



MISSION CONTROL CENTER

GMT 000: 17:00:40
ISS DOCKING 00: 51:00
DPC 01: 54:00
FD-CREW CONV 01: 49:00

PAO

1
00:00:07,430 --> 00:00:03,110
alicia simpson and happy holidays from

2
00:00:07,440 --> 00:00:13,030
happy holidays to you

3
00:00:26,950 --> 00:00:14,549
we're ready for your questions whenever

4
00:00:26,960 --> 00:00:34,310
what is done for the astronauts to keep

5
00:00:37,350 --> 00:00:35,830
we're having a hard time hearing you so

6
00:00:39,270 --> 00:00:37,360
you guys need to speak up a little bit

7
00:00:40,709 --> 00:00:39,280
we can see you here as well but i think

8
00:00:46,630 --> 00:00:40,719
we already know what your question was

9
00:00:51,670 --> 00:00:49,350
olivia did you ask me about their family

10
00:00:54,229 --> 00:00:51,680
about their family

11
00:00:56,229 --> 00:00:54,239
yes i did

12
00:00:58,229 --> 00:00:56,239
okay um

13
00:00:59,830 --> 00:00:58,239

it's it's kind of you know it's

14

00:01:01,430 --> 00:00:59,840

challenging for them just imagine if you

15

00:01:03,990 --> 00:01:01,440

were away from your family for long

16

00:01:05,509 --> 00:01:04,000

periods of time so uh but we have really

17

00:01:07,429 --> 00:01:05,519

good things in place here at nasa for

18

00:01:08,950 --> 00:01:07,439

them to be able to uh do video

19

00:01:10,950 --> 00:01:08,960

conferences with them like you're doing

20

00:01:13,190 --> 00:01:10,960

with me to be able to call down and talk

21

00:01:15,109 --> 00:01:13,200

to them on the phone so they're they're

22

00:01:16,550 --> 00:01:15,119

always in contact with their family but

23

00:01:17,990 --> 00:01:16,560

you know no one wants to be away from

24

00:01:19,590 --> 00:01:18,000

their family for a long period of time

25

00:01:20,630 --> 00:01:19,600

but we make sure that they are able to

26

00:01:22,310 --> 00:01:20,640

do that

27

00:01:24,149 --> 00:01:22,320

the really cool thing is that we have so

28

00:01:27,350 --> 00:01:24,159

many different ways of communicating

29

00:01:28,550 --> 00:01:27,360

with the crews now on orbit that we have

30

00:01:29,749 --> 00:01:28,560

email

31

00:01:31,270 --> 00:01:29,759

which is a

32

00:01:33,510 --> 00:01:31,280

way a lot of parents keep in touch with

33

00:01:34,630 --> 00:01:33,520

their kids anyway these days especially

34

00:01:36,310 --> 00:01:34,640

when they've grown up and gone away to

35

00:01:39,030 --> 00:01:36,320

college and the like

36

00:01:43,270 --> 00:01:39,040

we've got special sessions where we use

37

00:01:45,109 --> 00:01:43,280

net meeting kind of like a facetime or a

38

00:01:47,109 --> 00:01:45,119

skype where they can talk directly and

39

00:01:48,469 --> 00:01:47,119

see each other in the in the time that

40

00:01:50,149 --> 00:01:48,479

they're doing that

41

00:01:52,069 --> 00:01:50,159

and they have a telephone up there that

42

00:01:53,590 --> 00:01:52,079

is an ip phone where they can actually

43

00:01:55,270 --> 00:01:53,600

call down and talk to their family

44

00:01:56,950 --> 00:01:55,280

members directly

45

00:01:59,910 --> 00:01:56,960

so there's all those different ways that

46

00:02:02,630 --> 00:01:59,920

they have chances to communicate both

47

00:02:04,709 --> 00:02:02,640

visually through writing and through

48

00:02:06,709 --> 00:02:04,719

audio means and so it's a little bit

49

00:02:08,630 --> 00:02:06,719

like being away on a long business trip

50

00:02:10,229 --> 00:02:08,640

for the crews and so they miss their

51
00:02:11,190 --> 00:02:10,239
families and their families miss them

52
00:02:16,309 --> 00:02:11,200
but they still have lots of

53
00:02:16,319 --> 00:02:20,150
thank you oh you're welcome

54
00:02:28,229 --> 00:02:23,270
we have our next uh student jordan perry

55
00:02:31,830 --> 00:02:29,350
i'm sorry i didn't hear you could you

56
00:02:35,190 --> 00:02:33,190
and i think she said how does the

57
00:02:37,990 --> 00:02:35,200
spacesuit work

58
00:02:39,830 --> 00:02:38,000
oh wow that's a fairly loaded question

59
00:02:41,270 --> 00:02:39,840
it uh

60
00:02:44,550 --> 00:02:41,280
kelly do you want to try to tackle it

61
00:02:45,430 --> 00:02:44,560
well the space shoots we use for the u.s

62
00:02:47,670 --> 00:02:45,440
there's two different kinds of

63
00:02:49,830 --> 00:02:47,680

spacesuits first of all there's a u.s

64

00:02:52,150 --> 00:02:49,840

spacesuit a nasa space suit we call the

65

00:02:53,750 --> 00:02:52,160

extra vehicular mobility unit and

66

00:02:56,869 --> 00:02:53,760

there's a russian one that we call the

67

00:02:59,430 --> 00:02:56,879

orlon and they're very similar because

68

00:03:00,630 --> 00:02:59,440

essentially what they are is a personal

69

00:03:03,030 --> 00:03:00,640

spaceship

70

00:03:04,949 --> 00:03:03,040

and they provide all of the protection

71

00:03:07,190 --> 00:03:04,959

from the outside environment around

72

00:03:09,670 --> 00:03:07,200

space that you would need if you were

73

00:03:12,390 --> 00:03:09,680

actually in a spaceship but it allows

74

00:03:14,470 --> 00:03:12,400

you to move about and get use your arms

75

00:03:16,949 --> 00:03:14,480

and to do important tasks that we need

76

00:03:18,309 --> 00:03:16,959

to do to maintain the space station or

77

00:03:20,630 --> 00:03:18,319

they did a lot of it to assemble the

78

00:03:23,030 --> 00:03:20,640

space station in the first place and so

79

00:03:25,350 --> 00:03:23,040

what you've got is you've got a inside

80

00:03:27,990 --> 00:03:25,360

the space dude you have a liquid cooling

81

00:03:30,710 --> 00:03:28,000

garment because in spite of the fact you

82

00:03:32,390 --> 00:03:30,720

might think space is is cool actually

83

00:03:33,750 --> 00:03:32,400

all the work that you do in it can build

84

00:03:35,670 --> 00:03:33,760

up a lot of heat and we've got really

85

00:03:36,949 --> 00:03:35,680

good insulation in the spacesuit and so

86

00:03:39,430 --> 00:03:36,959

one of the hardest things you have to do

87

00:03:40,309 --> 00:03:39,440

is get rid of all that excess heat and

88

00:03:41,990 --> 00:03:40,319

so

89

00:03:44,630 --> 00:03:42,000

there is a liquid coulee garment that

90

00:03:45,750 --> 00:03:44,640

has lots of tubing with water and they

91

00:03:47,670 --> 00:03:45,760

can

92

00:03:48,949 --> 00:03:47,680

with a little dial on the front of their

93

00:03:50,949 --> 00:03:48,959

spacesuit they can adjust the

94

00:03:52,710 --> 00:03:50,959

temperature of the spacesuit so they can

95

00:03:55,110 --> 00:03:52,720

stay comfortable and work

96

00:03:56,789 --> 00:03:55,120

they've got a little uh

97

00:03:58,390 --> 00:03:56,799

mouth water

98

00:04:00,070 --> 00:03:58,400

delivery system so that they can take a

99

00:04:02,869 --> 00:04:00,080

drink because they're usually out there

100

00:04:04,630 --> 00:04:02,879

for six and a half or more hours and so

101
00:04:06,390 --> 00:04:04,640
it's very important that they be able to

102
00:04:07,830 --> 00:04:06,400
stay rehydrated

103
00:04:10,309 --> 00:04:07,840
they have

104
00:04:12,390 --> 00:04:10,319
a multi-layer spacesuit that provides

105
00:04:15,350 --> 00:04:12,400
pressure for them and it also provides

106
00:04:18,550 --> 00:04:15,360
protection uh against uh the uh the

107
00:04:21,110 --> 00:04:18,560
thermal environment and to some level uh

108
00:04:24,070 --> 00:04:21,120
uh tiny pieces of space junk uh that

109
00:04:25,749 --> 00:04:24,080
sort of thing uh and then uh

110
00:04:27,189 --> 00:04:25,759
the gloves are really important on the

111
00:04:29,270 --> 00:04:27,199
spacesuits because when you're out there

112
00:04:31,350 --> 00:04:29,280
doing work your hands are your most

113
00:04:33,270 --> 00:04:31,360

important thing and engineers here at

114

00:04:35,510 --> 00:04:33,280

johnson space room done a lot of work

115

00:04:37,670 --> 00:04:35,520

over the years to make these gloves

116

00:04:40,469 --> 00:04:37,680

protective enough but also

117

00:04:42,870 --> 00:04:40,479

nimble enough that you can do a lot of

118

00:04:44,550 --> 00:04:42,880

the the tight work that you have to do

119

00:04:46,629 --> 00:04:44,560

when you're connecting connectors for

120

00:04:48,070 --> 00:04:46,639

electrical connections or

121

00:04:50,230 --> 00:04:48,080

connecting fluid connections are

122

00:04:52,469 --> 00:04:50,240

associated with the cooling systems on

123

00:04:54,310 --> 00:04:52,479

the space station so

124

00:04:55,670 --> 00:04:54,320

and and that's basically how it works

125

00:04:57,270 --> 00:04:55,680

you have your oxygen tanks you have

126
00:04:59,270 --> 00:04:57,280
electricity that powers the systems of

127
00:05:23,110 --> 00:04:59,280
the suit and once you go outside you're

128
00:05:23,120 --> 00:05:28,950
are there wet in mission control

129
00:05:33,029 --> 00:05:31,350
regular routines followed by yes okay

130
00:05:34,870 --> 00:05:33,039
yes there are um

131
00:05:36,950 --> 00:05:34,880
regular routines yes they're daily

132
00:05:38,550 --> 00:05:36,960
operations they have to get up they have

133
00:05:40,310 --> 00:05:38,560
to talk to the flight directors they

134
00:05:42,230 --> 00:05:40,320
have meetings and figure out what the

135
00:05:45,830 --> 00:05:42,240
tasks are for today

136
00:05:49,990 --> 00:05:47,990
and then they

137
00:05:51,990 --> 00:05:50,000
go through what the plan is for the day

138
00:05:52,790 --> 00:05:52,000

the day is already planned out and so

139

00:06:02,550 --> 00:05:52,800

the

140

00:06:05,350 --> 00:06:02,560

follow a daily routine and it's planned

141

00:06:07,110 --> 00:06:05,360

out ahead of time for the most part

142

00:06:09,990 --> 00:06:07,120

yeah interestingly though we're working

143

00:06:12,309 --> 00:06:10,000

on new ways to keep from having to have

144

00:06:14,629 --> 00:06:12,319

mission control be so directly involved

145

00:06:16,550 --> 00:06:14,639

in everything that the crews do on orbit

146

00:06:17,990 --> 00:06:16,560

the crews like to be somewhat autonomous

147

00:06:19,590 --> 00:06:18,000

so they can choose when they get their

148

00:06:21,510 --> 00:06:19,600

work done

149

00:06:23,990 --> 00:06:21,520

and when to work on one thing versus

150

00:06:26,309 --> 00:06:24,000

another thing and and uh

151

00:06:28,390 --> 00:06:26,319

it's also important that we

152

00:06:30,070 --> 00:06:28,400

learn how to do that

153

00:06:31,830 --> 00:06:30,080

without having to have mission control

154

00:06:35,029 --> 00:06:31,840

there for everything because as we go

155

00:06:37,749 --> 00:06:35,039

farther out into space there are delays

156

00:06:39,430 --> 00:06:37,759

in communication that will occur and you

157

00:06:41,189 --> 00:06:39,440

don't want to have to wait half an hour

158

00:06:42,710 --> 00:06:41,199

when you're at mars to get an answer for

159

00:06:44,790 --> 00:06:42,720

mission control before you can go on to

160

00:06:46,790 --> 00:06:44,800

the next step and so

161

00:06:49,510 --> 00:06:46,800

lately they've been doing some special

162

00:06:50,790 --> 00:06:49,520

work earlier this week they did work on

163

00:06:59,350 --> 00:06:50,800

the

164

00:07:01,430 --> 00:06:59,360

now could do it virtually on his own

165

00:07:03,110 --> 00:07:01,440

without having to ask mission control

166

00:07:05,589 --> 00:07:03,120

questions and like

167

00:07:08,309 --> 00:07:05,599

and so while there is a very structured

168

00:07:09,909 --> 00:07:08,319

routine for the crew on board

169

00:07:11,830 --> 00:07:09,919

they're also

170

00:07:14,309 --> 00:07:11,840

are looking at new opportunities where

171

00:07:15,110 --> 00:07:14,319

we can minimize that so that the crews

172

00:07:16,629 --> 00:07:15,120

can

173

00:07:18,710 --> 00:07:16,639

go to the office and do their job

174

00:07:21,189 --> 00:07:18,720

without having to have somebody explain

175

00:07:22,550 --> 00:07:21,199

how to do things all day long

176

00:07:24,150 --> 00:07:22,560

you know the other part of that is that

177

00:07:25,350 --> 00:07:24,160

the folks here in mission control have a

178

00:07:29,110 --> 00:07:25,360

schedule

179

00:07:31,270 --> 00:07:29,120

we work here in mission control 24 7 365

180

00:07:32,950 --> 00:07:31,280

days a year and so that means that there

181

00:07:35,670 --> 00:07:32,960

are three shift to flight controllers

182

00:07:37,589 --> 00:07:35,680

that work every day and they cover about

183

00:07:39,909 --> 00:07:37,599

an eight hour shift each one and then

184

00:07:41,909 --> 00:07:39,919

they have a handover period so that the

185

00:07:43,830 --> 00:07:41,919

folks who are leaving can tell the

186

00:07:45,350 --> 00:07:43,840

status of all the systems and things

187

00:07:47,830 --> 00:07:45,360

that we have to do

188

00:07:49,189 --> 00:07:47,840

to the folks that are coming on and then

189

00:07:50,629 --> 00:07:49,199

uh the

190

00:07:52,550 --> 00:07:50,639

then that crew member does the same

191

00:07:54,629 --> 00:07:52,560

thing for the oncoming crew and so we

192

00:07:56,390 --> 00:07:54,639

keep a rotating crew in it make sure

193

00:07:59,350 --> 00:07:56,400

everybody's up to date everybody knows

194

00:08:04,309 --> 00:07:59,360

the important items and that everybody's

195

00:08:24,550 --> 00:08:07,749

thank you you're welcome you're welcome

196

00:08:24,560 --> 00:08:28,550

fresh fruit

197

00:08:32,070 --> 00:08:30,790

oh yeah they would love to get it more

198

00:08:33,269 --> 00:08:32,080

often but they can

199

00:08:34,709 --> 00:08:33,279

only get it

200

00:08:37,670 --> 00:08:34,719

when there's a vehicle that can bring it

201
00:08:39,509 --> 00:08:37,680
to them but as far as the food being on

202
00:08:42,149 --> 00:08:39,519
station they have some of the regular

203
00:08:44,149 --> 00:08:42,159
stuff that you eat here on earth granola

204
00:08:45,670 --> 00:08:44,159
bars m m's things like that and that

205
00:08:47,670 --> 00:08:45,680
doesn't require anything special for

206
00:08:49,030 --> 00:08:47,680
them to have that type of thing but they

207
00:08:50,389 --> 00:08:49,040
do also have

208
00:08:53,269 --> 00:08:50,399
food that's freeze-dried that they need

209
00:08:55,430 --> 00:08:53,279
to be rehydrated um when they're up

210
00:08:57,190 --> 00:08:55,440
there and so those uh have kind of a

211
00:08:57,990 --> 00:08:57,200
shelf life of about a year year and a

212
00:08:59,670 --> 00:08:58,000
half

213
00:09:01,509 --> 00:08:59,680

and um

214

00:09:03,509 --> 00:09:01,519

they uh

215

00:09:05,030 --> 00:09:03,519

and really enjoy the food they get to

216

00:09:06,870 --> 00:09:05,040

taste it on the ground before they go up

217

00:09:08,550 --> 00:09:06,880

into space actually so they get to kind

218

00:09:10,710 --> 00:09:08,560

of pick out their menus and decide what

219

00:09:12,470 --> 00:09:10,720

they what they think they might like to

220

00:09:14,389 --> 00:09:12,480

eat for six months since they're going

221

00:09:16,550 --> 00:09:14,399

to be there so it's it's kind of fun

222

00:09:18,630 --> 00:09:16,560

they get to do food tastings and and

223

00:09:19,990 --> 00:09:18,640

kind of pick their own menu yeah a lot

224

00:09:21,670 --> 00:09:20,000

of things that they have on the space

225

00:09:23,670 --> 00:09:21,680

station to eat are the same kind of

226

00:09:25,030 --> 00:09:23,680

things that you could go to the grocery

227

00:09:27,350 --> 00:09:25,040

store and buy

228

00:09:28,630 --> 00:09:27,360

thermo stabilized meals i know there are

229

00:09:29,990 --> 00:09:28,640

some really good ones out there that you

230

00:09:31,269 --> 00:09:30,000

can just buy and you can stick them in

231

00:09:32,790 --> 00:09:31,279

your pantry and you don't have to

232

00:09:33,990 --> 00:09:32,800

refrigerate them or freeze or anything

233

00:09:35,509 --> 00:09:34,000

and you can heat them up in the

234

00:09:36,870 --> 00:09:35,519

microwave they have different ways of

235

00:09:39,269 --> 00:09:36,880

heating them on the space station they

236

00:09:41,990 --> 00:09:39,279

don't have a microwave but they they do

237

00:09:43,190 --> 00:09:42,000

have that capability to eat the same

238

00:09:45,910 --> 00:09:43,200

kind of things you would eat here on the

239

00:09:47,509 --> 00:09:45,920

ground but the the folks here in in

240

00:09:49,350 --> 00:09:47,519

mission control and in our food

241

00:09:52,070 --> 00:09:49,360

laboratory also do a lot of work to make

242

00:09:54,310 --> 00:09:52,080

sure that the nutritional components of

243

00:09:55,910 --> 00:09:54,320

the diet are really healthy

244

00:09:57,829 --> 00:09:55,920

and we're learning more and more there's

245

00:09:59,829 --> 00:09:57,839

a special experiment called pro k right

246

00:10:02,949 --> 00:09:59,839

now where doctors on the ground are

247

00:10:05,590 --> 00:10:02,959

looking at how the nutritional

248

00:10:08,389 --> 00:10:05,600

components of their food that they eat

249

00:10:10,790 --> 00:10:08,399

affect their long-term health and their

250

00:10:11,990 --> 00:10:10,800

reaction to microgravity we're finding

251
00:10:14,630 --> 00:10:12,000
out that some of the things that you

252
00:10:17,350 --> 00:10:14,640
would think might be

253
00:10:19,190 --> 00:10:17,360
the expected behavior such as eating a

254
00:10:21,590 --> 00:10:19,200
lot of protein would be good for you

255
00:10:24,230 --> 00:10:21,600
when really it may end up not being as

256
00:10:26,949 --> 00:10:24,240
good for you and so we're working on how

257
00:10:28,710 --> 00:10:26,959
to fine-tune the diet so that

258
00:10:29,829 --> 00:10:28,720
they they can

259
00:10:30,949 --> 00:10:29,839
keep good

260
00:10:34,310 --> 00:10:30,959
muscle

261
00:10:35,910 --> 00:10:34,320
health and that their bones don't

262
00:10:37,990 --> 00:10:35,920
deteriorate and

263
00:10:39,350 --> 00:10:38,000

that goes right along with exercise

264

00:10:40,949 --> 00:10:39,360

which is very important to make sure

265

00:10:42,790 --> 00:10:40,959

they stay healthy and they can return to

266

00:10:48,150 --> 00:10:42,800

one gravity and be able to be healthy

267

00:10:52,150 --> 00:10:49,750

you're welcome

268

00:10:53,590 --> 00:10:52,160

and i should add that chris hadfield uh

269

00:10:55,910 --> 00:10:53,600

has said he's bringing some special

270

00:10:57,269 --> 00:10:55,920

treats up to the crew uh on his you know

271

00:10:59,590 --> 00:10:57,279

they're about ready to dock with the

272

00:11:01,350 --> 00:10:59,600

space station tomorrow and so whenever a

273

00:11:03,030 --> 00:11:01,360

new crew comes up they bring lots of

274

00:11:04,790 --> 00:11:03,040

special treats and some of those treats

275

00:11:06,630 --> 00:11:04,800

are fresh fruit and

276
00:11:07,829 --> 00:11:06,640
special things like chocolate and other

277
00:11:09,670 --> 00:11:07,839
things so we don't know exactly what

278
00:11:10,949 --> 00:11:09,680
they're bringing but we know that the

279
00:11:13,750 --> 00:11:10,959
crew that's on board is going to get

280
00:11:16,230 --> 00:11:13,760
some special holiday surprises

281
00:11:21,269 --> 00:11:16,240
yes i'm sure there'll be maple involved

282
00:11:21,279 --> 00:11:27,110
hi i'm

283
00:11:33,430 --> 00:11:28,790
the astronauts elizabeth feeling lonely

284
00:11:37,110 --> 00:11:35,430
oh wow yes they are because they are

285
00:11:38,630 --> 00:11:37,120
able to speak with their families and

286
00:11:39,990 --> 00:11:38,640
there's more than one of them on board

287
00:11:42,710 --> 00:11:40,000
at all times you know there's always

288
00:11:44,389 --> 00:11:42,720

constant interaction with one another

289

00:11:46,949 --> 00:11:44,399

they have what's called like a crew web

290

00:11:47,990 --> 00:11:46,959

page and they're able to select movies

291

00:11:49,430 --> 00:11:48,000

and you know some of their favorite

292

00:11:51,030 --> 00:11:49,440

movies and television shows that they

293

00:11:52,470 --> 00:11:51,040

like to watch here on the ground they're

294

00:11:54,389 --> 00:11:52,480

able to do that and read you know

295

00:11:55,829 --> 00:11:54,399

newspapers and

296

00:11:57,509 --> 00:11:55,839

they're able to still kind of keep up

297

00:11:59,590 --> 00:11:57,519

with world events and everything so they

298

00:12:00,710 --> 00:11:59,600

don't feel you know too isolated you

299

00:12:02,150 --> 00:12:00,720

don't want them to feel like they're

300

00:12:03,910 --> 00:12:02,160

completely out of touch and so there are

301
00:12:05,829 --> 00:12:03,920
ways we have a group a whole team of

302
00:12:08,069 --> 00:12:05,839
people that their job is to make sure

303
00:12:10,230 --> 00:12:08,079
that the crew doesn't feel lonely or

304
00:12:12,550 --> 00:12:10,240
isolated while they're in space right

305
00:12:14,550 --> 00:12:12,560
and they also have regular conferences

306
00:12:17,590 --> 00:12:14,560
with uh for example their boss here at

307
00:12:19,190 --> 00:12:17,600
the ground bob bacon is the lead

308
00:12:21,269 --> 00:12:19,200
astronaut and he has a regular

309
00:12:23,030 --> 00:12:21,279
conference with the crew and then you

310
00:12:25,110 --> 00:12:23,040
know we work

311
00:12:27,670 --> 00:12:25,120
in shifts here in mission control but

312
00:12:29,990 --> 00:12:27,680
for every expedition uh there is a lead

313
00:12:31,990 --> 00:12:30,000

flight director and chris edelman is the

314

00:12:34,230 --> 00:12:32,000

lead flight director for expedition 34

315

00:12:35,750 --> 00:12:34,240

right now and he has a weekly tag up

316

00:12:38,069 --> 00:12:35,760

with them and he can actually bring

317

00:12:39,750 --> 00:12:38,079

friends and and colleagues that are

318

00:12:41,829 --> 00:12:39,760

particularly close to the crew members

319

00:12:43,509 --> 00:12:41,839

in and they do a two-way conversation

320

00:12:45,590 --> 00:12:43,519

just like this where they can see and

321

00:12:47,509 --> 00:12:45,600

hear each other and do that so in

322

00:12:49,509 --> 00:12:47,519

addition to keeping them up together

323

00:12:50,790 --> 00:12:49,519

with their families they also have their

324

00:12:52,949 --> 00:12:50,800

friends and colleagues that they work

325

00:12:54,470 --> 00:12:52,959

with day to day an opportunity to get up

326

00:12:56,069 --> 00:12:54,480

there and one other thing they have is

327

00:12:57,350 --> 00:12:56,079

they do have access to the internet

328

00:13:01,350 --> 00:12:57,360

directly

329

00:13:05,509 --> 00:13:03,670

communication line that you've ever seen

330

00:13:07,269 --> 00:13:05,519

but they can actually go out and look

331

00:13:09,430 --> 00:13:07,279

online and they can even

332

00:13:11,269 --> 00:13:09,440

order flowers for their wives for their

333

00:13:13,269 --> 00:13:11,279

anniversary or send down a special

334

00:13:14,550 --> 00:13:13,279

birthday present

335

00:13:20,870 --> 00:13:14,560

through one of the online ordering

336

00:13:24,949 --> 00:13:22,629

thank you

337

00:13:26,790 --> 00:13:24,959

you're welcome

338

00:13:28,230 --> 00:13:26,800

okay we're gonna have the students speak

339

00:13:29,590 --> 00:13:28,240

a little bit closer to the computer i

340

00:13:31,190 --> 00:13:29,600

think that will help you out a little

341

00:13:33,670 --> 00:13:31,200

bit

342

00:13:39,590 --> 00:13:33,680

hi my name's kristen and my question is

343

00:13:44,230 --> 00:13:41,189

oh gosh i don't know exactly how many

344

00:13:46,870 --> 00:13:44,240

okay generally there are about 20 or 30

345

00:13:49,030 --> 00:13:46,880

people in here during a normal work

346

00:13:51,829 --> 00:13:49,040

workday shift for the crew

347

00:13:53,110 --> 00:13:51,839

the crew wakes up about midnight houston

348

00:13:55,430 --> 00:13:53,120

time

349

00:13:57,670 --> 00:13:55,440

and then they go to bed around 3 30 in

350

00:14:00,949 --> 00:13:57,680

the afternoon houston time

351
00:14:03,030 --> 00:14:00,959
and so from those periods we have a full

352
00:14:04,629 --> 00:14:03,040
team of flight controllers here and

353
00:14:06,470 --> 00:14:04,639
that's around 20 or 30 people and then

354
00:14:09,269 --> 00:14:06,480
there are some additional folks that are

355
00:14:12,069 --> 00:14:09,279
in support rooms that are nearby here

356
00:14:13,430 --> 00:14:12,079
that provide specialized input to the

357
00:14:14,949 --> 00:14:13,440
team here that's in what we call the

358
00:14:16,870 --> 00:14:14,959
front room

359
00:14:18,069 --> 00:14:16,880
and then we also

360
00:14:20,710 --> 00:14:18,079
have

361
00:14:23,430 --> 00:14:20,720
an opportunity to pull in specialists

362
00:14:25,590 --> 00:14:23,440
from the research area and principal

363
00:14:27,590 --> 00:14:25,600

investigators and those folks mainly

364

00:14:30,310 --> 00:14:27,600

come in through the payload operations

365

00:14:31,910 --> 00:14:30,320

center in huntsville alabama where nasa

366

00:14:33,509 --> 00:14:31,920

has the marshall space flight center and

367

00:14:35,590 --> 00:14:33,519

they coordinate all the research

368

00:14:46,949 --> 00:14:35,600

activities so there's lots of different

369

00:14:50,310 --> 00:14:48,470

hi i'm matthew

370

00:14:56,230 --> 00:14:50,320

what type of experiments are done on the

371

00:15:02,150 --> 00:14:58,470

there are so many you know there at any

372

00:15:03,829 --> 00:15:02,160

given time there are between 150 and 200

373

00:15:06,389 --> 00:15:03,839

different experiments going on the space

374

00:15:09,430 --> 00:15:06,399

station some of them involve crew

375

00:15:11,110 --> 00:15:09,440

involvement some of them are done by

376

00:15:12,389 --> 00:15:11,120

investigators here on the ground working

377

00:15:14,069 --> 00:15:12,399

remotely

378

00:15:15,990 --> 00:15:14,079

there are three different laboratories

379

00:15:18,550 --> 00:15:16,000

on the space station there's the nasa

380

00:15:21,509 --> 00:15:18,560

destiny laboratory there is the european

381

00:15:24,629 --> 00:15:21,519

space agency's columbus laboratory and

382

00:15:27,829 --> 00:15:24,639

there's the japanese space agency's kibo

383

00:15:29,269 --> 00:15:27,839

laboratory kibo means hope in japanese

384

00:15:31,430 --> 00:15:29,279

and so we have all these different

385

00:15:33,189 --> 00:15:31,440

experiments and there's a an

386

00:15:35,590 --> 00:15:33,199

international space station program

387

00:15:38,150 --> 00:15:35,600

science office that is based here in

388

00:15:39,350 --> 00:15:38,160

houston and they work with the folks at

389

00:15:42,069 --> 00:15:39,360

marshall

390

00:15:44,790 --> 00:15:42,079

in huntsville alabama to coordinate all

391

00:15:46,550 --> 00:15:44,800

the different experiments and among the

392

00:15:48,710 --> 00:15:46,560

experiments they do a lot of it is is

393

00:15:51,030 --> 00:15:48,720

biological experiments they use the crew

394

00:15:53,590 --> 00:15:51,040

members themselves as

395

00:15:57,990 --> 00:15:53,600

test subjects and so they will do

396

00:15:59,110 --> 00:15:58,000

different types of exercise or they will

397

00:16:01,749 --> 00:15:59,120

look at

398

00:16:04,230 --> 00:16:01,759

different displays on a laptop computer

399

00:16:06,949 --> 00:16:04,240

and have to respond to it

400

00:16:09,350 --> 00:16:06,959

they will record their daily intake of

401

00:16:12,230 --> 00:16:09,360

whatever foods they ate

402

00:16:15,030 --> 00:16:12,240

and keep journals of their moods and

403

00:16:17,189 --> 00:16:15,040

things that they feel and how they are

404

00:16:18,710 --> 00:16:17,199

and so they do all that and there's

405

00:16:21,670 --> 00:16:18,720

other biological experiments that

406

00:16:23,509 --> 00:16:21,680

involve things like fish and mice

407

00:16:25,670 --> 00:16:23,519

spiders and butterflies right now

408

00:16:27,990 --> 00:16:25,680

they're working today kevin ford was

409

00:16:29,829 --> 00:16:28,000

working with the madoka fish experiment

410

00:16:31,189 --> 00:16:29,839

which is these tiny little fish and

411

00:16:32,949 --> 00:16:31,199

there's a

412

00:16:34,230 --> 00:16:32,959

a small aquarium on board the space

413

00:16:36,870 --> 00:16:34,240

station

414

00:16:38,550 --> 00:16:36,880

and these little fish have uh of course

415

00:16:41,030 --> 00:16:38,560

skeletal systems because we all know if

416

00:16:43,829 --> 00:16:41,040

the fish have skeletons just like humans

417

00:16:46,550 --> 00:16:43,839

do they're just a lot smaller and so but

418

00:16:48,230 --> 00:16:46,560

because fish have faster metabolisms and

419

00:16:50,310 --> 00:16:48,240

don't live as long

420

00:16:52,790 --> 00:16:50,320

their the effects of microgravity on

421

00:16:53,990 --> 00:16:52,800

their bones are happens a lot faster

422

00:16:56,150 --> 00:16:54,000

than it does for us and so the

423

00:16:59,590 --> 00:16:56,160

researchers are looking at those fish

424

00:17:01,269 --> 00:16:59,600

bones to find out what longer duration

425

00:17:02,790 --> 00:17:01,279

space flight for humans how that might

426

00:17:04,150 --> 00:17:02,800

affect our skeleton systems because

427

00:17:06,390 --> 00:17:04,160

that's one of the things we've noticed

428

00:17:09,590 --> 00:17:06,400

is that when you live on board the space

429

00:17:12,309 --> 00:17:09,600

station for five six months you tend to

430

00:17:14,630 --> 00:17:12,319

lose bone mass now we're learning that

431

00:17:17,029 --> 00:17:14,640

certain types of exercise can really

432

00:17:18,949 --> 00:17:17,039

help us keep that from happening and

433

00:17:21,029 --> 00:17:18,959

we're actually getting really close to

434

00:17:22,630 --> 00:17:21,039

the point where we have zero loss of

435

00:17:23,990 --> 00:17:22,640

bone density on the space station but

436

00:17:25,510 --> 00:17:24,000

you can imagine

437

00:17:27,110 --> 00:17:25,520

a lot of people have a thing called

438

00:17:29,110 --> 00:17:27,120

osteoporosis when you get older i don't

439

00:17:30,549 --> 00:17:29,120

know if your grandparents may have any

440

00:17:32,070 --> 00:17:30,559

of this yet

441

00:17:33,750 --> 00:17:32,080

but but it means your skeleton is a

442

00:17:35,669 --> 00:17:33,760

little bit weaker and you tend to have

443

00:17:37,430 --> 00:17:35,679

broken bones or a lot of people have

444

00:17:40,390 --> 00:17:37,440

broken hips and things like that as they

445

00:17:42,710 --> 00:17:40,400

get older and we're working on learning

446

00:17:44,630 --> 00:17:42,720

how that affects astronauts because it

447

00:17:46,310 --> 00:17:44,640

happens at a lot faster rate we're

448

00:17:48,470 --> 00:17:46,320

hoping we can translate that to things

449

00:17:50,470 --> 00:17:48,480

that you can help people on the ground

450

00:17:52,390 --> 00:17:50,480

now there are plant experiments

451
00:17:54,390 --> 00:17:52,400
we were looking at the difference in the

452
00:17:56,390 --> 00:17:54,400
way plants grow

453
00:17:59,029 --> 00:17:56,400
on the ground and in space

454
00:18:01,909 --> 00:17:59,039
there are experiments as to how fire

455
00:18:03,350 --> 00:18:01,919
works and you know fire on a space

456
00:18:05,190 --> 00:18:03,360
station since it's an enclosed

457
00:18:06,470 --> 00:18:05,200
environment is a very dangerous thing

458
00:18:08,310 --> 00:18:06,480
and that's part of the thing you train

459
00:18:10,390 --> 00:18:08,320
them for is how to put out fires and how

460
00:18:13,350 --> 00:18:10,400
to react quickly

461
00:18:15,350 --> 00:18:13,360
but it also can help us make

462
00:18:17,590 --> 00:18:15,360
engines run more efficiently whether

463
00:18:18,870 --> 00:18:17,600

it's car engines or jet engines here on

464

00:18:19,750 --> 00:18:18,880

earth

465

00:18:23,590 --> 00:18:19,760

there's

466

00:18:25,510 --> 00:18:23,600

experiments into how to recycle things

467

00:18:27,590 --> 00:18:25,520

i don't know if you know this but the

468

00:18:28,870 --> 00:18:27,600

water that the crew members on the space

469

00:18:31,110 --> 00:18:28,880

station drink

470

00:18:32,789 --> 00:18:31,120

used to be their urine so they went to

471

00:18:35,510 --> 00:18:32,799

the bathroom and then that went through

472

00:18:37,990 --> 00:18:35,520

a special filtration system that does

473

00:18:40,150 --> 00:18:38,000

essentially what the earth itself does

474

00:18:42,549 --> 00:18:40,160

in about 5000 years but it takes about a

475

00:18:45,190 --> 00:18:42,559

week or two to recycle

476

00:18:46,870 --> 00:18:45,200

yesterday's coffee into tomorrow's

477

00:18:50,070 --> 00:18:46,880

coffee as one of our astronauts used to

478

00:18:52,789 --> 00:18:50,080

say and so we test things like that

479

00:18:55,430 --> 00:18:52,799

there are also important things

480

00:18:57,669 --> 00:18:55,440

looking at things like bacteria

481

00:19:00,549 --> 00:18:57,679

researchers have found out

482

00:19:03,510 --> 00:19:00,559

that there is a specific gene in some

483

00:19:05,510 --> 00:19:03,520

bacteria that turns on and off

484

00:19:07,750 --> 00:19:05,520

its ability to make you sick

485

00:19:09,510 --> 00:19:07,760

and so if we can apply that this

486

00:19:11,990 --> 00:19:09,520

particular one was salmonella which

487

00:19:14,549 --> 00:19:12,000

causes food poisoning if we can apply

488

00:19:16,310 --> 00:19:14,559

those lessons to treatments here on the

489

00:19:18,630 --> 00:19:16,320

ground we could

490

00:19:20,549 --> 00:19:18,640

virtually wipe out people getting food

491

00:19:21,990 --> 00:19:20,559

poisoning on earth

492

00:19:23,830 --> 00:19:22,000

and that would be a really help because

493

00:19:25,669 --> 00:19:23,840

a lot of people die or get very very

494

00:19:27,350 --> 00:19:25,679

sick every year

495

00:19:29,750 --> 00:19:27,360

around the world from that kind of a

496

00:19:32,310 --> 00:19:29,760

problem so very different lines of

497

00:19:34,390 --> 00:19:32,320

research oh and i should not

498

00:19:36,950 --> 00:19:34,400

i need to also look at astronomy because

499

00:19:40,230 --> 00:19:36,960

we have the alpha magnetic spectrometer

500

00:19:42,230 --> 00:19:40,240

that is collecting strange particles

501
00:19:43,830 --> 00:19:42,240
as the space station orbits the earth it

502
00:19:46,310 --> 00:19:43,840
takes advantage of the big solar rays

503
00:19:48,549 --> 00:19:46,320
and electricity to do that and we're

504
00:19:50,310 --> 00:19:48,559
expecting that to actually rewrite the

505
00:19:51,990 --> 00:19:50,320
astronomy textbooks here soon if you

506
00:19:54,230 --> 00:19:52,000
like to study the stars because it's

507
00:20:00,150 --> 00:19:54,240
going to teach us all about dark matter

508
00:20:03,029 --> 00:20:01,430
thank you

509
00:20:04,710 --> 00:20:03,039
you're welcome at least i know we're

510
00:20:06,230 --> 00:20:04,720
supposed to go to 12 15. i don't want i

511
00:20:07,990 --> 00:20:06,240
don't want to take too much more time do

512
00:20:09,750 --> 00:20:08,000
you have time for another question or

513
00:20:12,630 --> 00:20:09,760

two or is this it

514

00:20:14,789 --> 00:20:12,640

we've got time for one more question

515

00:20:17,590 --> 00:20:14,799

we'll give you one last more question uh

516

00:20:24,070 --> 00:20:17,600

this is from christina

517

00:20:26,630 --> 00:20:25,350

well you know it's very interesting that

518

00:20:28,710 --> 00:20:26,640

you asked that question because when i

519

00:20:31,750 --> 00:20:28,720

was a little girl i thought i would

520

00:20:33,669 --> 00:20:31,760

never be able to work at nasa because to

521

00:20:35,590 --> 00:20:33,679

me i thought it was unreachable

522

00:20:37,750 --> 00:20:35,600

but you know i was encouraged by my

523

00:20:39,669 --> 00:20:37,760

teachers especially and and by my

524

00:20:41,669 --> 00:20:39,679

parents that you know never say that

525

00:20:43,430 --> 00:20:41,679

anything is impossible as long as you

526

00:20:45,830 --> 00:20:43,440

try to do your best and i took a

527

00:20:48,070 --> 00:20:45,840

different avenue i didn't major

528

00:20:50,070 --> 00:20:48,080

in astronomy or anything like that but i

529

00:20:52,549 --> 00:20:50,080

did apply the knowledge that i did

530

00:20:55,029 --> 00:20:52,559

receive in school to what i do now and

531

00:20:57,190 --> 00:20:55,039

it and it's perfect and so i would just

532

00:20:59,510 --> 00:20:57,200

encourage you that don't limit yourself

533

00:21:02,070 --> 00:20:59,520

don't ever think that you know i'm not

534

00:21:04,070 --> 00:21:02,080

really into science or my strong point

535

00:21:06,070 --> 00:21:04,080

might be something else and so therefore

536

00:21:08,230 --> 00:21:06,080

i i would wouldn't make it in any

537

00:21:10,310 --> 00:21:08,240

particular field because you have so

538

00:21:12,630 --> 00:21:10,320

many talents inside of you that are just

539

00:21:14,870 --> 00:21:12,640

waiting to come out so for me

540

00:21:16,710 --> 00:21:14,880

i i thought i could never do it and here

541

00:21:18,470 --> 00:21:16,720

i am and i would never dream of being

542

00:21:19,990 --> 00:21:18,480

anywhere else i absolutely love being

543

00:21:21,909 --> 00:21:20,000

here to mona lisa you have to tell them

544

00:21:23,990 --> 00:21:21,919

what you studied okay

545

00:21:25,909 --> 00:21:24,000

so my my degree is actually in

546

00:21:27,590 --> 00:21:25,919

criminology so that just goes to show

547

00:21:30,390 --> 00:21:27,600

you here it is i thought i would be you

548

00:21:32,070 --> 00:21:30,400

know fbi cia and instead here i'm

549

00:21:33,270 --> 00:21:32,080

working with these great crew members

550

00:21:36,310 --> 00:21:33,280

and flight controllers and flight

551
00:21:38,549 --> 00:21:36,320
directors so you never know where your

552
00:21:40,630 --> 00:21:38,559
education will lead you that's right and

553
00:21:42,710 --> 00:21:40,640
you know i took a different path too

554
00:21:44,549 --> 00:21:42,720
i've been working at nasa for 26 years

555
00:21:46,710 --> 00:21:44,559
now

556
00:21:48,470 --> 00:21:46,720
i remember getting to stay home from

557
00:21:50,390 --> 00:21:48,480
kindergarten to watch alan shepard

558
00:21:52,950 --> 00:21:50,400
launch when the very first american went

559
00:21:54,789 --> 00:21:52,960
into space and i've always had a real

560
00:21:56,070 --> 00:21:54,799
interest in space but i never thought

561
00:21:58,310 --> 00:21:56,080
you know i want to be an astronaut and

562
00:22:00,470 --> 00:21:58,320
all that but i was too tall at the time

563
00:22:02,310 --> 00:22:00,480

and then i got needed to wear glasses of

564

00:22:04,149 --> 00:22:02,320

course wear contacts now and things like

565

00:22:05,909 --> 00:22:04,159

that so i never thought i could do it

566

00:22:07,510 --> 00:22:05,919

and i was a reporter and an editor for

567

00:22:09,110 --> 00:22:07,520

10 years before

568

00:22:11,350 --> 00:22:09,120

i got an opportunity to come work at

569

00:22:13,190 --> 00:22:11,360

nasa and now i've been here for 26 years

570

00:22:17,750 --> 00:22:13,200

and it's been a really rewarding career

571

00:22:20,310 --> 00:22:17,760

so my point is that a uh just study what

572

00:22:22,789 --> 00:22:20,320

you need your get a good general

573

00:22:24,390 --> 00:22:22,799

education and that will set you up for

574

00:22:26,390 --> 00:22:24,400

just about anything you want to do in

575

00:22:28,870 --> 00:22:26,400

life and if it ends up being working at

576
00:22:31,590 --> 00:22:28,880
nasa remember that not everybody has to

577
00:22:33,669 --> 00:22:31,600
be an astronaut that there are all kinds

578
00:22:36,070 --> 00:22:33,679
of people that support in many different

579
00:22:37,669 --> 00:22:36,080
ways there are business people that keep

580
00:22:39,510 --> 00:22:37,679
the budgets running for us so that we

581
00:22:41,669 --> 00:22:39,520
can do the things we do there are flight

582
00:22:43,750 --> 00:22:41,679
controllers that support the crews here

583
00:22:45,510 --> 00:22:43,760
on the ground or people like alicia that

584
00:22:47,830 --> 00:22:45,520
help coordinate the training that's so

585
00:22:49,510 --> 00:22:47,840
important to them doing their jobs well

586
00:22:50,950 --> 00:22:49,520
for people like me that help share it

587
00:22:52,950 --> 00:22:50,960
with people like you and people like

588
00:22:55,909 --> 00:22:52,960

michael hare who's helping us do this

589

00:22:58,070 --> 00:22:55,919

telecon today uh who are useful and

590

00:22:59,350 --> 00:22:58,080

they're human resources people that make

591

00:23:01,430 --> 00:22:59,360

sure that we have all the right people

592

00:23:04,230 --> 00:23:01,440

to do the jobs that need to be done

593

00:23:07,270 --> 00:23:04,240

so just remember that you should follow

594

00:23:09,270 --> 00:23:07,280

what what you like to do because

595

00:23:10,870 --> 00:23:09,280

life is too short to be doing something

596

00:23:13,430 --> 00:23:10,880

just for the paycheck you should be

597

00:23:15,190 --> 00:23:13,440

doing something you enjoy doing and if

598

00:23:24,390 --> 00:23:15,200

that ends up being a nasa we would

599

00:23:30,710 --> 00:23:27,430

alicia thank you so very very much for

600

00:23:32,149 --> 00:23:30,720

giving us this time um spend with you we

601
00:23:33,909 --> 00:23:32,159
know how valuable your time is and i

602
00:23:35,669 --> 00:23:33,919
can't begin to tell you what a thrill it

603
00:23:37,430 --> 00:23:35,679
has been for us here at christ king

604
00:23:39,190 --> 00:23:37,440
school in our little town of love in

605
00:23:40,630 --> 00:23:39,200
vermont to to be able to have this

606
00:23:43,029 --> 00:23:40,640
opportunity to speak with people in

607
00:23:45,110 --> 00:23:43,039
miscontrol it really is

608
00:23:47,029 --> 00:23:45,120
very inspiring to all of us thank you

609
00:23:49,590 --> 00:23:47,039
very much ken everybody can be given all

610
00:23:51,510 --> 00:23:49,600
big uh thank you

611
00:23:53,430 --> 00:23:51,520
thank you thank you i've really enjoyed

612
00:23:55,590 --> 00:23:53,440
the time we've spent together today

613
00:23:56,870 --> 00:23:55,600

thanks a bunch to you guys and to also

614

00:23:58,549 --> 00:23:56,880

everybody on the digital learning

615

00:24:00,789 --> 00:23:58,559

network that helps make these

616

00:24:03,269 --> 00:24:00,799

connections possible we love doing it