



CS-CRM COV 02:58:19

MISSION CONTROL CENTER

HOUSTON TV SD

PAO

1  
00:00:06,619 --> 00:00:04,160  
well hi Ryan and all the kids at camp

2  
00:00:09,140 --> 00:00:06,629  
KSC good morning welcome to Mission

3  
00:00:11,629 --> 00:00:09,150  
Control in Houston my name is Pat Ryan

4  
00:00:14,480 --> 00:00:11,639  
I'm the public affairs commentator on

5  
00:00:15,620 --> 00:00:14,490  
the orbit to shift today here in the

6  
00:00:18,189 --> 00:00:15,630  
International Space Station flight

7  
00:00:20,599 --> 00:00:18,199  
control room we just finished up our

8  
00:00:23,960 --> 00:00:20,609  
daily International Space Station update

9  
00:00:26,359 --> 00:00:23,970  
on NASA television and eager to hear

10  
00:00:28,609 --> 00:00:26,369  
your questions and talk about space and

11  
00:00:30,830 --> 00:00:28,619  
space exploration with me this morning

12  
00:00:32,240 --> 00:00:30,840  
is advanced ice is one of the

13  
00:00:34,970 --> 00:00:32,250

## International Space Station flight

14

00:00:36,889 --> 00:00:34,980

directors and he's they're the people

15

00:00:40,069 --> 00:00:36,899

that run everything that goes on in this

16

00:00:41,690 --> 00:00:40,079

room ed tell us a little bit about

17

00:00:43,310 --> 00:00:41,700

yourself your own educational and

18

00:00:45,440 --> 00:00:43,320

professional background how you ended up

19

00:00:47,600 --> 00:00:45,450

here sure well it's great to be with all

20

00:00:49,850 --> 00:00:47,610

you guys out there Camp KSC and

21

00:00:52,010 --> 00:00:49,860

certainly a pleasure to get the chance

22

00:00:53,900 --> 00:00:52,020

to talk to you my background you know

23

00:00:56,119 --> 00:00:53,910

honestly most of my life has been

24

00:00:57,410 --> 00:00:56,129

involved or interested in space to some

25

00:00:59,779 --> 00:00:57,420

degree it started off with us really

26  
00:01:02,750 --> 00:00:59,789  
young and so a lot of my growing up

27  
00:01:04,729 --> 00:01:02,760  
really kind of focused on that i am from

28  
00:01:07,399 --> 00:01:04,739  
Michigan originally basically Michigan

29  
00:01:09,800 --> 00:01:07,409  
out you're the Saginaw Bay if anybody's

30  
00:01:11,179 --> 00:01:09,810  
familiar with that area but went to

31  
00:01:12,440 --> 00:01:11,189  
grade school high school there went to

32  
00:01:15,170 --> 00:01:12,450  
University of Michigan for college

33  
00:01:17,800 --> 00:01:15,180  
aerospace engineering was my degree and

34  
00:01:19,880 --> 00:01:17,810  
when I was at Michigan I was a

35  
00:01:21,590 --> 00:01:19,890  
cooperative education student a co-op

36  
00:01:24,950 --> 00:01:21,600  
student here at the Johnson Space Center

37  
00:01:27,590 --> 00:01:24,960  
I've spent most of my career here in

38  
00:01:28,700 --> 00:01:27,600

## Mission Operations for the International

39

00:01:30,020 --> 00:01:28,710

Space Station I've actually been

40

00:01:32,240 --> 00:01:30,030

certified in a few the different

41

00:01:34,190 --> 00:01:32,250

consoles that are behind me here in the

42

00:01:37,399 --> 00:01:34,200

flight control room worked my way

43

00:01:38,870 --> 00:01:37,409

through the various certifications I've

44

00:01:41,480 --> 00:01:38,880

done a few other things here at Johnson

45

00:01:42,920 --> 00:01:41,490

and eventually of course applied to

46

00:01:45,289 --> 00:01:42,930

become a flight director was selected in

47

00:01:47,840 --> 00:01:45,299

2009 and I've been doing it ever since

48

00:01:50,990 --> 00:01:47,850

now you also when your background has

49

00:01:52,730 --> 00:01:51,000

something in common with the kids at

50

00:01:54,319 --> 00:01:52,740

camp KSA you were a space camp or

51  
00:01:55,789 --> 00:01:54,329  
yourself pressure was yeah I went to

52  
00:01:59,810 --> 00:01:55,799  
Space Camp at Huntsville Alabama I went

53  
00:02:01,910 --> 00:01:59,820  
there twice and it was certainly one of

54  
00:02:04,969 --> 00:02:01,920  
those experiences both times really that

55  
00:02:06,590 --> 00:02:04,979  
really helped me focus and and realize

56  
00:02:09,020 --> 00:02:06,600  
that I really wanted to be involved in

57  
00:02:10,490 --> 00:02:09,030  
space and the second time I went really

58  
00:02:12,730 --> 00:02:10,500  
helped me realize that mission

59  
00:02:15,010 --> 00:02:12,740  
operations might be the place for me but

60  
00:02:16,720 --> 00:02:15,020  
even more important it exposed me to a

61  
00:02:18,640 --> 00:02:16,730  
lot of the things that I don't don't

62  
00:02:20,140 --> 00:02:18,650  
normally get exposed to back home or

63  
00:02:23,320 --> 00:02:20,150

back in the school setting just all the

64

00:02:25,780 --> 00:02:23,330

opportunities the the the g-wiz things

65

00:02:28,030 --> 00:02:25,790

not only just that has to do with space

66

00:02:30,450 --> 00:02:28,040

but just all the the opportunities that

67

00:02:32,560 --> 00:02:30,460

might be out there and gave me a

68

00:02:35,080 --> 00:02:32,570

springboard if you will to go

69

00:02:37,240 --> 00:02:35,090

investigate all that different potential

70

00:02:39,850 --> 00:02:37,250

opportunities that are out there and it

71

00:02:41,560 --> 00:02:39,860

ends up as a flight director so I think

72

00:02:46,030 --> 00:02:41,570

we're ready Ryan let's see what the kids

73

00:02:48,310 --> 00:02:46,040

want to know about all right can you

74

00:02:51,780 --> 00:02:48,320

see this is your moment to shine you can

75

00:02:54,130 --> 00:02:51,790

go ahead and ask your questions now

76

00:02:56,350 --> 00:02:54,140

hello my name is Michael I'm from

77

00:03:00,040 --> 00:02:56,360

Melbourne Florida and my question is all

78

00:03:02,620 --> 00:03:00,050

you worry about asteroids oh and pore

79

00:03:04,960 --> 00:03:02,630

space debris hitting the ISS and what is

80

00:03:07,180 --> 00:03:04,970

your procedure something would happen

81

00:03:09,750 --> 00:03:07,190

like that Michael that's a great

82

00:03:12,850 --> 00:03:09,760

question and we actually do have a

83

00:03:14,170 --> 00:03:12,860

fairly good concern about the space

84

00:03:16,570 --> 00:03:14,180

debris environment that we're orbiting

85

00:03:18,610 --> 00:03:16,580

in obviously you're aware of the fact

86

00:03:19,900 --> 00:03:18,620

that there is a lot of debris up there

87

00:03:21,370 --> 00:03:19,910

and low Earth orbit and that's just

88

00:03:23,080 --> 00:03:21,380

because we've launched not only the

89

00:03:25,270 --> 00:03:23,090

United States but we launched a lot of

90

00:03:27,100 --> 00:03:25,280

as a planet launched a lot of things up

91

00:03:29,650 --> 00:03:27,110

into space and left a lot of those

92

00:03:31,240 --> 00:03:29,660

pieces behind so we fly in that

93

00:03:33,430 --> 00:03:31,250

environment we're not really so much

94

00:03:35,470 --> 00:03:33,440

worried about asteroids because they're

95

00:03:36,790 --> 00:03:35,480

so large they're pretty easy to spot

96

00:03:38,740 --> 00:03:36,800

once they get close enough to earth

97

00:03:40,720 --> 00:03:38,750

obviously as a planet we want to know

98

00:03:42,940 --> 00:03:40,730

further in advance that they're coming

99

00:03:45,520 --> 00:03:42,950

but for the space station anything

100

00:03:47,890 --> 00:03:45,530

that's about the size of a softball or

101  
00:03:49,840 --> 00:03:47,900  
larger we're able to track and get out

102  
00:03:51,280 --> 00:03:49,850  
of the way if we have to the space

103  
00:03:54,460 --> 00:03:51,290  
station has shielding on it that

104  
00:03:56,440 --> 00:03:54,470  
protects it from getting hit by anything

105  
00:03:58,930 --> 00:03:56,450  
that's smaller than about the size of a

106  
00:04:00,340 --> 00:03:58,940  
BB so anything that's pebble sized are

107  
00:04:02,770 --> 00:04:00,350  
smaller we really don't have too much

108  
00:04:04,540 --> 00:04:02,780  
concern with that either but it's the

109  
00:04:06,280 --> 00:04:04,550  
things that are between BB size and

110  
00:04:07,600 --> 00:04:06,290  
softball sized that's the the area of

111  
00:04:08,980 --> 00:04:07,610  
concern that we have that we're just not

112  
00:04:10,270 --> 00:04:08,990  
really well protected against but we

113  
00:04:12,910 --> 00:04:10,280

can't really track it from the ground

114

00:04:15,400 --> 00:04:12,920

either so for that we do have procedures

115

00:04:17,349 --> 00:04:15,410

in place that the crew can respond to if

116

00:04:18,970 --> 00:04:17,359

we call it a rapid depress but that just

117

00:04:21,940 --> 00:04:18,980

means that there's a hole in the cabin

118

00:04:23,090 --> 00:04:21,950

and there's air is going out so in that

119

00:04:25,610 --> 00:04:23,100

event the crew knows how

120

00:04:26,630 --> 00:04:25,620

take action we close hatches we could if

121

00:04:28,220 --> 00:04:26,640

it comes out to it we can get their

122

00:04:31,190 --> 00:04:28,230

Soyuz lifeboats and they can come home

123

00:04:32,600 --> 00:04:31,200

but haven't had to do that yet and hope

124

00:04:34,250 --> 00:04:32,610

we never have to but we're prepared if

125

00:04:36,080 --> 00:04:34,260

it comes to them there are a lot of

126

00:04:38,840 --> 00:04:36,090

different kinds of debris out there to

127

00:04:41,870 --> 00:04:38,850

some natural some not absolutely there's

128

00:04:44,030 --> 00:04:41,880

you mentioned asteroids and we think of

129

00:04:46,160 --> 00:04:44,040

the big gigantic asteroids that are out

130

00:04:48,440 --> 00:04:46,170

in the asteroid belt and that maybe I

131

00:04:50,000 --> 00:04:48,450

concerned with them but they interact

132

00:04:52,370 --> 00:04:50,010

with each other and they create their

133

00:04:54,020 --> 00:04:52,380

own smaller pieces of debris so there's

134

00:04:55,190 --> 00:04:54,030

the natural debris if you will and then

135

00:04:58,100 --> 00:04:55,200

of course there's a lot of the space

136

00:05:10,590 --> 00:04:58,110

junk that gets lost or comes apart in

137

00:05:15,450 --> 00:05:13,320

um fine in Shannon and I'm from Port

138

00:05:17,220 --> 00:05:15,460

Orange Florida my question is what I've

139

00:05:21,480 --> 00:05:17,230

been your most exciting day as a flight

140

00:05:24,300 --> 00:05:21,490

director wow that's a that's a great

141

00:05:25,650 --> 00:05:24,310

question you know it I thought the

142

00:05:27,180 --> 00:05:25,660

easiest way to answer it is to say every

143

00:05:29,790 --> 00:05:27,190

day is a great day just because I enjoy

144

00:05:31,770 --> 00:05:29,800

so much what I get to do working with

145

00:05:33,300 --> 00:05:31,780

the people in this room the the

146

00:05:34,830 --> 00:05:33,310

international partners the engineers

147

00:05:37,050 --> 00:05:34,840

there are so many people that support

148

00:05:38,430 --> 00:05:37,060

this program all around the world and

149

00:05:41,880 --> 00:05:38,440

it's just such a joy to get to work with

150

00:05:43,770 --> 00:05:41,890

them but to be honest there are a couple

151  
00:05:45,930 --> 00:05:43,780  
that really stand out of course my first

152  
00:05:48,480 --> 00:05:45,940  
day as a flight director I might say it

153  
00:05:49,890 --> 00:05:48,490  
was most nerve-racking there was a bit

154  
00:05:51,540 --> 00:05:49,900  
of a ceremony in the beginning I

155  
00:05:54,870 --> 00:05:51,550  
announced my call sign so I'm known as

156  
00:05:57,330 --> 00:05:54,880  
carbon flight there was a lot to do with

157  
00:05:59,220 --> 00:05:57,340  
that but then for the first time as in

158  
00:06:01,290 --> 00:05:59,230  
my flight director training they're all

159  
00:06:02,880 --> 00:06:01,300  
the management and all the teachers that

160  
00:06:04,440 --> 00:06:02,890  
I had they all left I was on my own to

161  
00:06:07,590 --> 00:06:04,450  
run this amazing spacecraft so that was

162  
00:06:09,960 --> 00:06:07,600  
certainly a memorable event only a week

163  
00:06:12,300 --> 00:06:09,970

and a half later I had my first the

164

00:06:14,160 --> 00:06:12,310

vehicle the space station welcome to me

165

00:06:16,740 --> 00:06:14,170

by having and one of its big power

166

00:06:17,880 --> 00:06:16,750

supply boxes do a power on reset we call

167

00:06:20,130 --> 00:06:17,890

it but it turned itself off and then

168

00:06:21,720 --> 00:06:20,140

turned back on and that caused some

169

00:06:23,880 --> 00:06:21,730

cautions and warnings we woke up the

170

00:06:26,490 --> 00:06:23,890

cruise that was my first big as flight

171

00:06:28,050 --> 00:06:26,500

director experience with responding to

172

00:06:31,800 --> 00:06:28,060

something on the spacecraft on the space

173

00:06:35,460 --> 00:06:31,810

station just last week I helped install

174

00:06:37,140 --> 00:06:35,470

the Japanese h2 Transfer Vehicle on the

175

00:06:38,880 --> 00:06:37,150

space station that was that was a really

176

00:06:41,640 --> 00:06:38,890

neat experience I was a flight director

177

00:06:44,280 --> 00:06:41,650

for sts-131 so that was fun and a

178

00:06:45,810 --> 00:06:44,290

keystone so far for me was last summer I

179

00:06:47,700 --> 00:06:45,820

was the lead flight director for the

180

00:06:50,330 --> 00:06:47,710

increment 28 mission that was a four

181

00:06:52,350 --> 00:06:50,340

month span of time last summer and

182

00:06:53,250 --> 00:06:52,360

increment lead flight director means

183

00:06:55,110 --> 00:06:53,260

that I was the flight director

184

00:06:57,540 --> 00:06:55,120

completely in charge of the space

185

00:06:59,520 --> 00:06:57,550

station mission so not just the current

186

00:07:02,400 --> 00:06:59,530

shift like Pat mentioned we were on the

187

00:07:03,960 --> 00:07:02,410

orbit to shift right now but it's for

188

00:07:06,180 --> 00:07:03,970

the entire mission during that span of

189

00:07:07,950 --> 00:07:06,190

time and a lot around the clock yeah

190

00:07:09,450 --> 00:07:07,960

always getting not all the time but

191

00:07:11,310 --> 00:07:09,460

getting phone calls and not only getting

192

00:07:13,110 --> 00:07:11,320

calls from this room but you know my

193

00:07:14,910 --> 00:07:13,120

phone rings when the space station has a

194

00:07:17,040 --> 00:07:14,920

telephone so they've called me too but

195

00:07:24,100 --> 00:07:17,050

that was certainly a very unique

196

00:07:29,659 --> 00:07:27,020

my name is Evan Evan Mackenzie from

197

00:07:32,290 --> 00:07:29,669

Yongsan Korea I was always wondering

198

00:07:35,209 --> 00:07:32,300

what kind of experiments are currently

199

00:07:37,969 --> 00:07:35,219

being ran on on the International Space

200

00:07:40,279 --> 00:07:37,979

Station that's a great question to

201  
00:07:41,959 --> 00:07:40,289  
heaven you know the primary purpose of

202  
00:07:43,909 --> 00:07:41,969  
the space station is to be an orbiting

203  
00:07:45,350 --> 00:07:43,919  
laboratory not only for the United

204  
00:07:47,330 --> 00:07:45,360  
States but for all the partners that are

205  
00:07:49,730 --> 00:07:47,340  
involved in it you know Russia and Japan

206  
00:07:52,610 --> 00:07:49,740  
and Canada and the United European Space

207  
00:07:54,649 --> 00:07:52,620  
Agency they all have laboratory and

208  
00:07:57,499 --> 00:07:54,659  
research facilities and experiments and

209  
00:08:00,529 --> 00:07:57,509  
we're doing also all sorts of work so

210  
00:08:03,320 --> 00:08:00,539  
that's a fantastic question the major

211  
00:08:04,760 --> 00:08:03,330  
areas that we try to study are as you

212  
00:08:07,339 --> 00:08:04,770  
would guess we try to study everything

213  
00:08:10,010 --> 00:08:07,349

that would benefit from not having

214

00:08:12,679 --> 00:08:10,020

gravity involved in the research so a

215

00:08:14,209 --> 00:08:12,689

lot of the research has to do with the

216

00:08:16,459 --> 00:08:14,219

human body because the human body

217

00:08:18,800 --> 00:08:16,469

actually operates very differently when

218

00:08:22,279 --> 00:08:18,810

you take gravity away we do research

219

00:08:26,360 --> 00:08:22,289

with materials most of that has to do

220

00:08:29,480 --> 00:08:26,370

with liquids and flames because they

221

00:08:31,309 --> 00:08:29,490

interact very differently on orbit than

222

00:08:33,860 --> 00:08:31,319

they do here on the ground and what's

223

00:08:35,360 --> 00:08:33,870

really unique about those those types of

224

00:08:37,009 --> 00:08:35,370

research is when you take gravity away

225

00:08:39,589 --> 00:08:37,019

you can learn a whole lot more about how

226

00:08:42,409 --> 00:08:39,599

the fundamental science works which

227

00:08:44,209 --> 00:08:42,419

maybe doesn't sound like it's all that

228

00:08:45,590 --> 00:08:44,219

exciting and and to watch some of the

229

00:08:46,939 --> 00:08:45,600

science it doesn't sound like it's all

230

00:08:49,130 --> 00:08:46,949

that exciting until you realize what the

231

00:08:50,689 --> 00:08:49,140

applications of that are and all the

232

00:08:52,220 --> 00:08:50,699

applications of the science that we're

233

00:08:54,620 --> 00:08:52,230

doing on the space station really apply

234

00:08:56,930 --> 00:08:54,630

to how we live and what we do here on

235

00:08:59,900 --> 00:08:56,940

earth for example some of the liquid

236

00:09:05,210 --> 00:08:59,910

science that they're looking at if you

237

00:09:07,850 --> 00:09:05,220

understand how how how fuel droplets are

238

00:09:09,319 --> 00:09:07,860

formed and it doesn't sound like it's

239

00:09:12,530 --> 00:09:09,329

all that useful until you realize that

240

00:09:14,210 --> 00:09:12,540

engines work that way and if you want to

241

00:09:16,550 --> 00:09:14,220

understand how a spark plug makes your

242

00:09:18,740 --> 00:09:16,560

engine fire and you want to make it more

243

00:09:20,960 --> 00:09:18,750

fuel efficient so you can help with our

244

00:09:22,460 --> 00:09:20,970

global warming and carbon footprints and

245

00:09:24,170 --> 00:09:22,470

things like that then you start to

246

00:09:25,970 --> 00:09:24,180

realize that this unique science that

247

00:09:28,430 --> 00:09:25,980

we're doing actually has applicability

248

00:09:29,990 --> 00:09:28,440

on earth of course all the medical

249

00:09:32,960 --> 00:09:30,000

research that we're doing part of that

250

00:09:34,309 --> 00:09:32,970

is to try to help offset the symptoms

251  
00:09:34,600 --> 00:09:34,319  
that the crew feels like their heart

252  
00:09:35,889 --> 00:09:34,610  
gets

253  
00:09:37,710 --> 00:09:35,899  
weaker when they're on orbit if they

254  
00:09:40,720 --> 00:09:37,720  
don't exercise their bones get weaker

255  
00:09:42,819 --> 00:09:40,730  
they're exposed to radiation if we want

256  
00:09:44,860 --> 00:09:42,829  
to send them to to Mars we have to be

257  
00:09:46,269 --> 00:09:44,870  
able to figure out how to make it so

258  
00:09:47,650 --> 00:09:46,279  
that they're not so brittle and frail

259  
00:09:50,079 --> 00:09:47,660  
that they can actually go walk around on

260  
00:09:52,210 --> 00:09:50,089  
Mars all that applies to things here on

261  
00:09:54,759 --> 00:09:52,220  
earth so we're learning how to maybe

262  
00:09:56,170 --> 00:09:54,769  
combat osteoporosis or some of those

263  
00:09:57,610 --> 00:09:56,180

other ailments that are out there so

264

00:09:59,920 --> 00:09:57,620

we're doing a lot of research on the

265

00:10:10,449 --> 00:09:59,930

space station that directly applies to

266

00:10:13,329 --> 00:10:10,459

improving life here on earth what is the

267

00:10:17,019 --> 00:10:13,339

perfect what is the purpose of building

268

00:10:18,699 --> 00:10:17,029

the International Space Station there

269

00:10:22,600 --> 00:10:18,709

there are so many answers to that

270

00:10:24,340 --> 00:10:22,610

question um the primary answer is to do

271

00:10:25,960 --> 00:10:24,350

that research that we were just talking

272

00:10:27,100 --> 00:10:25,970

about that that's the really the

273

00:10:29,530 --> 00:10:27,110

fundamental reason that we have the

274

00:10:31,690 --> 00:10:29,540

space station is to do that in-depth

275

00:10:34,269 --> 00:10:31,700

research and investigations and it

276

00:10:36,220 --> 00:10:34,279

sounds you know the investigations that

277

00:10:38,319 --> 00:10:36,230

we have up there are big range from very

278

00:10:41,050 --> 00:10:38,329

expensive very high-end like the Alpha

279

00:10:44,380 --> 00:10:41,060

Magnetic Spectrometer was you know it's

280

00:10:47,019 --> 00:10:44,390

a multi nation multi-million dollar if

281

00:10:49,870 --> 00:10:47,029

not billion dollar investment to go

282

00:10:52,120 --> 00:10:49,880

explore the cosmos from our orbiting

283

00:10:55,329 --> 00:10:52,130

platform from the other end of the

284

00:10:57,730 --> 00:10:55,339

spectrum we have just taken delivery of

285

00:10:59,410 --> 00:10:57,740

two spiders on the spit on the on the

286

00:11:01,800 --> 00:10:59,420

space station from the h2 Transfer

287

00:11:06,280 --> 00:11:01,810

Vehicle that just arrived and those are

288

00:11:08,019 --> 00:11:06,290

part of a YouTube science lab that the

289

00:11:09,430 --> 00:11:08,029

whole focus of that is to go learn a

290

00:11:11,530 --> 00:11:09,440

little bit about how these spiders

291

00:11:14,199 --> 00:11:11,540

interact with micro gravity and and and

292

00:11:15,850 --> 00:11:14,209

how they adapt living up there but it

293

00:11:19,210 --> 00:11:15,860

was an experiment that was proposed

294

00:11:21,550 --> 00:11:19,220

through YouTube by students and so we're

295

00:11:23,259 --> 00:11:21,560

another focus is to get the people here

296

00:11:25,090 --> 00:11:23,269

on earth engaged in learning new things

297

00:11:27,490 --> 00:11:25,100

about the environment that's up there

298

00:11:28,980 --> 00:11:27,500

and then like I said before how that can

299

00:11:31,300 --> 00:11:28,990

apply the people here on earth so

300

00:11:33,759 --> 00:11:31,310

there's obviously a piece of trying to

301  
00:11:36,090 --> 00:11:33,769  
do more than just having the six people

302  
00:11:39,550 --> 00:11:36,100  
on the space station doing research

303  
00:11:41,380 --> 00:11:39,560  
obviously we want to go and send people

304  
00:11:42,910 --> 00:11:41,390  
beyond low-earth orbit we want to go to

305  
00:11:44,350 --> 00:11:42,920  
the moon or go to an asteroid or go to

306  
00:11:44,940 --> 00:11:44,360  
Mars and we have to learn how to do that

307  
00:11:46,680 --> 00:11:44,950  
not

308  
00:11:48,690 --> 00:11:46,690  
with the people themselves but also the

309  
00:11:52,110 --> 00:11:48,700  
spacecraft and since we do have this

310  
00:11:54,000 --> 00:11:52,120  
very nice large orbiting platform where

311  
00:11:56,670 --> 00:11:54,010  
people can stay for long durations of

312  
00:11:58,620 --> 00:11:56,680  
time we can learn a lot about the people

313  
00:11:59,970 --> 00:11:58,630

and the systems that are required to do

314

00:12:01,290 --> 00:11:59,980

those even longer missions so if you're

315

00:12:03,420 --> 00:12:01,300

going to send people to Mars for takes

316

00:12:05,280 --> 00:12:03,430

two or three years we get a lot of good

317

00:12:08,490 --> 00:12:05,290

practice with that on the space station

318

00:12:12,510 --> 00:12:08,500

and one of the reasons that we built it

319

00:12:14,580 --> 00:12:12,520

was to find out how to build a large

320

00:12:16,080 --> 00:12:14,590

thing like that in that environment yeah

321

00:12:17,550 --> 00:12:16,090

you're absolutely right people talk

322

00:12:20,010 --> 00:12:17,560

about doing science on the space station

323

00:12:21,600 --> 00:12:20,020

and I come back often with the fact that

324

00:12:24,510 --> 00:12:21,610

just the fact that we have a space

325

00:12:26,160 --> 00:12:24,520

station is a lot of science the systems

326

00:12:29,130 --> 00:12:26,170

that are inside keeping those running

327

00:12:31,440 --> 00:12:29,140

for 12 plus years now going on for at

328

00:12:33,690 --> 00:12:31,450

least another 10 that's a scientific

329

00:12:36,690 --> 00:12:33,700

endeavor and then putting this this

330

00:12:38,520 --> 00:12:36,700

space station is a football field long

331

00:12:40,140 --> 00:12:38,530

and it didn't launch that way we

332

00:12:43,280 --> 00:12:40,150

launched individual pieces over the

333

00:12:46,140 --> 00:12:43,290

course of at least 10 years right and

334

00:12:47,700 --> 00:12:46,150

you know doing that and doing all the

335

00:12:50,370 --> 00:12:47,710

international cooperation I figure out

336

00:12:52,020 --> 00:12:50,380

how to assemble them a space that it may

337

00:12:53,880 --> 00:12:52,030

not fall under the label of science but

338

00:12:55,500 --> 00:12:53,890

it certainly is an engineering marvel to

339

00:12:57,930 --> 00:12:55,510

to be able to do that and that was all

340

00:12:59,700 --> 00:12:57,940

through the you know the application of

341

00:13:01,830 --> 00:12:59,710

the math and the science and engineering

342

00:13:07,610 --> 00:13:01,840

that you learn in school and put it up

343

00:13:13,860 --> 00:13:11,340

um my name is Alice from Paramount

344

00:13:17,550 --> 00:13:13,870

California my question was what is the

345

00:13:19,140 --> 00:13:17,560

most difficult part of the job the most

346

00:13:20,340 --> 00:13:19,150

difficult part of my job and this

347

00:13:23,100 --> 00:13:20,350

doesn't count as part of your right

348

00:13:24,720 --> 00:13:23,110

talking to public affairs and no I found

349

00:13:26,520 --> 00:13:24,730

it to be quite obviously I love talking

350

00:13:27,750 --> 00:13:26,530

to people about what we do and being

351

00:13:31,650 --> 00:13:27,760

able to share it so it's certainly not

352

00:13:34,230 --> 00:13:31,660

this part of it there are a lot of

353

00:13:36,570 --> 00:13:34,240

challenges with what we have to do just

354

00:13:37,950 --> 00:13:36,580

putting six people up in space and

355

00:13:42,270 --> 00:13:37,960

keeping them up there and keeping them

356

00:13:44,280 --> 00:13:42,280

happy healthy safe and keeping them with

357

00:13:45,720 --> 00:13:44,290

work to do and having good work up on

358

00:13:47,900 --> 00:13:45,730

the space station obviously that takes a

359

00:13:50,210 --> 00:13:47,910

lot of work and a lot of challenge

360

00:13:52,500 --> 00:13:50,220

there's also a lot of challenge

361

00:13:54,180 --> 00:13:52,510

integrating really when you ask a flight

362

00:13:56,100 --> 00:13:54,190

director what do we do our one of our

363

00:13:58,500 --> 00:13:56,110

principal jobs is integration and what

364

00:14:00,930 --> 00:13:58,510

that means is taking something from the

365

00:14:03,600 --> 00:14:00,940

program mr. suffered Dinis our program

366

00:14:05,010 --> 00:14:03,610

manager he'll say I want at this

367

00:14:07,170 --> 00:14:05,020

particular time I want this particular

368

00:14:08,490 --> 00:14:07,180

thing to happen and then the engineering

369

00:14:10,770 --> 00:14:08,500

community will say well you need these

370

00:14:12,960 --> 00:14:10,780

boxes and they need to go be able to do

371

00:14:14,850 --> 00:14:12,970

this thing and then you have operations

372

00:14:16,440 --> 00:14:14,860

and they say well in order for to

373

00:14:18,780 --> 00:14:16,450

actually function we need to have this

374

00:14:21,150 --> 00:14:18,790

type of software and we need to have

375

00:14:22,830 --> 00:14:21,160

these sort of controls and you have

376

00:14:24,000 --> 00:14:22,840

safety playing a role and you have all

377

00:14:26,130 --> 00:14:24,010

the international partners playing a

378

00:14:28,310 --> 00:14:26,140

role the flight directors help bring

379

00:14:30,420 --> 00:14:28,320

that all together to make it into a

380

00:14:32,780 --> 00:14:30,430

package that we can actually put on

381

00:14:36,180 --> 00:14:32,790

board and go execute successfully

382

00:14:37,800 --> 00:14:36,190

sometimes the difficulty is in lies in

383

00:14:39,930 --> 00:14:37,810

that integration work being able to pull

384

00:14:41,700 --> 00:14:39,940

all the pieces together especially when

385

00:14:43,380 --> 00:14:41,710

you talk about my Rosie the increment

386

00:14:45,390 --> 00:14:43,390

flight director Hoover it was a four

387

00:14:47,130 --> 00:14:45,400

month span then you're not only trying

388

00:14:49,020 --> 00:14:47,140

to get today to be successful not only

389

00:14:51,000 --> 00:14:49,030

this week to be successful but you want

390

00:14:52,860 --> 00:14:51,010

the entire mission over that four or six

391

00:14:56,220 --> 00:14:52,870

month or however long piece of the

392

00:14:58,110 --> 00:14:56,230

puzzle to be successful you know and

393

00:15:00,630 --> 00:14:58,120

i'll be frankly honest with you another

394

00:15:04,860 --> 00:15:00,640

difficult piece is trying to maintain a

395

00:15:06,840 --> 00:15:04,870

life balance if I if I could I love what

396

00:15:09,900 --> 00:15:06,850

I do so much I could spend way too many

397

00:15:12,210 --> 00:15:09,910

hours here at NASA then I really ought

398

00:15:14,220 --> 00:15:12,220

to because I do have a wife and two two

399

00:15:16,079 --> 00:15:14,230

great kids at home and I diff it's very

400

00:15:18,900 --> 00:15:16,089

difficult to figure out sometimes how to

401

00:15:21,030 --> 00:15:18,910

manage not being so absorbed and

402

00:15:22,440 --> 00:15:21,040

consumed by this job here that I don't

403

00:15:26,190 --> 00:15:22,450

get to spend time with them and with

404

00:15:27,840 --> 00:15:26,200

family so it's a part of living here and

405

00:15:29,700 --> 00:15:27,850

past nanas heading because everybody

406

00:15:36,829 --> 00:15:29,710

that works here loves it so much that it

407

00:15:43,079 --> 00:15:39,570

hello my name is Brandon um what is the

408

00:15:46,920 --> 00:15:43,089

best part of your job besides talking to

409

00:15:50,400 --> 00:15:46,930

you good I'll be you know the best part

410

00:15:52,170 --> 00:15:50,410

is the the reward the sense of reward of

411

00:15:53,520 --> 00:15:52,180

the feeling of reward that you have to

412

00:15:55,470 --> 00:15:53,530

see something that you've worked on for

413

00:15:58,500 --> 00:15:55,480

a long time really come to fruition and

414

00:16:00,270 --> 00:15:58,510

then be successfully completed an

415

00:16:02,490 --> 00:16:00,280

example might be this h2 Transfer

416

00:16:04,290 --> 00:16:02,500

Vehicle mission we have been working out

417

00:16:05,790 --> 00:16:04,300

in the backup lead for that David Korth

418

00:16:08,579 --> 00:16:05,800

is the lead flight director for that and

419

00:16:11,070 --> 00:16:08,589

I will be the lead for the next one next

420

00:16:12,990 --> 00:16:11,080

summer but that's a project that you

421

00:16:14,190 --> 00:16:13,000

work on for at least for a year and you

422

00:16:15,690 --> 00:16:14,200

do all of this planning and the

423

00:16:18,870 --> 00:16:15,700

integration that I talked about and then

424

00:16:20,820 --> 00:16:18,880

to see it launch and then being able to

425

00:16:22,140 --> 00:16:20,830

see it successfully be birth to the

426

00:16:24,750 --> 00:16:22,150

space station last week and next week

427

00:16:27,270 --> 00:16:24,760

we'll be moving some pieces of it around

428

00:16:29,699 --> 00:16:27,280

to outfit the space station to see all

429

00:16:33,660 --> 00:16:29,709

that come together be successful is

430

00:16:35,010 --> 00:16:33,670

really rewarding and that's why we put

431

00:16:37,290 --> 00:16:35,020

in all the long hours just do whatever

432

00:16:40,710 --> 00:16:37,300

test it is that we're doing actually

433

00:16:43,110 --> 00:16:40,720

come to fruition being able to give I

434

00:16:44,670 --> 00:16:43,120

call them my guys but the the crew that

435

00:16:46,440 --> 00:16:44,680

was on board when I was the increment

436

00:16:48,180 --> 00:16:46,450

flight director being able to watch them

437

00:16:49,440 --> 00:16:48,190

do their task but then to give him a

438

00:16:51,240 --> 00:16:49,450

handshake and a hug when they get back

439

00:16:52,829 --> 00:16:51,250

on the ground that just we could all

440

00:17:01,650 --> 00:16:52,839

celebrate up a job very well done no

441

00:17:05,410 --> 00:17:03,730

one of the education and job

442

00:17:08,590 --> 00:17:05,420

requirements as well as what inspired

443

00:17:09,970 --> 00:17:08,600

you to do this job let me tackle the

444

00:17:12,520 --> 00:17:09,980

last question first because it starts

445

00:17:15,429 --> 00:17:12,530

earlier in my life my particular

446

00:17:16,630 --> 00:17:15,439

inspiration it may sound hard to believe

447

00:17:20,579 --> 00:17:16,640

but actually the Challenger accident

448

00:17:23,350 --> 00:17:20,589

when we lost Challenger and its crew

449

00:17:26,079 --> 00:17:23,360

turned out to be a major inspiration for

450

00:17:27,850 --> 00:17:26,089

me not so much watching the event on TV

451  
00:17:29,530 --> 00:17:27,860  
although I was another third grade when

452  
00:17:33,070 --> 00:17:29,540  
that happens so I did see it in a

453  
00:17:35,110 --> 00:17:33,080  
regular replace but learning about it

454  
00:17:38,440 --> 00:17:35,120  
afterwards was reading a book about it

455  
00:17:41,620 --> 00:17:38,450  
and it talked about how this engineering

456  
00:17:43,390 --> 00:17:41,630  
this machine basically was trying to

457  
00:17:46,270 --> 00:17:43,400  
overcome the forces that were happening

458  
00:17:49,390 --> 00:17:46,280  
to it and to me it sparked off a l

459  
00:17:51,790 --> 00:17:49,400  
wonder moment of how could engineers go

460  
00:17:54,370 --> 00:17:51,800  
and design and build a spacecraft or a

461  
00:17:55,720 --> 00:17:54,380  
machine that recognizes what's happening

462  
00:17:57,070 --> 00:17:55,730  
is trying to pull it apart and yet and

463  
00:18:00,040 --> 00:17:57,080

still try and get those people safely

464

00:18:02,560 --> 00:18:00,050

there's that to orbit and that that

465

00:18:04,750 --> 00:18:02,570

sparked it for me after that I just

466

00:18:06,669 --> 00:18:04,760

wanted to go learn more about what what

467

00:18:09,460 --> 00:18:06,679

this all meant what the space space

468

00:18:10,930 --> 00:18:09,470

travel thing was and it just kept going

469

00:18:14,230 --> 00:18:10,940

I kept looking for different

470

00:18:15,880 --> 00:18:14,240

opportunities to learn more and that's

471

00:18:17,950 --> 00:18:15,890

how I ended up going to space camp but I

472

00:18:20,020 --> 00:18:17,960

could learn a whole lot there had a lot

473

00:18:22,900 --> 00:18:20,030

of great inspiration there that really

474

00:18:26,400 --> 00:18:22,910

set me on my course as far as working

475

00:18:29,409 --> 00:18:26,410

here at NASA you really need to have a

476

00:18:31,000 --> 00:18:29,419

bachelor's degree and it's a pretty wide

477

00:18:34,480 --> 00:18:31,010

range and what that can be it needs to

478

00:18:35,620 --> 00:18:34,490

be something technical or I'm just

479

00:18:37,630 --> 00:18:35,630

trying to think of people that I know

480

00:18:40,360 --> 00:18:37,640

some people have engineering degrees of

481

00:18:42,430 --> 00:18:40,370

course but then I had no some math

482

00:18:44,500 --> 00:18:42,440

majors and physics and things like that

483

00:18:47,320 --> 00:18:44,510

basically anything that's in the science

484

00:18:49,630 --> 00:18:47,330

technology engineering or math type of

485

00:18:52,150 --> 00:18:49,640

degrees will really help get you on your

486

00:18:54,280 --> 00:18:52,160

way like I mentioned earlier I was a

487

00:18:56,169 --> 00:18:54,290

co-op cooperative education student a

488

00:18:59,200 --> 00:18:56,179

co-op student where I got to come spend

489

00:19:00,790 --> 00:18:59,210

a couple semesters here for me I got to

490

00:19:02,020 --> 00:19:00,800

learn what NASA was all about NASA got

491

00:19:04,570 --> 00:19:02,030

to look at me and see if I was maybe

492

00:19:06,220 --> 00:19:04,580

worth hiring because I obviously keep

493

00:19:08,110 --> 00:19:06,230

pieces seeing if what you think you want

494

00:19:10,480 --> 00:19:08,120

to do when you grow up is something you

495

00:19:11,790 --> 00:19:10,490

really want to do and co-op and let you

496

00:19:13,920 --> 00:19:11,800

do that

497

00:19:15,180 --> 00:19:13,930

you know once you get working here you

498

00:19:18,390 --> 00:19:15,190

want to really work on your leadership

499

00:19:19,520 --> 00:19:18,400

and teamwork communication skills as far

500

00:19:21,810 --> 00:19:19,530

as getting to be the flight director

501  
00:19:24,360 --> 00:19:21,820  
it's almost a given that you can learn

502  
00:19:26,550 --> 00:19:24,370  
the various systems but the true test is

503  
00:19:28,560 --> 00:19:26,560  
how well you can lead and lead a team

504  
00:19:30,870 --> 00:19:28,570  
communicate with all those different

505  
00:19:32,430 --> 00:19:30,880  
organizations we deal with and

506  
00:19:34,920 --> 00:19:32,440  
communicative communicate effectively

507  
00:19:36,960 --> 00:19:34,930  
and what it says is true particularly

508  
00:19:39,150 --> 00:19:36,970  
for those who work in technical fields

509  
00:19:41,370 --> 00:19:39,160  
but even people who have degrees in

510  
00:19:43,650 --> 00:19:41,380  
non-technical areas can still work here

511  
00:19:45,450 --> 00:19:43,660  
there are I don't have a technical

512  
00:19:47,910 --> 00:19:45,460  
degree mine is in journalism I know

513  
00:19:49,890 --> 00:19:47,920

people who are English majors who are

514

00:19:51,810 --> 00:19:49,900

work here because there's all kinds of

515

00:19:53,940 --> 00:19:51,820

work that is done as part of the support

516

00:19:55,950 --> 00:19:53,950

of the space program it is fun to watch

517

00:19:57,030 --> 00:19:55,960

and talk to people that don't

518

00:20:00,540 --> 00:19:57,040

necessarily have those engineering

519

00:20:02,550 --> 00:20:00,550

degrees because we as flight controllers

520

00:20:04,140 --> 00:20:02,560

we maybe put ourselves in the little box

521

00:20:05,550 --> 00:20:04,150

where we just interact with people with

522

00:20:07,650 --> 00:20:05,560

those degrees and it's fun to meet

523

00:20:10,410 --> 00:20:07,660

people that have just the same passion

524

00:20:12,180 --> 00:20:10,420

that we do that haven't been admitted

525

00:20:14,520 --> 00:20:12,190

Business Administration or they work in

526

00:20:16,770 --> 00:20:14,530

procurement or even on site in the

527

00:20:18,770 --> 00:20:16,780

facilities so really I think the message

528

00:20:21,390 --> 00:20:18,780

we're both trying to tell you is that

529

00:20:23,130 --> 00:20:21,400

even if engineering or math is not is

530

00:20:24,240 --> 00:20:23,140

not your thing but you really want to

531

00:20:25,680 --> 00:20:24,250

work with the space program the

532

00:20:27,900 --> 00:20:25,690

opportunities are certainly out there

533

00:20:29,820 --> 00:20:27,910

and what you'll find here at this Center

534

00:20:31,500 --> 00:20:29,830

and I'm sure it's true a KSC and any of

535

00:20:33,060 --> 00:20:31,510

the other field centers is that

536

00:20:35,430 --> 00:20:33,070

everybody just they have such a passion

537

00:20:38,160 --> 00:20:35,440

for what we do and then they just able

538

00:20:40,410 --> 00:20:38,170

to take their unique skill set and apply

539

00:20:46,560 --> 00:20:40,420

it to something that we do it do here to

540

00:20:47,760 --> 00:20:46,570

help with our various jobs right all

541

00:20:49,950 --> 00:20:47,770

right I couldn't say it even better

542

00:20:51,390 --> 00:20:49,960

money this is a Ryan Dalziel in by the

543

00:20:52,890 --> 00:20:51,400

way but I just got the word that we have

544

00:20:54,360 --> 00:20:52,900

four minutes left so I think we have

545

00:20:56,430 --> 00:20:54,370

time for one more question and then you

546

00:21:01,400 --> 00:20:56,440

can say anything else you'd like to

547

00:21:07,370 --> 00:21:04,430

um hi my name is Lizzie I'm from Russia

548

00:21:09,350 --> 00:21:07,380

England and my question is how many how

549

00:21:11,650 --> 00:21:09,360

many calls do you make to the

550

00:21:15,920 --> 00:21:11,660

International Space Station in one day

551  
00:21:17,840 --> 00:21:15,930  
that's a good question also you know

552  
00:21:19,370 --> 00:21:17,850  
there's we've in this room we've got one

553  
00:21:21,740 --> 00:21:19,380  
person that normally talks to the crew

554  
00:21:24,860 --> 00:21:21,750  
and that's called the Capcom and I asked

555  
00:21:27,320 --> 00:21:24,870  
around the other day actually to try to

556  
00:21:29,480 --> 00:21:27,330  
get a sense of that and they on a

557  
00:21:32,060 --> 00:21:29,490  
typical day like today is a typical day

558  
00:21:34,520 --> 00:21:32,070  
in space they'll talk to the crew 15 or

559  
00:21:35,870 --> 00:21:34,530  
20 times and that's true for here in

560  
00:21:37,190 --> 00:21:35,880  
Houston but of course there are five

561  
00:21:39,440 --> 00:21:37,200  
different control centers around the

562  
00:21:43,100 --> 00:21:39,450  
world that interact with the crew at

563  
00:21:44,360 --> 00:21:43,110

various times and so they they may also

564

00:21:45,680 --> 00:21:44,370

talk to the crew so their payload

565

00:21:47,630 --> 00:21:45,690

questions they'll call Huntsville if

566

00:21:51,230 --> 00:21:47,640

they have questions about the Jackson

567

00:21:53,300 --> 00:21:51,240

module they'll call japan etc so it's

568

00:21:56,090 --> 00:21:53,310

not go ahead and a few minutes ago while

569

00:21:59,510 --> 00:21:56,100

we were doing our our program there were

570

00:22:01,580 --> 00:21:59,520

calls from the crew members talking to

571

00:22:03,680 --> 00:22:01,590

the control room here in Houston the

572

00:22:06,430 --> 00:22:03,690

control room in Moscow and the control

573

00:22:09,620 --> 00:22:06,440

room outside Tokyo all at the same time

574

00:22:12,860 --> 00:22:09,630

to think the people in Germany were

575

00:22:15,350 --> 00:22:12,870

feeling left out right on the weekends

576  
00:22:16,850 --> 00:22:15,360  
the astronauts cosmonauts actually get a

577  
00:22:19,070 --> 00:22:16,860  
what you and I would consider to be a

578  
00:22:20,570 --> 00:22:19,080  
typical weekend they get to their only

579  
00:22:23,420 --> 00:22:20,580  
working half a day on Saturday they'll

580  
00:22:25,250 --> 00:22:23,430  
get an entire sunday off and so the

581  
00:22:26,600 --> 00:22:25,260  
flight control room here in houston we

582  
00:22:28,700 --> 00:22:26,610  
won't have as many people here either

583  
00:22:30,620 --> 00:22:28,710  
and the flight director gets to serve as

584  
00:22:32,420 --> 00:22:30,630  
the Capcom so on those days I get to

585  
00:22:33,560 --> 00:22:32,430  
actually talk to the crew directly we

586  
00:22:35,060 --> 00:22:33,570  
don't talk to them very much though on

587  
00:22:36,740 --> 00:22:35,070  
the weekend as you would expect most

588  
00:22:39,170 --> 00:22:36,750

Sundays we probably don't talk to them

589

00:22:40,780 --> 00:22:39,180

at all and then on Saturday just just a

590

00:22:42,980 --> 00:22:40,790

few times if they have any questions

591

00:22:45,440 --> 00:22:42,990

Brian said we're about at a time do you

592

00:22:48,170 --> 00:22:45,450

have a one space camper with a message

593

00:22:50,650 --> 00:22:48,180

for the others you know the only thing I

594

00:22:53,270 --> 00:22:50,660

can really tell you guys is to keep

595

00:22:54,350 --> 00:22:53,280

wondering about the things that that you

596

00:22:56,270 --> 00:22:54,360

learn are the things that you're

597

00:22:57,930 --> 00:22:56,280

interested in keep pursuing your

598

00:22:59,549 --> 00:22:57,940

interests keep trying to

599

00:23:01,799 --> 00:22:59,559

learn more and what if it brings you

600

00:23:03,210 --> 00:23:01,809

here or to NASA that's great but what's

601

00:23:05,159 --> 00:23:03,220

most important is that you keep pursuing

602

00:23:09,210 --> 00:23:05,169

what it is that really is your interest

603

00:23:11,490 --> 00:23:09,220

and I wish you all the very best it