



1  
00:00:04,550 --> 00:00:03,110  
good morning thanks for joining us here

2  
00:00:06,150 --> 00:00:04,560  
from the mission control center we're

3  
00:00:08,150 --> 00:00:06,160  
here in the international space station

4  
00:00:09,750 --> 00:00:08,160  
flight control room and i'm pleased to

5  
00:00:11,669 --> 00:00:09,760  
be joined by heather rarick a flight

6  
00:00:13,430 --> 00:00:11,679  
director here for the iss flight control

7  
00:00:15,589 --> 00:00:13,440  
team thanks for joining us this morning

8  
00:00:17,029 --> 00:00:15,599  
thank you i'm glad to be here and you're

9  
00:00:19,269 --> 00:00:17,039  
also a native of pittsburgh as well

10  
00:00:20,310 --> 00:00:19,279  
right yep same state pennsylvania so

11  
00:00:22,470 --> 00:00:20,320  
we're looking forward to hearing your

12  
00:00:24,710 --> 00:00:22,480  
questions go ahead and start

13  
00:00:27,109 --> 00:00:24,720

um how big of a role do communications

14

00:00:28,790 --> 00:00:27,119

play with being a flight director

15

00:00:31,189 --> 00:00:28,800

extremely important that's essentially

16

00:00:32,870 --> 00:00:31,199

my job in addition to making decisions

17

00:00:34,549 --> 00:00:32,880

is the communicating to both to the team

18

00:00:36,870 --> 00:00:34,559

here in mission control

19

00:00:38,229 --> 00:00:36,880

those decisions it's also communicating

20

00:00:40,630 --> 00:00:38,239

with the astronauts on board

21

00:00:44,150 --> 00:00:40,640

international space station so it's a

22

00:00:46,229 --> 00:00:44,160

major role in a very important one

23

00:00:49,910 --> 00:00:46,239

how important is it to react quickly and

24

00:00:51,510 --> 00:00:49,920

confidently when i'm working

25

00:00:53,350 --> 00:00:51,520

it's extremely important

26

00:00:54,389 --> 00:00:53,360

the space station

27

00:00:56,069 --> 00:00:54,399

functions

28

00:00:58,310 --> 00:00:56,079

and the astronauts that live aboard the

29

00:01:00,229 --> 00:00:58,320

space station are reliant on everybody

30

00:01:01,750 --> 00:01:00,239

here in mission control to make good

31

00:01:03,910 --> 00:01:01,760

decisions and make them in a timely

32

00:01:05,590 --> 00:01:03,920

fashion and make them confidently that

33

00:01:07,830 --> 00:01:05,600

we know what we're doing

34

00:01:09,910 --> 00:01:07,840

the way we do this is by years of

35

00:01:11,830 --> 00:01:09,920

training so the training plays into our

36

00:01:12,630 --> 00:01:11,840

ability to be confident in the answers

37

00:01:17,030 --> 00:01:12,640

we

38

00:01:19,190 --> 00:01:17,040

and also you guys have a lot of sims

39

00:01:20,310 --> 00:01:19,200

right to practice right when things go

40

00:01:21,670 --> 00:01:20,320

wrong so that probably is a big

41

00:01:23,590 --> 00:01:21,680

confidence builder for the team

42

00:01:25,429 --> 00:01:23,600

absolutely um so part of the training

43

00:01:27,270 --> 00:01:25,439

that we do is uh there's a lot of

44

00:01:29,590 --> 00:01:27,280

workbooks that we read and study

45

00:01:31,590 --> 00:01:29,600

training materials and then we try to

46

00:01:32,950 --> 00:01:31,600

practice what we do which is so it's a

47

00:01:34,149 --> 00:01:32,960

simulation so it's an environment that

48

00:01:36,630 --> 00:01:34,159

looks very much like this mission

49

00:01:38,390 --> 00:01:36,640

control and we actually practice not the

50

00:01:40,310 --> 00:01:38,400

way things are supposed to work but way

51  
00:01:41,910 --> 00:01:40,320  
things work when they fail so when we

52  
00:01:43,990 --> 00:01:41,920  
have problems then we have an

53  
00:01:45,590 --> 00:01:44,000  
opportunity to see how we respond to

54  
00:01:48,550 --> 00:01:45,600  
those scenarios and some of the

55  
00:01:50,389 --> 00:01:48,560  
simulations are very stressful and are

56  
00:01:52,870 --> 00:01:50,399  
somewhat unrealistic in that we have so

57  
00:01:54,149 --> 00:01:52,880  
many failures that it's not a real day

58  
00:01:56,310 --> 00:01:54,159  
but if you can handle that in a very

59  
00:01:58,389 --> 00:01:56,320  
stressful a very stressful environment

60  
00:01:59,749 --> 00:01:58,399  
in a easy and confident way then you

61  
00:02:02,709 --> 00:01:59,759  
know you can do your job on a daily

62  
00:02:02,719 --> 00:02:08,229  
thank you

63  
00:02:12,790 --> 00:02:10,790

what responsibilities must you

64

00:02:15,589 --> 00:02:12,800

well are part of your job of being a

65

00:02:17,350 --> 00:02:15,599

flight director in mission control

66

00:02:18,470 --> 00:02:17,360

well our responsibilities are to make

67

00:02:20,229 --> 00:02:18,480

sure that we

68

00:02:22,710 --> 00:02:20,239

take care of the astronauts on board so

69

00:02:24,630 --> 00:02:22,720

the primary responsibility is the safety

70

00:02:26,869 --> 00:02:24,640

of the crew members our secondary

71

00:02:30,390 --> 00:02:26,879

responsibility is the safety and control

72

00:02:32,790 --> 00:02:30,400

and maintaining a livable atmosphere in

73

00:02:34,229 --> 00:02:32,800

workplace for the astronauts and that's

74

00:02:35,990 --> 00:02:34,239

space station so

75

00:02:37,910 --> 00:02:36,000

our primary responsibility being the

76  
00:02:40,150 --> 00:02:37,920  
crew then our secondary responsibility

77  
00:02:42,390 --> 00:02:40,160  
is the place they live which then also

78  
00:02:44,070 --> 00:02:42,400  
supports their safety then the third

79  
00:02:45,910 --> 00:02:44,080  
thing that's important for us is the

80  
00:02:47,750 --> 00:02:45,920  
mission objective so there are science

81  
00:02:50,070 --> 00:02:47,760  
objectives experiments that are

82  
00:02:52,070 --> 00:02:50,080  
performed there are

83  
00:02:54,470 --> 00:02:52,080  
spacewalks that are done to

84  
00:02:56,790 --> 00:02:54,480  
build the space station or add on

85  
00:02:58,390 --> 00:02:56,800  
different elements so those

86  
00:03:00,550 --> 00:02:58,400  
all contribute then to the mission

87  
00:03:03,670 --> 00:03:00,560  
objectives which are the purpose for

88  
00:03:07,750 --> 00:03:05,190

what do you find most difficult about

89

00:03:07,760 --> 00:03:11,110

yeah great question

90

00:03:14,869 --> 00:03:12,949

i don't know that any one part of it's

91

00:03:17,430 --> 00:03:14,879

difficult it's

92

00:03:20,390 --> 00:03:17,440

it's exhilarating so it's a lot of fun

93

00:03:22,309 --> 00:03:20,400

it is hard in that you do have to make

94

00:03:23,670 --> 00:03:22,319

tough decisions i think maybe the

95

00:03:25,670 --> 00:03:23,680

toughest thing was realizing the

96

00:03:27,830 --> 00:03:25,680

responsibility i took on when i accepted

97

00:03:29,670 --> 00:03:27,840

the job and so knowing that people

98

00:03:30,869 --> 00:03:29,680

depend on me both the astronauts and

99

00:03:32,869 --> 00:03:30,879

their families

100

00:03:34,949 --> 00:03:32,879

nasa the country other countries that

101  
00:03:37,509 --> 00:03:34,959  
are involved in space station and what

102  
00:03:38,869 --> 00:03:37,519  
we do for all of mankind i think that

103  
00:03:40,470 --> 00:03:38,879  
responsibility has probably been the

104  
00:03:42,149 --> 00:03:40,480  
hardest thing for me is just realizing

105  
00:03:44,630 --> 00:03:42,159  
that i've accepted that and i need to do

106  
00:03:49,030 --> 00:03:44,640  
my best

107  
00:03:52,229 --> 00:03:50,309  
um

108  
00:03:56,070 --> 00:03:52,239  
i'm aaron so

109  
00:03:58,229 --> 00:03:56,080  
um hi what kind of education oh hi

110  
00:04:01,270 --> 00:03:58,239  
so what kind of education or training do

111  
00:04:02,789 --> 00:04:01,280  
you need to be a flight director

112  
00:04:04,550 --> 00:04:02,799  
i think right now

113  
00:04:05,589 --> 00:04:04,560

up until now almost all of us have been

114

00:04:07,190 --> 00:04:05,599

engineers

115

00:04:09,750 --> 00:04:07,200

so all of us have gone to college for

116

00:04:11,910 --> 00:04:09,760

engineering some form of it many of us

117

00:04:13,990 --> 00:04:11,920

are aerospace engineers but we also have

118

00:04:16,390 --> 00:04:14,000

chemical and electrical mechanical

119

00:04:17,990 --> 00:04:16,400

engineers as well

120

00:04:20,789 --> 00:04:18,000

that's the primary educational

121

00:04:22,310 --> 00:04:20,799

responsibility or expectation

122

00:04:23,189 --> 00:04:22,320

also to be a flight director then you

123

00:04:25,030 --> 00:04:23,199

have to

124

00:04:26,469 --> 00:04:25,040

usually serve some time and some other

125

00:04:27,909 --> 00:04:26,479

role in mission control so that you

126

00:04:29,670 --> 00:04:27,919

understand the protocols and the

127

00:04:32,150 --> 00:04:29,680

expectations for being in this room and

128

00:04:33,749 --> 00:04:32,160

the responsibility it holds

129

00:04:35,590 --> 00:04:33,759

and i think maybe a lot of students

130

00:04:36,870 --> 00:04:35,600

don't know what engineering is when

131

00:04:39,510 --> 00:04:36,880

you're studying that what can you tell

132

00:04:41,030 --> 00:04:39,520

them on a day-to-day you know matter

133

00:04:42,390 --> 00:04:41,040

what does an engineer do and what types

134

00:04:44,469 --> 00:04:42,400

of things are you learning

135

00:04:46,390 --> 00:04:44,479

so engineering is a lot like your

136

00:04:48,710 --> 00:04:46,400

science classes in that you have to have

137

00:04:50,950 --> 00:04:48,720

a logical progression of ideas so when

138

00:04:52,230 --> 00:04:50,960

you do like a science experiment or

139

00:04:55,590 --> 00:04:52,240

project you know you start with your

140

00:04:57,350 --> 00:04:55,600

hypothesis and and you formulate

141

00:04:58,790 --> 00:04:57,360

a plan and procedure

142

00:05:00,070 --> 00:04:58,800

it's that critical thinking that gets

143

00:05:02,150 --> 00:05:00,080

you through all those steps and

144

00:05:04,070 --> 00:05:02,160

understanding the logic between what you

145

00:05:06,150 --> 00:05:04,080

want to do and how you do it so in

146

00:05:08,390 --> 00:05:06,160

engineering classes you'll take

147

00:05:09,909 --> 00:05:08,400

you'll study how a propulsion system

148

00:05:11,909 --> 00:05:09,919

might work so you'll understand the

149

00:05:13,510 --> 00:05:11,919

different components of an engine and

150

00:05:15,510 --> 00:05:13,520

how those all work then together and

151

00:05:17,430 --> 00:05:15,520

then the different elements

152

00:05:19,270 --> 00:05:17,440

so those are the things that when you

153

00:05:21,749 --> 00:05:19,280

can understand those in a logical and

154

00:05:23,990 --> 00:05:21,759

easy way then you can apply that that

155

00:05:25,670 --> 00:05:24,000

same thinking to almost any problem or

156

00:05:27,189 --> 00:05:25,680

project that you have and so that's why

157

00:05:28,390 --> 00:05:27,199

engineering becomes important in this

158

00:05:30,550 --> 00:05:28,400

role

159

00:05:31,990 --> 00:05:30,560

so you're expert problem solvers

160

00:05:33,350 --> 00:05:32,000

that's what i like to think of it is

161

00:05:35,189 --> 00:05:33,360

absolutely and i think engineers are

162

00:05:36,790 --> 00:05:35,199

some of the unsung heroes because

163

00:05:38,230 --> 00:05:36,800

everything that we use every day was

164

00:05:40,629 --> 00:05:38,240

probably designed by an engineer

165

00:05:42,150 --> 00:05:40,639

somewhere yeah absolutely and if it

166

00:05:44,310 --> 00:05:42,160

wasn't an engineer they were thinking

167

00:05:47,270 --> 00:05:44,320

like an engineer most likely to get it

168

00:05:49,830 --> 00:05:47,280

built or designed or used yeah

169

00:05:50,950 --> 00:05:49,840

okay go ahead with your next questions

170

00:05:52,070 --> 00:05:50,960

um

171

00:05:54,230 --> 00:05:52,080

well

172

00:05:57,430 --> 00:05:54,240

what characteristics do you feel are

173

00:05:59,749 --> 00:05:57,440

important within your position

174

00:06:02,469 --> 00:05:59,759

well like i mentioned the critical um

175

00:06:04,550 --> 00:06:02,479

thinking the problem solving

176

00:06:05,909 --> 00:06:04,560

just being able to see also

177

00:06:08,950 --> 00:06:05,919

at the flight director level you need to

178

00:06:10,710 --> 00:06:08,960

see all the systems working together so

179

00:06:13,110 --> 00:06:10,720

individually there's several different

180

00:06:14,390 --> 00:06:13,120

positions in the room behind me here

181

00:06:16,070 --> 00:06:14,400

they're each responsible for their

182

00:06:17,590 --> 00:06:16,080

individual system so like the

183

00:06:19,590 --> 00:06:17,600

environmental control so that be your

184

00:06:22,150 --> 00:06:19,600

life support the oxygen

185

00:06:24,469 --> 00:06:22,160

the pressure of the space station so

186

00:06:26,950 --> 00:06:24,479

they focus on that specific system that

187

00:06:27,749 --> 00:06:26,960

that person focuses on that system

188

00:06:29,749 --> 00:06:27,759

but

189

00:06:31,110 --> 00:06:29,759

then there's one for propulsion and

190

00:06:33,990 --> 00:06:31,120

motion control

191

00:06:37,029 --> 00:06:34,000

there's one for thermal control so all

192

00:06:39,430 --> 00:06:37,039

of those then have to work together and

193

00:06:41,590 --> 00:06:39,440

add up to being an integrated system and

194

00:06:43,189 --> 00:06:41,600

that entire space station then at the

195

00:06:44,870 --> 00:06:43,199

flight director position

196

00:06:47,749 --> 00:06:44,880

is is what we need to look at is how

197

00:06:49,430 --> 00:06:47,759

does it all work together and it is each

198

00:06:50,950 --> 00:06:49,440

answer for one system the right answer

199

00:06:52,790 --> 00:06:50,960

for the whole station

200

00:06:53,589 --> 00:06:52,800

so that's one of the most important

201  
00:06:55,189 --> 00:06:53,599

things

202  
00:06:56,790 --> 00:06:55,199

making decisions and not being afraid to

203  
00:06:58,629 --> 00:06:56,800

make decisions and knowing the risks

204  
00:07:00,150 --> 00:06:58,639

that you're taking with those decisions

205  
00:07:02,950 --> 00:07:00,160

and being able to weigh that all in a

206  
00:07:04,870 --> 00:07:02,960

very timely fashion very quickly

207  
00:07:08,710 --> 00:07:04,880

and thinking through all that that's

208  
00:07:08,720 --> 00:07:13,350

thank you

209  
00:07:18,230 --> 00:07:16,309

hi um what were the other jobs that you

210  
00:07:20,870 --> 00:07:18,240

personally had that led up to the one

211  
00:07:22,629 --> 00:07:20,880

that you have now

212  
00:07:24,950 --> 00:07:22,639

um early on i worked in the space

213  
00:07:27,029 --> 00:07:24,960

shuttle um program i did flight design

214

00:07:29,589 --> 00:07:27,039

so that was i helped build trajectories

215

00:07:31,589 --> 00:07:29,599

for the shuttle i did the ascent and the

216

00:07:33,990 --> 00:07:31,599

aborts on the ascent

217

00:07:35,350 --> 00:07:34,000

those were mostly uh guidance navigation

218

00:07:37,749 --> 00:07:35,360

control type

219

00:07:39,830 --> 00:07:37,759

trajectory um workings

220

00:07:41,830 --> 00:07:39,840

then um the other thing i did i think

221

00:07:44,150 --> 00:07:41,840

that led to the flight director role was

222

00:07:47,270 --> 00:07:44,160

the working with the russians i worked

223

00:07:49,589 --> 00:07:47,280

as an interface for space station

224

00:07:51,430 --> 00:07:49,599

the u.s portion with the russians

225

00:07:53,749 --> 00:07:51,440

because we work very very closely

226

00:07:55,990 --> 00:07:53,759

together in the operational world that's

227

00:07:57,589 --> 00:07:56,000

a daily responsibility to keep in sync

228

00:07:59,909 --> 00:07:57,599

with them and make sure that we're

229

00:08:01,909 --> 00:07:59,919

working toward the same objectives so i

230

00:08:02,790 --> 00:08:01,919

think those two things played a large

231

00:08:05,909 --> 00:08:02,800

role in

232

00:08:11,589 --> 00:08:05,919

in moving toward the flight director job

233

00:08:15,909 --> 00:08:14,309

hi um what is the most valuable lesson

234

00:08:19,350 --> 00:08:15,919

you've learned working as a flight

235

00:08:22,309 --> 00:08:20,710

oh my goodness

236

00:08:24,150 --> 00:08:22,319

i've learned a lot of lessons

237

00:08:25,029 --> 00:08:24,160

maybe not just one

238

00:08:26,550 --> 00:08:25,039

um

239

00:08:28,230 --> 00:08:26,560

certainly uh

240

00:08:30,550 --> 00:08:28,240

i've been around for a few failures that

241

00:08:32,310 --> 00:08:30,560

have occurred and i think each time i've

242

00:08:35,350 --> 00:08:32,320

been exposed to a failure i've learned

243

00:08:37,029 --> 00:08:35,360

on how to do it better the next time

244

00:08:39,110 --> 00:08:37,039

some of the things that one of the main

245

00:08:40,790 --> 00:08:39,120

things was i don't always have all the

246

00:08:42,630 --> 00:08:40,800

information and i need to make sure i

247

00:08:44,470 --> 00:08:42,640

get the right people involved to help

248

00:08:47,990 --> 00:08:44,480

solve the problem especially when it's

249

00:08:52,470 --> 00:08:50,150

thank you so let me say all those group

250

00:08:54,310 --> 00:08:52,480

projects you do those are all important

251  
00:08:56,470 --> 00:08:54,320  
you really learn how to work well and

252  
00:08:59,990 --> 00:08:56,480  
learn that you need each other to be

253  
00:09:06,710 --> 00:09:01,430  
i hear lots of laughing they must do a

254  
00:09:12,710 --> 00:09:08,870  
hey um how did you become part of the

255  
00:09:19,670 --> 00:09:14,550  
maybe nobody else wanted to do it i

256  
00:09:22,310 --> 00:09:20,470  
no

257  
00:09:24,389 --> 00:09:22,320  
there was an opportunity there i had

258  
00:09:27,350 --> 00:09:24,399  
spent some time traveling back and forth

259  
00:09:29,110 --> 00:09:27,360  
between the us and russia and had gotten

260  
00:09:30,550 --> 00:09:29,120  
to know many of the people in the

261  
00:09:32,710 --> 00:09:30,560  
russian control room

262  
00:09:36,550 --> 00:09:32,720  
and what they how they operated and so

263  
00:09:39,030 --> 00:09:36,560

there was a position for that panel um

264

00:09:40,870 --> 00:09:39,040

to be chaired and i offered to do it and

265

00:09:43,030 --> 00:09:40,880

the office that was responsible for it

266

00:09:46,949 --> 00:09:43,040

said i i should do it and so

267

00:09:51,670 --> 00:09:49,750

and what kind of things did you do there

268

00:09:52,949 --> 00:09:51,680

uh so we did some um

269

00:09:55,350 --> 00:09:52,959

planning for

270

00:09:56,389 --> 00:09:55,360

operations and that would include when

271

00:09:58,550 --> 00:09:56,399

um

272

00:10:01,110 --> 00:09:58,560

like when we would do spacewalks like

273

00:10:02,949 --> 00:10:01,120

what the timing and the uh

274

00:10:04,710 --> 00:10:02,959

expectations were there a lot of

275

00:10:05,910 --> 00:10:04,720

coordination that goes into a spacewalk

276

00:10:07,430 --> 00:10:05,920

if you're going

277

00:10:09,430 --> 00:10:07,440

toward let's say like the russian

278

00:10:11,750 --> 00:10:09,440

segment has

279

00:10:13,190 --> 00:10:11,760

engines on it and you don't want a crew

280

00:10:14,949 --> 00:10:13,200

member to be near the engines in their

281

00:10:16,710 --> 00:10:14,959

spacesuit

282

00:10:19,190 --> 00:10:16,720

so we would have to work on coordinating

283

00:10:20,630 --> 00:10:19,200

the timeline so that we knew when the

284

00:10:22,630 --> 00:10:20,640

russian thrusters needed to be on and

285

00:10:25,590 --> 00:10:22,640

when they needed to be off based on the

286

00:10:26,710 --> 00:10:25,600

activities of the planned spacewalk so

287

00:10:28,150 --> 00:10:26,720

we did those

288

00:10:29,829 --> 00:10:28,160

types of things

289

00:10:31,910 --> 00:10:29,839

to coordinate and make sure we all

290

00:10:34,949 --> 00:10:31,920

understood how we would execute and keep

291

00:10:34,959 --> 00:10:38,790

thank you

292

00:10:43,430 --> 00:10:41,430

hello um as a software executive

293

00:10:45,269 --> 00:10:43,440

engineer what type of work was involved

294

00:10:47,350 --> 00:10:45,279

with that job

295

00:10:49,030 --> 00:10:47,360

so i did this work as a rotational

296

00:10:50,230 --> 00:10:49,040

assignment to headquarters and nasa

297

00:10:52,470 --> 00:10:50,240

headquarters

298

00:10:54,470 --> 00:10:52,480

so i was only there for about 10 months

299

00:10:55,990 --> 00:10:54,480

but in that 10 months the project that i

300

00:10:58,870 --> 00:10:56,000

was assigned to support the software

301  
00:11:01,509 --> 00:10:58,880  
executive was a benchmarking effort so

302  
00:11:03,110 --> 00:11:01,519  
um myself and several other people in

303  
00:11:04,310 --> 00:11:03,120  
the software

304  
00:11:06,470 --> 00:11:04,320  
group

305  
00:11:08,790 --> 00:11:06,480  
around nasa uh got together it was a

306  
00:11:11,670 --> 00:11:08,800  
small team of about five or six people

307  
00:11:14,870 --> 00:11:11,680  
and we interviewed um both uh let me say

308  
00:11:16,150 --> 00:11:14,880  
nasa centers industry so different

309  
00:11:17,509 --> 00:11:16,160  
companies

310  
00:11:19,110 --> 00:11:17,519  
a couple

311  
00:11:21,190 --> 00:11:19,120  
defense agency

312  
00:11:23,110 --> 00:11:21,200  
elements dod type

313  
00:11:24,389 --> 00:11:23,120

organizations that did software and then

314

00:11:26,389 --> 00:11:24,399

some universities that were very

315

00:11:28,310 --> 00:11:26,399

involved in software projects and we

316

00:11:29,990 --> 00:11:28,320

collected information and data about how

317

00:11:32,310 --> 00:11:30,000

they did different things like how they

318

00:11:34,310 --> 00:11:32,320

bought software if they were using it

319

00:11:35,990 --> 00:11:34,320

as part of their deliverables their

320

00:11:37,990 --> 00:11:36,000

product software

321

00:11:39,670 --> 00:11:38,000

and let's see how they did standards how

322

00:11:41,430 --> 00:11:39,680

they did process changes how they did

323

00:11:44,630 --> 00:11:41,440

their testing how much they spent time

324

00:11:46,790 --> 00:11:44,640

on testing so we did a benchmarking

325

00:11:48,550 --> 00:11:46,800

effort and then wrote a report and that

326  
00:11:49,910 --> 00:11:48,560  
report i think is available at nasa

327  
00:11:51,670 --> 00:11:49,920  
somewhere

328  
00:11:53,590 --> 00:11:51,680  
and that's been used to help us

329  
00:11:55,350 --> 00:11:53,600  
determine where we need to do better in

330  
00:11:58,790 --> 00:11:55,360  
the future at nasa to make sure our

331  
00:12:02,550 --> 00:11:58,800  
software projects are all tip top

332  
00:12:05,750 --> 00:12:03,990  
hi my name is joe and i have two

333  
00:12:07,030 --> 00:12:05,760  
questions for you first of all what

334  
00:12:08,629 --> 00:12:07,040  
would you consider to be the most

335  
00:12:14,710 --> 00:12:08,639  
interesting or memorable experience

336  
00:12:19,350 --> 00:12:16,069  
yeah

337  
00:12:24,470 --> 00:12:21,990  
watching the crew members

338  
00:12:25,590 --> 00:12:24,480

i did a shuttle flight and so watching

339

00:12:27,509 --> 00:12:25,600

the shuttle

340

00:12:29,430 --> 00:12:27,519

crew arrive to space station and then

341

00:12:31,350 --> 00:12:29,440

watching them depart and seeing the

342

00:12:33,590 --> 00:12:31,360

motions that the crew members had when

343

00:12:35,829 --> 00:12:33,600

those guys came and left and how

344

00:12:37,509 --> 00:12:35,839

important the human interaction is for

345

00:12:39,590 --> 00:12:37,519

all of us and even

346

00:12:42,550 --> 00:12:39,600

people that are brave enough to spend

347

00:12:44,949 --> 00:12:42,560

six months onboard space station

348

00:12:46,150 --> 00:12:44,959

okay and um

349

00:12:48,069 --> 00:12:46,160

have you ever had a time where you

350

00:12:51,190 --> 00:12:48,079

doubted yourself or

351

00:12:53,910 --> 00:12:51,200

were unsure what to do

352

00:12:56,310 --> 00:12:53,920

yeah i think that happens to everybody

353

00:12:57,670 --> 00:12:56,320

but yes um and that's where you have to

354

00:12:59,190 --> 00:12:57,680

trust your instinct that maybe you don't

355

00:13:01,030 --> 00:12:59,200

know all the information and you have to

356

00:13:04,949 --> 00:13:01,040

go get additional information to make

357

00:13:04,959 --> 00:13:08,389

okay thank you

358

00:13:12,230 --> 00:13:10,550

hello my name is justin and i i would

359

00:13:14,550 --> 00:13:12,240

like to ask you

360

00:13:17,190 --> 00:13:14,560

who i mean or what inspired you to be

361

00:13:19,190 --> 00:13:17,200

what you are today

362

00:13:21,350 --> 00:13:19,200

so uh i think i was about three or four

363

00:13:22,150 --> 00:13:21,360

years old and i saw the landing on the

364

00:13:24,230 --> 00:13:22,160

moon

365

00:13:25,829 --> 00:13:24,240

and i think ever since that then that

366

00:13:27,990 --> 00:13:25,839

has stuck with me and i've always wanted

367

00:13:31,509 --> 00:13:28,000

to be part of the nasa programs and what

368

00:13:36,629 --> 00:13:31,519

they do here with human space flight

369

00:13:43,829 --> 00:13:38,550

hi what do you consider to be the most

370

00:13:43,839 --> 00:13:47,430

that's a tough one

371

00:13:51,910 --> 00:13:50,310

for flight safety i think

372

00:13:54,310 --> 00:13:51,920

we have a lot of

373

00:13:55,910 --> 00:13:54,320

planning that goes into

374

00:13:57,269 --> 00:13:55,920

making sure things are safe before we

375

00:13:59,030 --> 00:13:57,279

ever fly

376

00:14:01,350 --> 00:13:59,040

so

377

00:14:04,470 --> 00:14:01,360

the design of the spacecraft

378

00:14:05,910 --> 00:14:04,480

has a lot of rigor in how it's designed

379

00:14:08,230 --> 00:14:05,920

and tested

380

00:14:10,389 --> 00:14:08,240

and then we have a lot of

381

00:14:12,069 --> 00:14:10,399

tolerance for failure so we instead of

382

00:14:14,470 --> 00:14:12,079

having one computer we have three

383

00:14:16,550 --> 00:14:14,480

computers that do the same job so if one

384

00:14:18,710 --> 00:14:16,560

fails there's two more that will work

385

00:14:20,310 --> 00:14:18,720

well you can fix the third one

386

00:14:23,990 --> 00:14:20,320

then the other thing i would say is

387

00:14:26,069 --> 00:14:24,000

training is to be you know very prepared

388

00:14:29,990 --> 00:14:26,079

and the more we train and are prepared

389

00:14:35,590 --> 00:14:30,000

the safer everything is

390

00:14:40,230 --> 00:14:38,790

hi i'm francisco um i have like three

391

00:14:43,110 --> 00:14:40,240

questions um

392

00:14:44,949 --> 00:14:43,120

what do you um sorry what did nasa learn

393

00:14:47,430 --> 00:14:44,959

from the unmanned rocket that exploded

394

00:14:49,269 --> 00:14:47,440

in october

395

00:14:51,750 --> 00:14:49,279

i don't know that we've learned anything

396

00:14:54,230 --> 00:14:51,760

yet um but there is data that is coming

397

00:14:56,710 --> 00:14:54,240

forward and as we see the data we will

398

00:14:58,710 --> 00:14:56,720

we will certainly learn some things

399

00:15:01,350 --> 00:14:58,720

i since there were no humans on board

400

00:15:03,509 --> 00:15:01,360

that um spacecraft um

401

00:15:06,150 --> 00:15:03,519

that's a great thing that we

402

00:15:08,230 --> 00:15:06,160

we do learn every time something happens

403

00:15:10,069 --> 00:15:08,240

negative happens

404

00:15:11,910 --> 00:15:10,079

but we have to look at the data and see

405

00:15:14,069 --> 00:15:11,920

what it tells us so that we can figure

406

00:15:15,750 --> 00:15:14,079

out what what did go wrong and every

407

00:15:18,150 --> 00:15:15,760

time we have something go wrong then we

408

00:15:19,509 --> 00:15:18,160

figure out what was it that caused that

409

00:15:21,590 --> 00:15:19,519

and then what do we do to prevent that

410

00:15:24,629 --> 00:15:21,600

in the future so we we do take lessons

411

00:15:26,550 --> 00:15:24,639

learned very seriously at nasa and we

412

00:15:28,629 --> 00:15:26,560

learn from all different events um even

413

00:15:30,150 --> 00:15:28,639

the virgin galactic event that happened

414

00:15:33,590 --> 00:15:30,160

shortly after the

415

00:15:35,910 --> 00:15:33,600

the orbital uh cygnus spacecraft event

416

00:15:37,910 --> 00:15:35,920

uh the both of those will be uh reviewed

417

00:15:39,910 --> 00:15:37,920

and anything that's applicable to our

418

00:15:40,949 --> 00:15:39,920

environment which will likely be

419

00:15:42,069 --> 00:15:40,959

something

420

00:15:43,749 --> 00:15:42,079

we will

421

00:15:44,870 --> 00:15:43,759

look at our processes that are similar

422

00:15:47,990 --> 00:15:44,880

and make sure that we don't have the

423

00:15:52,069 --> 00:15:50,310

and what does nasa do after such an

424

00:15:53,430 --> 00:15:52,079

event and what measures are taken in

425

00:15:55,829 --> 00:15:53,440

advance to prevent these things from

426  
00:15:59,110 --> 00:15:55,839  
occurring

427  
00:16:00,310 --> 00:15:59,120  
so we do a lessons learned process with

428  
00:16:03,509 --> 00:16:00,320  
all of our

429  
00:16:05,509 --> 00:16:03,519  
events we such we had a spacesuit that

430  
00:16:07,590 --> 00:16:05,519  
leaked water into the helmet and that

431  
00:16:10,150 --> 00:16:07,600  
has taken over a year but we have tried

432  
00:16:11,670 --> 00:16:10,160  
to diagnose what caused that problem and

433  
00:16:13,670 --> 00:16:11,680  
for everything that we find that could

434  
00:16:15,990 --> 00:16:13,680  
be a cause we then look for a way to

435  
00:16:18,230 --> 00:16:16,000  
solve that problem or make it better and

436  
00:16:20,310 --> 00:16:18,240  
prevent it from happening again so

437  
00:16:23,110 --> 00:16:20,320  
everything that we do we take time to

438  
00:16:25,749 --> 00:16:23,120

review it even our successes we've when

439

00:16:28,150 --> 00:16:25,759

we complete a six month increment with a

440

00:16:30,310 --> 00:16:28,160

crew member a set of crew members we

441

00:16:32,150 --> 00:16:30,320

take a a

442

00:16:33,670 --> 00:16:32,160

couple meetings and review all the

443

00:16:35,350 --> 00:16:33,680

things that may have been problems or

444

00:16:36,710 --> 00:16:35,360

potential problems and we try to find

445

00:16:38,629 --> 00:16:36,720

solutions to prevent those from

446

00:16:41,350 --> 00:16:38,639

happening again so we do that on a

447

00:16:47,269 --> 00:16:41,360

routine basis here

448

00:16:53,350 --> 00:16:50,629

hi my question is regarding the uh file

449

00:16:54,389 --> 00:16:53,360

probe that landed on the 67p comment

450

00:16:57,189 --> 00:16:54,399

recently

451  
00:16:59,030 --> 00:16:57,199  
um do you know what the europeans like

452  
00:17:01,430 --> 00:16:59,040  
hope to discover with that mission or

453  
00:17:06,470 --> 00:17:01,440  
was the mission primarily to ensure that

454  
00:17:09,429 --> 00:17:07,909  
i don't have the details of that mission

455  
00:17:12,069 --> 00:17:09,439  
but it's so exciting to hear that they

456  
00:17:13,990 --> 00:17:12,079  
actually landed a probe on a comet since

457  
00:17:16,710 --> 00:17:14,000  
it's never been done before and it is

458  
00:17:18,390 --> 00:17:16,720  
quite a feat uh they had to find the

459  
00:17:20,309 --> 00:17:18,400  
kind of chase the comet for a long time

460  
00:17:21,669 --> 00:17:20,319  
to be able to get to it

461  
00:17:23,189 --> 00:17:21,679  
i'm sure they're going to collect data

462  
00:17:26,069 --> 00:17:23,199  
now that it's on

463  
00:17:28,069 --> 00:17:26,079

the surface of the comet or at the comet

464

00:17:30,310 --> 00:17:28,079

so they'll be collecting data on it so

465

00:17:32,710 --> 00:17:30,320

it's scientific research to understand

466

00:17:34,950 --> 00:17:32,720

our solar system better and then also

467

00:17:37,029 --> 00:17:34,960

just to you know can we accomplish these

468

00:17:39,350 --> 00:17:37,039

types of things

469

00:17:41,750 --> 00:17:39,360

do you think nasa will perform similar

470

00:17:43,430 --> 00:17:41,760

missions in the future so i think we're

471

00:17:45,990 --> 00:17:43,440

still working on the asteroid redirect

472

00:17:48,310 --> 00:17:46,000

mission so that's still in the the

473

00:17:49,190 --> 00:17:48,320

planning stages but working toward uh

474

00:17:51,669 --> 00:17:49,200

sending

475

00:17:53,590 --> 00:17:51,679

a spacecraft to an asteroid is on in our

476

00:17:55,350 --> 00:17:53,600

future hopefully and we're working

477

00:18:02,230 --> 00:17:55,360

toward that yes

478

00:18:05,590 --> 00:18:03,990

hi i wanted to know what an average

479

00:18:06,870 --> 00:18:05,600

workday looks like for you like is it a

480

00:18:08,870 --> 00:18:06,880

strict routine or is it very

481

00:18:10,630 --> 00:18:08,880

unpredictable

482

00:18:12,549 --> 00:18:10,640

yeah what happens on console is always

483

00:18:14,070 --> 00:18:12,559

unpredictable you can't really plan for

484

00:18:15,510 --> 00:18:14,080

it that's why we try to stress ourselves

485

00:18:17,909 --> 00:18:15,520

in these sims

486

00:18:19,270 --> 00:18:17,919

so that we have

487

00:18:21,590 --> 00:18:19,280

an idea that we don't know what's going

488

00:18:23,990 --> 00:18:21,600

on just to kind of reinforce that idea

489

00:18:25,590 --> 00:18:24,000

a typical work day is the first hour of

490

00:18:27,350 --> 00:18:25,600

working in mission control as a handover

491

00:18:29,110 --> 00:18:27,360

so the team that's coming that's been

492

00:18:31,590 --> 00:18:29,120

here for the previous eight or nine

493

00:18:33,990 --> 00:18:31,600

hours tells us what's going on and both

494

00:18:35,750 --> 00:18:34,000

the astronauts and the systems and then

495

00:18:37,029 --> 00:18:35,760

from there we get right into either

496

00:18:38,470 --> 00:18:37,039

taking care of the astronauts and the

497

00:18:39,510 --> 00:18:38,480

activities that they're working on that

498

00:18:41,830 --> 00:18:39,520

day

499

00:18:44,150 --> 00:18:41,840

or addressing any system issues if

500

00:18:46,310 --> 00:18:44,160

something's not working properly

501  
00:18:47,750 --> 00:18:46,320  
when we think that everything's kind of

502  
00:18:49,750 --> 00:18:47,760  
working well

503  
00:18:51,190 --> 00:18:49,760  
we always have additional planning

504  
00:18:53,350 --> 00:18:51,200  
activities so we can prepare for the

505  
00:18:55,110 --> 00:18:53,360  
next day or the day after and make sure

506  
00:18:57,110 --> 00:18:55,120  
that everything is that we're planning

507  
00:18:58,950 --> 00:18:57,120  
to do for those days is all in order and

508  
00:19:00,950 --> 00:18:58,960  
that it'll be

509  
00:19:04,390 --> 00:19:00,960  
accomplished easily without any

510  
00:19:04,400 --> 00:19:08,230  
thank you

511  
00:19:12,470 --> 00:19:10,390  
hi how are you i wanted to have i have a

512  
00:19:14,230 --> 00:19:12,480  
question for you and it is

513  
00:19:17,590 --> 00:19:14,240

do you have teams working under you or

514

00:19:20,150 --> 00:19:17,600

is it just a few individuals

515

00:19:22,070 --> 00:19:20,160

uh so the mission control room um on the

516

00:19:24,310 --> 00:19:22,080

weekend and nights is down to four or

517

00:19:26,150 --> 00:19:24,320

five people so at night it's a very

518

00:19:28,070 --> 00:19:26,160

small team but during the houston work

519

00:19:32,390 --> 00:19:28,080

day monday through friday i think

520

00:19:33,510 --> 00:19:32,400

there's about 15 25 people in the room

521

00:19:34,710 --> 00:19:33,520

and so

522

00:19:36,789 --> 00:19:34,720

those are the people in the room that

523

00:19:38,789 --> 00:19:36,799

are working during the houston work day

524

00:19:40,390 --> 00:19:38,799

there are also people supporting

525

00:19:43,190 --> 00:19:40,400

meetings and

526

00:19:45,270 --> 00:19:43,200

all doing other planning activities for

527

00:19:46,710 --> 00:19:45,280

further out so we usually take care of

528

00:19:48,470 --> 00:19:46,720

today and tomorrow in the next couple

529

00:19:50,070 --> 00:19:48,480

days here in the control room but if

530

00:19:51,190 --> 00:19:50,080

we're talking about next week or next

531

00:19:53,110 --> 00:19:51,200

month then we have other people

532

00:19:55,830 --> 00:19:53,120

supporting that as well so it's a large

533

00:19:55,840 --> 00:20:01,029

okay thank you

534

00:20:05,830 --> 00:20:03,669

hi my name is bijan and uh i have two

535

00:20:09,110 --> 00:20:05,840

questions my first one is is it very

536

00:20:11,350 --> 00:20:09,120

competitive to get a career in nasa

537

00:20:13,430 --> 00:20:11,360

i think it is competitive uh i know a

538

00:20:15,430 --> 00:20:13,440

lot of people start at nasa through the

539

00:20:17,669 --> 00:20:15,440

co-op program and i think it's been

540

00:20:19,270 --> 00:20:17,679

changed to called pathways now but that

541

00:20:20,870 --> 00:20:19,280

that program is very competitive because

542

00:20:22,950 --> 00:20:20,880

there's a lot of

543

00:20:25,029 --> 00:20:22,960

college students that apply to to work

544

00:20:26,870 --> 00:20:25,039

there through that program

545

00:20:28,870 --> 00:20:26,880

so i think it's difficult to get in but

546

00:20:30,789 --> 00:20:28,880

once you get in and you're successful in

547

00:20:32,149 --> 00:20:30,799

doing your job here at nasa i think then

548

00:20:34,789 --> 00:20:32,159

you can look forward to a long and

549

00:20:36,710 --> 00:20:34,799

promising career

550

00:20:38,630 --> 00:20:36,720

okay and my second question is on

551  
00:20:42,390 --> 00:20:38,640  
average how much time does it take to

552  
00:20:44,870 --> 00:20:42,400  
prepare and launch a rocket

553  
00:20:47,350 --> 00:20:44,880  
yeah i'm not quite sure about that

554  
00:20:49,110 --> 00:20:47,360  
i think the way i understand the r

555  
00:20:50,230 --> 00:20:49,120  
because i don't do the rocket part of

556  
00:20:52,390 --> 00:20:50,240  
the

557  
00:20:54,630 --> 00:20:52,400  
space space flight

558  
00:20:57,430 --> 00:20:54,640  
it takes about at least two years

559  
00:20:59,430 --> 00:20:57,440  
to build a rocket and so in that time

560  
00:21:01,669 --> 00:20:59,440  
frame we are also

561  
00:21:04,070 --> 00:21:01,679  
building either a spacecraft or supplies

562  
00:21:06,710 --> 00:21:04,080  
to be put on that rocket so i think it's

563  
00:21:08,549 --> 00:21:06,720

it's about two years long for that

564

00:21:13,029 --> 00:21:08,559

process

565

00:21:17,350 --> 00:21:14,710

what is the average cost of a flight

566

00:21:20,310 --> 00:21:17,360

that you prepare

567

00:21:21,990 --> 00:21:20,320

i don't have the data on the cost i

568

00:21:25,029 --> 00:21:22,000

i don't know that one

569

00:21:30,630 --> 00:21:25,039

sorry do you have another question

570

00:21:34,070 --> 00:21:32,549

if i wanted to get to your position

571

00:21:37,909 --> 00:21:34,080

later on in my life what would be the

572

00:21:41,430 --> 00:21:40,149

i think an engineering degree would be

573

00:21:43,510 --> 00:21:41,440

the most useful

574

00:21:46,870 --> 00:21:43,520

uh and then i think if you want then try

575

00:21:49,029 --> 00:21:46,880

to get a position at nasa and spend some

576

00:21:51,990 --> 00:21:49,039

time in the mission control and

577

00:21:53,590 --> 00:21:52,000

you could work your way there

578

00:21:55,350 --> 00:21:53,600

and um do you ever get to take a

579

00:21:59,750 --> 00:21:55,360

vacation

580

00:21:59,760 --> 00:22:05,110

okay thank you

581

00:22:09,990 --> 00:22:07,990

how is calculating trajec trajectory and

582

00:22:12,870 --> 00:22:10,000

flight path different when you're in

583

00:22:17,029 --> 00:22:12,880

space versus on earth or on another

584

00:22:21,750 --> 00:22:18,950

so you have to take into account the

585

00:22:23,350 --> 00:22:21,760

gravitational forces

586

00:22:25,590 --> 00:22:23,360

and the different

587

00:22:27,510 --> 00:22:25,600

atmospheric forces as well

588

00:22:29,590 --> 00:22:27,520

so depending on what planet you're on

589

00:22:31,909 --> 00:22:29,600

that'll tell you uh what those variables

590

00:22:33,590 --> 00:22:31,919

would be and then um

591

00:22:35,830 --> 00:22:33,600

you know when you stay

592

00:22:38,310 --> 00:22:35,840

you know airplanes fly at a certain

593

00:22:40,390 --> 00:22:38,320

altitude at all times or max altitudes

594

00:22:42,470 --> 00:22:40,400

are different than the rockets that try

595

00:22:44,870 --> 00:22:42,480

to leave the atmosphere so those are the

596

00:22:47,510 --> 00:22:44,880

different elements

597

00:22:51,510 --> 00:22:47,520

you know earth transportation versus

598

00:22:51,520 --> 00:22:56,630

thank you

599

00:23:04,390 --> 00:22:59,190

hello alex

600

00:23:11,669 --> 00:23:07,270

do the astronauts wear any uh specific

601  
00:23:16,950 --> 00:23:13,270  
they take

602  
00:23:19,830 --> 00:23:16,960  
personal clothing most of it is

603  
00:23:20,789 --> 00:23:19,840  
shorts and pants and t-shirt type polo

604  
00:23:22,870 --> 00:23:20,799  
shirts

605  
00:23:25,430 --> 00:23:22,880  
i don't think i've ever seen them wear a

606  
00:23:28,950 --> 00:23:27,510  
it's very casual clothing

607  
00:23:30,390 --> 00:23:28,960  
i think the most unique thing about it

608  
00:23:31,909 --> 00:23:30,400  
is they usually throw everything away

609  
00:23:34,830 --> 00:23:31,919  
when they're done wearing it since we

610  
00:23:43,029 --> 00:23:34,840  
have no way to wash it

611  
00:23:47,190 --> 00:23:44,310  
hi i'm sam

612  
00:23:52,549 --> 00:23:49,669  
what type of exercises do the astronauts

613  
00:23:54,390 --> 00:23:52,559

do to prevent muscle atrophy

614

00:23:56,630 --> 00:23:54,400

okay so uh there's a couple different

615

00:23:58,710 --> 00:23:56,640

exercise pieces of equipment on board

616

00:24:00,310 --> 00:23:58,720

space station we have a treadmill so

617

00:24:01,750 --> 00:24:00,320

they do some running

618

00:24:03,350 --> 00:24:01,760

of course they have to bungee themselves

619

00:24:05,830 --> 00:24:03,360

to the treadmill so they don't fly off

620

00:24:09,110 --> 00:24:05,840

of it as they they run

621

00:24:11,510 --> 00:24:09,120

they also do a resistive exercise device

622

00:24:13,750 --> 00:24:11,520

somewhat some similar to like a bowflex

623

00:24:14,549 --> 00:24:13,760

machine that has like the rubber band

624

00:24:17,029 --> 00:24:14,559

type

625

00:24:19,990 --> 00:24:17,039

uh exercise that's not weights but

626

00:24:21,350 --> 00:24:20,000

resistance and then they also had a

627

00:24:23,190 --> 00:24:21,360

cycle ergometer which i don't know if

628

00:24:25,510 --> 00:24:23,200

they still use very often but they do

629

00:24:27,590 --> 00:24:25,520

have a bicycle type

630

00:24:28,470 --> 00:24:27,600

apparatus as well

631

00:24:33,510 --> 00:24:28,480

oh

632

00:24:37,510 --> 00:24:35,909

hi i'm zachary um

633

00:24:39,750 --> 00:24:37,520

i imagine the astronauts probably have a

634

00:24:41,430 --> 00:24:39,760

lot of downtime on the space station do

635

00:24:42,549 --> 00:24:41,440

you have any idea what they would do for

636

00:24:44,630 --> 00:24:42,559

fun

637

00:24:45,909 --> 00:24:44,640

so they are limited on their downtime

638

00:24:47,350 --> 00:24:45,919

they only get a couple hours in the

639

00:24:49,190 --> 00:24:47,360

evening before they go to sleep and then

640

00:24:50,630 --> 00:24:49,200

the weekends they do have free time

641

00:24:52,549 --> 00:24:50,640

although their saturday morning is

642

00:24:54,230 --> 00:24:52,559

dedicated to cleaning

643

00:24:56,390 --> 00:24:54,240

just like all of us that have to clean

644

00:24:57,590 --> 00:24:56,400

our rooms on saturdays

645

00:25:01,269 --> 00:24:57,600

they clean the space station on

646

00:25:02,870 --> 00:25:01,279

saturdays then their downtime

647

00:25:04,950 --> 00:25:02,880

what i know that they do is they call

648

00:25:06,710 --> 00:25:04,960

their family and friends they have a

649

00:25:08,149 --> 00:25:06,720

iphone so a phone that works through the

650

00:25:10,149 --> 00:25:08,159

computer system

651  
00:25:11,990 --> 00:25:10,159  
they can call anywhere in the world so

652  
00:25:13,269 --> 00:25:12,000  
they call people and talk quite

653  
00:25:15,510 --> 00:25:13,279  
frequently

654  
00:25:17,110 --> 00:25:15,520  
they can watch movies or videos they

655  
00:25:18,630 --> 00:25:17,120  
also have access to the internet so i

656  
00:25:20,630 --> 00:25:18,640  
know they do some computer work and

657  
00:25:22,630 --> 00:25:20,640  
email and then i think one of their most

658  
00:25:24,070 --> 00:25:22,640  
favorite activities is watching uh

659  
00:25:25,990 --> 00:25:24,080  
outside the windows just seeing the

660  
00:25:28,310 --> 00:25:26,000  
views of earth

661  
00:25:30,549 --> 00:25:28,320  
they take a lot of pictures um almost

662  
00:25:33,750 --> 00:25:30,559  
more than we can download at one time

663  
00:25:35,990 --> 00:25:33,760

they have beautiful video and photos if

664

00:25:37,990 --> 00:25:36,000

you haven't gone to the nasa website you

665

00:25:41,269 --> 00:25:38,000

should go look at it

666

00:25:43,430 --> 00:25:41,279

the borealis the aurora borealis and

667

00:25:45,909 --> 00:25:43,440

the sites of the

668

00:25:48,470 --> 00:25:45,919

the cities at night with all the lights

669

00:25:51,269 --> 00:25:48,480

they also look for different weather and

670

00:25:52,950 --> 00:25:51,279

earth activities so they've seen some

671

00:25:54,390 --> 00:25:52,960

fire events like out in california

672

00:25:56,950 --> 00:25:54,400

they've also seen volcanoes and

673

00:25:58,230 --> 00:25:56,960

hurricanes so they spent a lot of time

674

00:25:59,750 --> 00:25:58,240

just looking out the window and taking

675

00:26:01,269 --> 00:25:59,760

pictures

676  
00:26:05,190 --> 00:26:01,279  
okay i think we only have time for about

677  
00:26:09,590 --> 00:26:08,149  
hi i'm jeffrey do you consider your job

678  
00:26:11,269 --> 00:26:09,600  
to be stressful

679  
00:26:13,110 --> 00:26:11,279  
yes

680  
00:26:15,110 --> 00:26:13,120  
yeah it is stressful but when you like

681  
00:26:16,950 --> 00:26:15,120  
to do something the stress kind of goes

682  
00:26:19,269 --> 00:26:16,960  
away when you're doing it

683  
00:26:20,630 --> 00:26:19,279  
so as you get into it into the rhythm of

684  
00:26:22,310 --> 00:26:20,640  
your job

685  
00:26:24,390 --> 00:26:22,320  
it seems like the stress takes care of

686  
00:26:25,990 --> 00:26:24,400  
itself

687  
00:26:27,269 --> 00:26:26,000  
great well thank you all so much for the

688  
00:26:29,830 --> 00:26:27,279

great questions i thought that was

689

00:26:31,269 --> 00:26:29,840

really interesting

690

00:26:34,149 --> 00:26:31,279

and thank you heather for joining us

691

00:26:35,510 --> 00:26:34,159

thank you this is my pleasure