:09:42,790 --> 00:09:40,560
your spacecraft the pressure of your

250
00:09:44,630 --> 00:09:42,800
spacecraft whether you have a normoxic

251
00:09:45,990 --> 00:09:44,640
environment with the appropriate oxygen

252
00:09:47,350 --> 00:09:46,000
and pressure

253
00:09:48,630 --> 00:09:47,360
and so

254
00:09:51,430 --> 00:09:48,640
these types of things are considered

255
00:09:53,509 --> 00:09:51,440
very early on in a spacecraft design and

256
00:09:54,790 --> 00:09:53,519
are very critical to the the crew's

257
00:09:56,070 --> 00:09:54,800
health

258
00:09:57,350 --> 00:09:56,080
i was also going to mention you know

259
00:09:59,030 --> 00:09:57,360
when we were talking about all of the

260
00:10:00,630 --> 00:09:59,040
medical hardware they have on board a

261
00:10:02,550 --> 00:10:00,640
number of years ago i was able to help

262
00:10:05,590 --> 00:10:02,560
with the design and certification of

263
00:10:08,150 --> 00:10:05,600

hardware for both space station and uh

264
00:10:10,150 --> 00:10:08,160
and the space shuttle and um

265
00:10:12,150 --> 00:10:10,160
you know we try to use a lot of things

266
00:10:13,350 --> 00:10:12,160
that we have here on the ground that are

267
00:10:15,269 --> 00:10:13,360
common to you

268
00:10:16,710 --> 00:10:15,279
but going through certification of those

269
00:10:19,350 --> 00:10:16,720
for spaceflight and sometimes you have

270
00:10:22,550 --> 00:10:20,870
have a slightly modified version of

271
00:10:23,590 --> 00:10:22,560
things you know keeping in mind keeping

272
00:10:27,509 --> 00:10:23,600
the

273
00:10:29,590 --> 00:10:27,519
environment that you're working in in

274
00:10:31,190 --> 00:10:29,600
space so those are all types of things

275
00:10:32,870 --> 00:10:31,200
that our engineers here work on is

276
00:10:34,150 --> 00:10:32,880
getting that equipment ready for space

277
00:10:35,990 --> 00:10:34,160
yeah one of the ones i think christy

278
00:10:37,430 --> 00:10:36,000
worked on is the treadmill system that

279
00:10:39,190 --> 00:10:37,440
they're they have onboard the space

280
00:10:41,190 --> 00:10:39,200
station right now it's actually a

281
00:10:43,110 --> 00:10:41,200
commercially built treadmill that is

282
00:10:44,069 --> 00:10:43,120
used primarily by pro athletes here on

283
00:10:46,470 --> 00:10:44,079
the ground because it's kind of

284
00:10:48,150 --> 00:10:46,480
expensive but it was modified for use on

285
00:10:53,590 --> 00:10:48,160
the space station

286
00:10:53,600 --> 00:11:01,430
here

287
00:11:06,150 --> 00:11:04,230
really loud okay

288
00:11:10,550 --> 00:11:06,160

what is the hardest or most difficult

289
00:11:19,910 --> 00:11:13,670
hardest or most difficult job

290
00:11:24,069 --> 00:11:21,590
i'd say you know one of one of the

291
00:11:26,829 --> 00:11:24,079
challenging things around here is that

292
00:11:28,870 --> 00:11:26,839
we've got a lot of great work to do and

293
00:11:31,030 --> 00:11:28,880
sometimes um

294
00:11:33,269 --> 00:11:31,040
so much to do that you almost have to to

295
00:11:34,870 --> 00:11:33,279
turn away things and you know and bring

296
00:11:36,470 --> 00:11:34,880
bring other people on board to do things

297
00:11:38,550 --> 00:11:36,480
so i'll be honest that can be one of the

298
00:11:40,470 --> 00:11:38,560
hardest things is saying no to folks

299
00:11:42,230 --> 00:11:40,480
when they want you to be a part of

300
00:11:44,790 --> 00:11:42,240
an effort that they're doing with some

301
00:11:46,870 --> 00:11:44,800
exciting work around here

302
00:11:49,509 --> 00:11:46,880
other than that another thing more on a

303
00:11:51,750 --> 00:11:49,519
physical level that comes to mind um i

304
00:11:53,910 --> 00:11:51,760
did have the chance to go in the zero g

305
00:11:55,829 --> 00:11:53,920
aircraft a couple years back where you

306
00:11:57,590 --> 00:11:55,839
fly the parabolas and and we were

307
00:11:59,190 --> 00:11:57,600
testing some hardware for orion we

308
00:12:01,670 --> 00:11:59,200
wanted to see for

309
00:12:03,750 --> 00:12:01,680
our seats there at our

310
00:12:05,350 --> 00:12:03,760
control station

311
00:12:08,069 --> 00:12:05,360
how would we be able to get into those

312
00:12:10,550 --> 00:12:08,079
seats in in zero gravity and so i was

313
00:12:12,629 --> 00:12:10,560

able to fly on that flight and you know

314
00:12:14,870 --> 00:12:12,639
got to experience that the challenges of

315
00:12:16,870 --> 00:12:14,880
going through those parabolas and the

316
00:12:19,190 --> 00:12:16,880
the tendency to want to get sick and

317
00:12:20,949 --> 00:12:19,200
managed to to hang in there for that

318
00:12:22,710 --> 00:12:20,959
flight we got a lot of great test data

319
00:12:25,269 --> 00:12:22,720
out of that but that was physically a

320
00:12:26,710 --> 00:12:25,279
challenging day um one one last thing

321
00:12:28,870 --> 00:12:26,720
i'll mention i had an opportunity to get

322
00:12:30,470 --> 00:12:28,880
in a russian orlan suit a while back and

323
00:12:32,710 --> 00:12:30,480
you know i didn't appreciate until doing

324
00:12:34,949 --> 00:12:32,720
that the challenge of being in a suit

325
00:12:37,030 --> 00:12:34,959
that's pressurized when they close that

326
00:12:38,870 --> 00:12:37,040
that hatch and and you're

327
00:12:40,629 --> 00:12:38,880
just in a closed system there within

328
00:12:42,150 --> 00:12:40,639
your suit um

329
00:12:48,069 --> 00:12:42,160
that

330
00:12:49,509 --> 00:12:48,079
for my heart to stop racing as i got

331
00:12:51,110 --> 00:12:49,519
used to that environment and and

332
00:12:51,829 --> 00:12:51,120
although quickly you do get used to it

333
00:12:53,190 --> 00:12:51,839
and

334
00:12:54,550 --> 00:12:53,200
that's what the astronauts go through a

335
00:12:56,870 --> 00:12:54,560
lot there's a lot of tough stuff but

336
00:12:58,550 --> 00:12:56,880
with training you quickly become adapted

337
00:13:00,389 --> 00:12:58,560
and uh ready to do that in the

338
00:13:01,750 --> 00:13:00,399

challenging environment what christie's

339
00:13:03,509 --> 00:13:01,760
talking about there is the spacesuits

340
00:13:05,030 --> 00:13:03,519
they wear when they go outside to do

341
00:13:06,550 --> 00:13:05,040
construction tests on the outside of the

342
00:13:07,990 --> 00:13:06,560
space station there's two different

343
00:13:09,430 --> 00:13:08,000
kinds of those there's an american

344
00:13:11,430 --> 00:13:09,440
spacesuit that's called the extra

345
00:13:13,190 --> 00:13:11,440
vehicular mobility unit and then there's

346
00:13:15,750 --> 00:13:13,200
the russian version of that which is

347
00:13:17,590 --> 00:13:15,760
called as she said the

348
00:13:19,030 --> 00:13:17,600
orlan suit so

349
00:13:21,190 --> 00:13:19,040
that's what she was talking about there

350
00:13:23,670 --> 00:13:21,200
now there's a couple other big issues

351
00:13:25,990 --> 00:13:23,680
that space station astronauts deal with

352
00:13:28,550 --> 00:13:26,000
and one of them is

353
00:13:30,790 --> 00:13:28,560
cooperation the space station is an

354
00:13:31,829 --> 00:13:30,800
international effort and you have people

355
00:13:34,710 --> 00:13:31,839
from

356
00:13:36,230 --> 00:13:34,720
15 different countries and cultures all

357
00:13:38,069 --> 00:13:36,240
working together whether it's on the

358
00:13:41,750 --> 00:13:38,079
ground to support the astronauts in

359
00:13:44,230 --> 00:13:41,760
orbit or the they're on on orbit working

360
00:13:46,150 --> 00:13:44,240
together uh using different languages

361
00:13:48,710 --> 00:13:46,160
different cultures and yet we make it

362
00:13:51,590 --> 00:13:48,720
all work and so it can be hard to do

363
00:13:54,230 --> 00:13:51,600

that sometimes to overcome a

364
00:13:57,269 --> 00:13:54,240
a difference of the way you perceive

365
00:13:59,189 --> 00:13:57,279
something because of the way you grew up

366
00:14:00,550 --> 00:13:59,199
but yesterday we had a briefing for one

367
00:14:02,310 --> 00:14:00,560
of the upcoming crews and one of our

368
00:14:03,990 --> 00:14:02,320
italian crew members had a great great

369
00:14:07,110 --> 00:14:04,000
line i thought they said we are the

370
00:14:09,030 --> 00:14:07,120
world champions in cooperation uh and i

371
00:14:11,189 --> 00:14:09,040
think that's really true because the

372
00:14:13,910 --> 00:14:11,199
space station is a multinational effort

373
00:14:15,910 --> 00:14:13,920
and it takes people of all kinds to work

374
00:14:17,110 --> 00:14:15,920
together and make it happen and do all

375
00:14:19,189 --> 00:14:17,120
these great things they're doing for us

376
00:14:20,629 --> 00:14:19,199
here on the ground in earth and so i

377
00:14:22,949 --> 00:14:20,639
think that's a really neat aspect of

378
00:14:24,790 --> 00:14:22,959
space station

379
00:14:26,150 --> 00:14:24,800
well the next question is coming up if i

380
00:14:28,150 --> 00:14:26,160
could uh

381
00:14:30,949 --> 00:14:28,160
add in for just a second i

382
00:14:33,509 --> 00:14:30,959
i know we've got a bunch of

383
00:14:36,389 --> 00:14:33,519
future leader ladies here joining us

384
00:14:38,389 --> 00:14:36,399
today and you know i know that um

385
00:14:40,069 --> 00:14:38,399
you guys are probably thinking about

386
00:14:41,750 --> 00:14:40,079
your next steps beyond high school and

387
00:14:43,509 --> 00:14:41,760
just wanted to throw out some ideas real

388
00:14:45,430 --> 00:14:43,519

quick about

389
00:14:47,110 --> 00:14:45,440
what to be looking towards

390
00:14:48,790 --> 00:14:47,120
if you're interested in in the stem

391
00:14:51,750 --> 00:14:48,800
areas of science technology engineering

392
00:14:53,670 --> 00:14:51,760
math you know it is never too early to

393
00:14:56,710 --> 00:14:53,680
start looking for those opportunities to

394
00:14:58,790 --> 00:14:56,720
branch into stem i know nasa has a lot

395
00:15:01,189 --> 00:14:58,800
of opportunities starting as early as

396
00:15:03,590 --> 00:15:01,199
the junior high level where you can find

397
00:15:05,829 --> 00:15:03,600
competitions online just recently last

398
00:15:07,990 --> 00:15:05,839
week orion

399
00:15:09,269 --> 00:15:08,000
announced a new radiation student

400
00:15:10,790 --> 00:15:09,279
program that really starts all the way

401
00:15:12,629 --> 00:15:10,800
from kindergarten all the way through

402
00:15:14,150 --> 00:15:12,639
high school so you know you're able to

403
00:15:16,550 --> 00:15:14,160
go through the nasa website and look for

404
00:15:20,069 --> 00:15:16,560
things like that to to get those first

405
00:15:22,550 --> 00:15:20,079
opportunities to look at at engineering

406
00:15:24,230 --> 00:15:22,560
and science and so then

407
00:15:25,750 --> 00:15:24,240
as you get more into the high school

408
00:15:29,189 --> 00:15:25,760
ages you know obviously you're starting

409
00:15:31,189 --> 00:15:29,199
to look at what college to go to and

410
00:15:33,670 --> 00:15:31,199
one of the biggest pieces of advice i

411
00:15:35,990 --> 00:15:33,680
can give there is

412
00:15:38,629 --> 00:15:36,000
to look for those opportunities

413
00:15:40,310 --> 00:15:38,639

in college for interning or co-oping

414
00:15:42,550 --> 00:15:40,320
with companies whether it's with nasa or

415
00:15:44,389 --> 00:15:42,560
some other group

416
00:15:46,389 --> 00:15:44,399
and and even as you search for a college

417
00:15:48,629 --> 00:15:46,399
you can find colleges that

418
00:15:51,670 --> 00:15:48,639
that embrace that more and provide uh

419
00:15:55,030 --> 00:15:51,680
you know a strong co-op environment and

420
00:15:56,150 --> 00:15:55,040
that's how i came to be here at nasa i

421
00:15:58,069 --> 00:15:56,160
went to georgia tech for my

422
00:16:00,150 --> 00:15:58,079
undergraduate and university of colorado

423
00:16:01,670 --> 00:16:00,160
for my graduate school but at

424
00:16:04,230 --> 00:16:01,680
georgia tech i didn't even know about

425
00:16:06,310 --> 00:16:04,240
co-oping coming into this and they had a

426
00:16:08,550 --> 00:16:06,320
a strong program and was able to find

427
00:16:10,069 --> 00:16:08,560
out about the ties already there to nasa

428
00:16:12,230 --> 00:16:10,079
and was blessed to get a job here and

429
00:16:14,310 --> 00:16:12,240
that that led me to where i am today but

430
00:16:16,150 --> 00:16:14,320
um it's not too early to be thinking

431
00:16:17,430 --> 00:16:16,160
about those things because honestly if i

432
00:16:18,949 --> 00:16:17,440
hadn't

433
00:16:20,710 --> 00:16:18,959
ended up in that co-op program i

434
00:16:22,069 --> 00:16:20,720
wouldn't be sitting here today because

435
00:16:24,870 --> 00:16:22,079
that is

436
00:16:26,629 --> 00:16:24,880
our main avenue for hiring people

437
00:16:28,870 --> 00:16:26,639
at nasa so

438
00:16:31,910 --> 00:16:28,880

so be proactive in looking for those

439
00:16:33,829 --> 00:16:31,920
opportunities to to get ties to whatever

440
00:16:35,269 --> 00:16:33,839
your industry is that you're interested

441
00:16:37,670 --> 00:16:35,279
in early

442
00:16:39,990 --> 00:16:37,680
do those internships or or

443
00:16:41,189 --> 00:16:40,000
shadowing different different

444
00:16:42,870 --> 00:16:41,199
disciplines

445
00:16:45,430 --> 00:16:42,880
and i'll add that you know i'm not a

446
00:16:47,990 --> 00:16:45,440
scientist or an engineer like christy is

447
00:16:49,910 --> 00:16:48,000
but i was an intern at nasa too and so

448
00:16:51,670 --> 00:16:49,920
even if your interests don't lie in

449
00:16:53,670 --> 00:16:51,680
science and engineering nasa needs

450
00:16:55,910 --> 00:16:53,680
people from all different walks of life

451
00:16:58,069 --> 00:16:55,920
to do the things that we do we need

452
00:17:00,790 --> 00:16:58,079
people that know how to do budgets and

453
00:17:03,030 --> 00:17:00,800
billing and things like that we need

454
00:17:05,510 --> 00:17:03,040
doctors we need

455
00:17:07,909 --> 00:17:05,520
people who help with human relation

456
00:17:09,429 --> 00:17:07,919
human resources for hiring and that kind

457
00:17:10,710 --> 00:17:09,439
of thing so there's all kinds of

458
00:17:12,470 --> 00:17:10,720
different career options if you want to

459
00:17:14,630 --> 00:17:12,480
get involved in the space

460
00:17:16,949 --> 00:17:14,640
industry and i even if you're not a

461
00:17:18,470 --> 00:17:16,959
scientist or an engineer or that doesn't

462
00:17:20,150 --> 00:17:18,480
float your boat there's other ways that

463
00:17:24,470 --> 00:17:20,160

you can get involved just if you're just

464
00:17:29,029 --> 00:17:27,750
um my name is rebecca and i was

465
00:17:30,950 --> 00:17:29,039
what they're saying or my friend was

466
00:17:35,750 --> 00:17:30,960
building what kind of training did you

467
00:17:38,789 --> 00:17:37,110
what kind of training do you need for

468
00:17:40,310 --> 00:17:38,799
your job

469
00:17:41,990 --> 00:17:40,320
great question

470
00:17:43,750 --> 00:17:42,000
so you know

471
00:17:45,830 --> 00:17:43,760
really nasa will help

472
00:17:47,430 --> 00:17:45,840
train you along the way to get

473
00:17:49,510 --> 00:17:47,440
to where you need to be for your job

474
00:17:51,110 --> 00:17:49,520
assignment so that's a great thing but

475
00:17:53,029 --> 00:17:51,120
the types of training that i have found

476
00:17:55,270 --> 00:17:53,039
that i need

477
00:17:56,630 --> 00:17:55,280
you know very much leadership skills to

478
00:17:59,350 --> 00:17:56,640
be able to

479
00:18:00,789 --> 00:17:59,360
to lead my projects

480
00:18:02,789 --> 00:18:00,799
being able to

481
00:18:05,669 --> 00:18:02,799
uh interact well with others i mean

482
00:18:07,750 --> 00:18:05,679
everything we do is done through teams

483
00:18:10,470 --> 00:18:07,760
very seldom are you on your own

484
00:18:12,710 --> 00:18:10,480
tackling a task so um that's a huge part

485
00:18:14,630 --> 00:18:12,720
of of what we do and what we train for

486
00:18:18,150 --> 00:18:14,640
also

487
00:18:20,310 --> 00:18:18,160
in the areas of like computer-aided

488
00:18:22,950 --> 00:18:20,320

design to be able to

489
00:18:24,230 --> 00:18:22,960
bring your ideas into a cad environment

490
00:18:25,750 --> 00:18:24,240
start to create those and be able to

491
00:18:27,270 --> 00:18:25,760
build those you know

492
00:18:29,029 --> 00:18:27,280
one of my main tasks right now is

493
00:18:31,830 --> 00:18:29,039
developing the mock-ups that we work on

494
00:18:34,230 --> 00:18:31,840
for orion and we use these to flush out

495
00:18:36,470 --> 00:18:34,240
the design eventually to to certify the

496
00:18:38,950 --> 00:18:36,480
design and eventually train the crew and

497
00:18:40,789 --> 00:18:38,960
um you know we are constantly designing

498
00:18:42,710 --> 00:18:40,799
hardware to put into those mock-ups same

499
00:18:45,270 --> 00:18:42,720
thing if you know for those working on

500
00:18:48,870 --> 00:18:45,280
the flight vehicle and um

501
00:18:49,830 --> 00:18:48,880
you know so things like cad and

502
00:18:52,470 --> 00:18:49,840
you know

503
00:18:54,390 --> 00:18:52,480
powerpoint and things like that that you

504
00:18:56,870 --> 00:18:54,400
guys probably already know well that

505
00:18:57,990 --> 00:18:56,880
help you communicate your design ideas

506
00:18:59,669 --> 00:18:58,000
you know there's other things we get

507
00:19:02,390 --> 00:18:59,679
training in too uh some things that you

508
00:19:04,549 --> 00:19:02,400
wouldn't necessarily think uh of in nasa

509
00:19:06,310 --> 00:19:04,559
but uh one of the things we've added on

510
00:19:08,630 --> 00:19:06,320
to our training recently is inclusion

511
00:19:12,630 --> 00:19:08,640
and innovation uh and that's the whole

512
00:19:14,789 --> 00:19:12,640
idea of of not uh excluding somebody

513
00:19:17,510 --> 00:19:14,799

because of their race or their religion

514
00:19:19,430 --> 00:19:17,520
or any of their preferences uh so you

515
00:19:21,510 --> 00:19:19,440
embrace those folks and and you're able

516
00:19:24,390 --> 00:19:21,520
to work together with them on a regular

517
00:19:25,909 --> 00:19:24,400
basis uh no matter what your backgrounds

518
00:19:27,669 --> 00:19:25,919
are and that goes along with the whole

519
00:19:29,110 --> 00:19:27,679
cooperation scheme so that's an

520
00:19:30,630 --> 00:19:29,120
interesting part and we also like to try

521
00:19:33,350 --> 00:19:30,640
and make sure people try and think

522
00:19:35,270 --> 00:19:33,360
differently and try to innovate and and

523
00:19:36,710 --> 00:19:35,280
look at new ways of doing things so we

524
00:19:42,549 --> 00:19:36,720
can improve our efficiency and our

525
00:19:46,549 --> 00:19:44,150
you guys kind of broke out we didn't get

526
00:19:49,029 --> 00:19:46,559
that ending are you

527
00:19:51,029 --> 00:19:49,039
are we able to ask the next question

528
00:19:54,630 --> 00:19:51,039
yes definitely testing one two three can

529
00:19:59,350 --> 00:19:57,510
do testing once you can hear us

530
00:20:00,310 --> 00:19:59,360
yes we can so go ahead with your next

531
00:20:19,590 --> 00:20:00,320
question

532
00:20:23,510 --> 00:20:21,110
so

533
00:20:24,789 --> 00:20:23,520
my name is vivia velvik and i was

534
00:20:26,710 --> 00:20:24,799
wondering

535
00:20:29,110 --> 00:20:26,720
what would you say is the most important

536
00:20:38,549 --> 00:20:29,120
scientific discovery made so far from

537
00:20:42,390 --> 00:20:40,549
and did you happen to hear that one

538
00:20:43,830 --> 00:20:42,400

i i'm sure that that is a matter of

539
00:20:46,230 --> 00:20:43,840
opinion and i don't think i'm going to

540
00:20:48,630 --> 00:20:46,240
even begin to to try to tackle that one

541
00:20:50,549 --> 00:20:48,640
kelly i don't know if you want to well

542
00:20:53,270 --> 00:20:50,559
i'll just say that there is research

543
00:20:55,830 --> 00:20:53,280
going on in so many different areas from

544
00:20:57,350 --> 00:20:55,840
biology to human physiology in our

545
00:21:00,830 --> 00:20:57,360
bodies to

546
00:21:02,630 --> 00:21:00,840
uh how materials can be formed in

547
00:21:06,390 --> 00:21:02,640
microgravity

548
00:21:08,310 --> 00:21:06,400
to even looking at the cosmos

549
00:21:10,070 --> 00:21:08,320
because we've got an amazing instrument

550
00:21:12,149 --> 00:21:10,080
on board the space station called the

551
00:21:14,950 --> 00:21:12,159
alpha magnetic spectrometer

552
00:21:17,430 --> 00:21:14,960
that is looking for that dark matter

553
00:21:19,830 --> 00:21:17,440
that all the physicists have theorized

554
00:21:21,510 --> 00:21:19,840
is out there uh we know that there's

555
00:21:22,789 --> 00:21:21,520
matter and there's antimatter but

556
00:21:25,110 --> 00:21:22,799
there's a whole bunch of stuff in the

557
00:21:27,029 --> 00:21:25,120
universe that we don't know exactly what

558
00:21:29,590 --> 00:21:27,039
it is and we theorize it's this thing

559
00:21:31,110 --> 00:21:29,600
called dark matter and we're looking

560
00:21:32,710 --> 00:21:31,120
forward hopefully this year to getting

561
00:21:35,029 --> 00:21:32,720
some results from that experiment it's

562
00:21:37,430 --> 00:21:35,039
been collecting billions of particles

563
00:21:39,029 --> 00:21:37,440

for the last year since it was last on

564
00:21:41,110 --> 00:21:39,039
the launch on the next last shuttle

565
00:21:43,190 --> 00:21:41,120
mission and so that could actually

566
00:21:45,190 --> 00:21:43,200
change our understanding of the universe

567
00:21:47,750 --> 00:21:45,200
and that's the kind of things that

568
00:21:49,669 --> 00:21:47,760
really make the differences that change

569
00:21:50,630 --> 00:21:49,679
your textbooks for students that are

570
00:21:52,470 --> 00:21:50,640
coming

571
00:21:53,750 --> 00:21:52,480
down the road from you

572
00:21:56,230 --> 00:21:53,760
but but a lot of the things we're

573
00:21:57,830 --> 00:21:56,240
working on have everyday applications i

574
00:21:59,669 --> 00:21:57,840
had a guy in here yesterday who's an

575
00:22:03,029 --> 00:21:59,679
experimenter working on

576
00:22:08,870 --> 00:22:06,230
chondrites or or dendrites and when you

577
00:22:10,789 --> 00:22:08,880
make metals uh on the earth you have all

578
00:22:12,870 --> 00:22:10,799
these little crystals that forms as part

579
00:22:15,110 --> 00:22:12,880
of the alloy process where you mix two

580
00:22:17,190 --> 00:22:15,120
metals together to make a stronger metal

581
00:22:18,870 --> 00:22:17,200
thing kind of things are used in engines

582
00:22:20,630 --> 00:22:18,880
and things like that

583
00:22:22,310 --> 00:22:20,640
and they're looking at those on the

584
00:22:24,870 --> 00:22:22,320
international space station here's

585
00:22:26,549 --> 00:22:24,880
example here's an example from the

586
00:22:28,950 --> 00:22:26,559
coarsening of

587
00:22:30,789 --> 00:22:28,960
solid and liquid mixtures experiment

588
00:22:32,710 --> 00:22:30,799

that shows you that on the ground all of

589
00:22:34,870 --> 00:22:32,720
the particles that are solids and the

590
00:22:36,390 --> 00:22:34,880
crystals tend to

591
00:22:38,070 --> 00:22:36,400
float up to the top but in the

592
00:22:41,190 --> 00:22:38,080
microgravity environment and space

593
00:22:43,669 --> 00:22:41,200
station they're dispersed uh uniformly

594
00:22:45,909 --> 00:22:43,679
throughout the sample the idea there is

595
00:22:47,990 --> 00:22:45,919
we can make stronger better metals and

596
00:22:49,830 --> 00:22:48,000
other materials that will help us here

597
00:22:51,590 --> 00:22:49,840
on the ground and so that's a really

598
00:22:54,070 --> 00:22:51,600
important discovery

599
00:22:56,630 --> 00:22:54,080
another one is the discovery that we can

600
00:22:59,029 --> 00:22:56,640
monitor our planet from the earth uh

601
00:23:00,870 --> 00:22:59,039
with photography and other kinds of

602
00:23:03,110 --> 00:23:00,880
instruments and those are helping us

603
00:23:05,830 --> 00:23:03,120
learn more about how humans affect the

604
00:23:07,830 --> 00:23:05,840
environment and how it's changing

605
00:23:09,430 --> 00:23:07,840
letting us look at

606
00:23:11,669 --> 00:23:09,440
you know changes in the world's

607
00:23:14,310 --> 00:23:11,679
environment and

608
00:23:15,590 --> 00:23:14,320
we've also got tom marshburn working on

609
00:23:17,909 --> 00:23:15,600
experiment you can see right here on

610
00:23:19,909 --> 00:23:17,919
some live tv from the space station and

611
00:23:23,510 --> 00:23:19,919
he's working on a thing called the

612
00:23:25,990 --> 00:23:23,520
marangoni experiment that looks at how

613
00:23:27,909 --> 00:23:26,000

fluids react to microgravity and those

614
00:23:29,750 --> 00:23:27,919
will help us build better engines on the

615
00:23:31,990 --> 00:23:29,760
ground and things so all those

616
00:23:33,510 --> 00:23:32,000
discoveries will add up to improvements

617
00:23:35,029 --> 00:23:33,520
in our everyday lives and i don't know

618
00:23:36,789 --> 00:23:35,039
that anybody can come up as christie

619
00:23:37,669 --> 00:23:36,799
said with what the most important one is

620
00:23:40,470 --> 00:23:37,679
yet

621
00:23:43,190 --> 00:23:40,480
i think it's the cumulative growth in

622
00:23:45,669 --> 00:23:43,200
our scientific knowledge uh in all these

623
00:23:48,710 --> 00:23:45,679
different fields that is is really going

624
00:23:51,029 --> 00:23:48,720
to help propel us into the next era of

625
00:23:52,549 --> 00:23:51,039
exploration and discovery

626
00:23:55,669 --> 00:23:52,559
and we want you to be along for that

627
00:23:59,110 --> 00:23:57,510
all right in ann richards school um

628
00:24:01,269 --> 00:23:59,120
we're just about at the end of our

629
00:24:02,870 --> 00:24:01,279
window so we have time for one final

630
00:24:05,830 --> 00:24:02,880
quick question and then we're going to

631
00:24:10,789 --> 00:24:05,840
wrap up

632
00:24:16,549 --> 00:24:14,149
hi i'm isabelle with milo and my doctor

633
00:24:19,029 --> 00:24:16,559
mr m got a question that picked up here

634
00:24:20,950 --> 00:24:19,039
today so i can ask for him so what are

635
00:24:25,990 --> 00:24:20,960
the goals for the orion project this is

636
00:24:29,190 --> 00:24:28,070
i think you know that one christy

637
00:24:30,630 --> 00:24:29,200
i just heard the last part of the

638
00:24:33,029 --> 00:24:30,640

question can you go for the orion

639
00:24:35,430 --> 00:24:33,039
program absolutely right so

640
00:24:37,269 --> 00:24:35,440
you know um we've obviously got our iss

641
00:24:39,350 --> 00:24:37,279
presence today and and we've got

642
00:24:41,590 --> 00:24:39,360
commercial entities that are working to

643
00:24:44,470 --> 00:24:41,600
um give us a back and forth capability

644
00:24:47,350 --> 00:24:44,480
to iss so orion our main mission is to

645
00:24:49,350 --> 00:24:47,360
go beyond low earth orbit

646
00:24:51,110 --> 00:24:49,360
we want to explore explore further we

647
00:24:52,070 --> 00:24:51,120
want to go back to the moon we want to

648
00:24:54,549 --> 00:24:52,080
go

649
00:24:55,750 --> 00:24:54,559
possibly to an asteroid or to a lagrange

650
00:24:56,950 --> 00:24:55,760
point if you're not familiar with those

651
00:24:59,830 --> 00:24:56,960
you'll have to look that up but those

652
00:25:01,510 --> 00:24:59,840
are points out in space

653
00:25:03,430 --> 00:25:01,520
that are more stable so a vehicle is

654
00:25:05,110 --> 00:25:03,440
going to stay there more easily with

655
00:25:06,870 --> 00:25:05,120
very little propellant

656
00:25:09,830 --> 00:25:06,880
allowing it to stay there

657
00:25:11,510 --> 00:25:09,840
you know with little mass so

658
00:25:13,430 --> 00:25:11,520
there's a great advantage going to a

659
00:25:16,070 --> 00:25:13,440
place like that as a stepping stone

660
00:25:17,110 --> 00:25:16,080
towards the moon or to

661
00:25:19,029 --> 00:25:17,120
mars

662
00:25:20,630 --> 00:25:19,039
and then ultimately of course our main

663
00:25:22,789 --> 00:25:20,640

destination we want to be getting to is

664
00:25:25,350 --> 00:25:22,799
to mars so all these other destinations

665
00:25:27,269 --> 00:25:25,360
that we could go to will

666
00:25:30,230 --> 00:25:27,279
be an opportunity for us to test out our

667
00:25:32,149 --> 00:25:30,240
technologies a little closer to home um

668
00:25:34,070 --> 00:25:32,159
and then venture out you know looking in

669
00:25:35,190 --> 00:25:34,080
that maybe 20 30 ish time frame for

670
00:25:36,390 --> 00:25:35,200
being on

671
00:25:38,789 --> 00:25:36,400
on mars with

672
00:25:41,430 --> 00:25:38,799
with our crew so a lot of exciting

673
00:25:42,630 --> 00:25:41,440
places to go and and so our orion

674
00:25:44,149 --> 00:25:42,640
vehicle

675
00:25:45,990 --> 00:25:44,159
you know the main

676
00:25:49,110 --> 00:25:46,000
portion that the crew in is in is a

677
00:25:51,029 --> 00:25:49,120
capsule and it's very uh similar in in

678
00:25:52,710 --> 00:25:51,039
shape to

679
00:25:55,029 --> 00:25:52,720
apollo capsule although it's a bit

680
00:25:57,430 --> 00:25:55,039
bigger we can hold four crew members in

681
00:25:59,190 --> 00:25:57,440
that and of course they've got

682
00:26:01,190 --> 00:25:59,200
some of the comforts of home having a

683
00:26:04,789 --> 00:26:01,200
hygiene area with potty and a galley for

684
00:26:06,470 --> 00:26:04,799
food preparation but obviously

685
00:26:09,269 --> 00:26:06,480
simplified food preparation and things

686
00:26:10,950 --> 00:26:09,279
like that to keep mass down

687
00:26:13,350 --> 00:26:10,960
they would have sleeping bags on there

688
00:26:15,029 --> 00:26:13,360

and and you know a typical mission on

689
00:26:15,990 --> 00:26:15,039
there would probably be about two weeks

690
00:26:17,430 --> 00:26:16,000
long

691
00:26:18,630 --> 00:26:17,440
for missions where you need to go beyond

692
00:26:20,310 --> 00:26:18,640
that where you're going to maybe stay at

693
00:26:22,390 --> 00:26:20,320
a la garage point for a while you would

694
00:26:24,549 --> 00:26:22,400
mate with another vehicle and have extra

695
00:26:27,190 --> 00:26:24,559
living space to be in and extra supplies

696
00:26:29,590 --> 00:26:27,200
you know we found out um that you know

697
00:26:31,190 --> 00:26:29,600
it's very expensive to human rate a

698
00:26:34,549 --> 00:26:31,200
vehicle and so you want that vehicle

699
00:26:36,390 --> 00:26:34,559
that the crew is in to be as

700
00:26:37,750 --> 00:26:36,400
as simple as it can be to get its job of

701
00:26:39,909 --> 00:26:37,760
getting the crew to and from its

702
00:26:41,510 --> 00:26:39,919
destinations and then the other living

703
00:26:43,590 --> 00:26:41,520
space or other payloads that you want to

704
00:26:47,190 --> 00:26:43,600
take up you we want to take those up on

705
00:26:49,110 --> 00:26:47,200
a unmanned mission unmanned launch um

706
00:26:51,029 --> 00:26:49,120
just because we can get that to orbit

707
00:26:54,310 --> 00:26:51,039
much cheaper in a vehicle that's not

708
00:26:56,470 --> 00:26:54,320
human rated so that's why you see uh not

709
00:26:58,070 --> 00:26:56,480
a super spacecraft with with all the

710
00:26:59,909 --> 00:26:58,080
bells and whistles in that but but a

711
00:27:02,070 --> 00:26:59,919
combination of multiple spacecraft that

712
00:27:03,350 --> 00:27:02,080
come together to get the whole job done

713
00:27:05,029 --> 00:27:03,360

well one thing i don't think you did

714
00:27:06,710 --> 00:27:05,039
mention christy is the other thing is

715
00:27:08,390 --> 00:27:06,720
people may think uh about the space

716
00:27:09,830 --> 00:27:08,400
shuttle and how cool it was and it came

717
00:27:11,190 --> 00:27:09,840
back but the one thing the shuttle

718
00:27:12,789 --> 00:27:11,200
couldn't do is it couldn't go as far as

719
00:27:14,710 --> 00:27:12,799
orion's being planned to go and the main

720
00:27:17,430 --> 00:27:14,720
reason for that is because when you're

721
00:27:19,990 --> 00:27:17,440
coming back to earth from distances that

722
00:27:22,149 --> 00:27:20,000
far away you're coming back a lot faster

723
00:27:25,990 --> 00:27:22,159
and it increases the heat that the

724
00:27:27,909 --> 00:27:26,000
spacecraft has to be able to survive

725
00:27:29,269 --> 00:27:27,919
i think it's about 10 times the heating

726
00:27:31,590 --> 00:27:29,279
of a shuttle

727
00:27:33,590 --> 00:27:31,600
and so you've got to make sure that the

728
00:27:35,990 --> 00:27:33,600
heat shield for that capsule and that

729
00:27:38,230 --> 00:27:36,000
the capsule shape itself is something

730
00:27:39,750 --> 00:27:38,240
that is better suited toward those high

731
00:27:41,750 --> 00:27:39,760
speed reentries

732
00:27:43,430 --> 00:27:41,760
right and so the orion spacecraft does

733
00:27:46,070 --> 00:27:43,440
enter with its heat shield and then

734
00:27:47,669 --> 00:27:46,080
deploy shoots to allow it to land soft

735
00:27:49,350 --> 00:27:47,679
enough that you wouldn't have injury to

736
00:27:51,430 --> 00:27:49,360
the crew on landing and

737
00:27:54,070 --> 00:27:51,440
nominally we land in the water and you

738
00:27:55,669 --> 00:27:54,080

would have a ship right nearby to pluck

739
00:27:58,549 --> 00:27:55,679
that vehicle out up under the ship and

740
00:27:59,669 --> 00:27:58,559
then the crew would get out there

741
00:28:02,230 --> 00:27:59,679
a lot of

742
00:28:03,990 --> 00:28:02,240
desirable aspects about the water

743
00:28:06,070 --> 00:28:04,000
landing and that we have so many

744
00:28:07,669 --> 00:28:06,080
opportunities different locations to

745
00:28:09,430 --> 00:28:07,679
land on the earth that gives you a

746
00:28:12,549 --> 00:28:09,440
chance to return to earth

747
00:28:16,950 --> 00:28:14,389
all right kelly humphreys from the

748
00:28:19,269 --> 00:28:16,960
public affairs office and christy sowers

749
00:28:21,909 --> 00:28:19,279
thank you so much for answering

750
00:28:24,549 --> 00:28:21,919
questions from ann richards school for

751
00:28:26,149 --> 00:28:24,559
young women leaders um for the school

752
00:28:28,950 --> 00:28:26,159
itself do you want to say uh goodbye or

753
00:28:36,149 --> 00:28:30,549
thank you

754
00:28:37,750 --> 00:28:36,159
um sixth grade gen class and we were so

755
00:28:40,549 --> 00:28:37,760
excited to ask you today thank you so

756
00:28:42,389 --> 00:28:40,559
much to everyone for your time