



1
00:00:07,909 --> 00:00:04,070
and station mrs houston are you ready

2
00:00:12,390 --> 00:00:10,310
we are ready for the event

3
00:00:14,629 --> 00:00:12,400
associated press this is mission control

4
00:00:15,430 --> 00:00:14,639
houston please call station for a voice

5
00:00:17,430 --> 00:00:15,440
check

6
00:00:21,269 --> 00:00:17,440
station this is the associated press how

7
00:00:25,509 --> 00:00:23,910
station hears you loud and clear how do

8
00:00:28,550 --> 00:00:25,519
you hear us

9
00:00:30,310 --> 00:00:28,560
i hear you just fine good day gentlemen

10
00:00:32,549 --> 00:00:30,320
this is marcia dunn speaking to you from

11
00:00:34,709 --> 00:00:32,559
the kennedy space center

12
00:00:37,670 --> 00:00:34,719
i'd like to start out by asking about

13
00:00:39,350 --> 00:00:37,680

the next week's visit or the dragon

14

00:00:42,549 --> 00:00:39,360

that has some pretty fine imagery the

15

00:00:44,709 --> 00:00:42,559

astronaut night snaring the dragon

16

00:00:46,229 --> 00:00:44,719

tell me tell me all about it and what

17

00:00:50,310 --> 00:00:46,239

you're doing to get ready and how

18

00:00:56,950 --> 00:00:54,150

uh it's good to be talking to you marcia

19

00:00:58,950 --> 00:00:56,960

interesting about getting ready because

20

00:01:00,950 --> 00:00:58,960

we were practicing a bit this morning

21

00:01:03,590 --> 00:01:00,960

and then we put our practice on hold so

22

00:01:05,670 --> 00:01:03,600

we could do this pao event and as soon

23

00:01:08,710 --> 00:01:05,680

as this pio event is over we're going to

24

00:01:10,789 --> 00:01:08,720

be practicing a dragon again and what

25

00:01:12,550 --> 00:01:10,799

we're what i've been doing earlier today

26

00:01:15,109 --> 00:01:12,560

is just doing our

27

00:01:18,469 --> 00:01:15,119

computer simulation of the arm which is

28

00:01:21,270 --> 00:01:18,479

similar to what we do on at jsc

29

00:01:22,950 --> 00:01:21,280

and and right after this event

30

00:01:25,429 --> 00:01:22,960

we will

31

00:01:28,710 --> 00:01:25,439

float into the cupola and start flying

32

00:01:31,270 --> 00:01:28,720

the real arm in uh what we call offset

33

00:01:33,590 --> 00:01:31,280

grapples it's uh it's a

34

00:01:35,830 --> 00:01:33,600

procedure where we go in and actually

35

00:01:38,870 --> 00:01:35,840

grapple a go over a pin on a grapple

36

00:01:40,789 --> 00:01:38,880

fixture and and from that point we call

37

00:01:43,590 --> 00:01:40,799

it good and we back up and we do it over

38

00:01:46,230 --> 00:01:43,600

and over and over again so we are

39

00:01:47,910 --> 00:01:46,240

getting uh prepared for uh our visitor

40

00:01:50,069 --> 00:01:47,920

next week

41

00:01:52,550 --> 00:01:50,079

are you personally excited to be the one

42

00:01:54,389 --> 00:01:52,560

reeling dragon in it's a historic first

43

00:01:56,789 --> 00:01:54,399

a lot of eyes are going to be on the

44

00:01:58,550 --> 00:01:56,799

whole process

45

00:02:03,510 --> 00:01:58,560

how honored are you to be the one to be

46

00:02:07,190 --> 00:02:05,030

really i see this

47

00:02:09,029 --> 00:02:07,200

as a team effort andre and i are flying

48

00:02:11,270 --> 00:02:09,039

the arm we're taking turns flying the

49

00:02:13,110 --> 00:02:11,280

arm and it really doesn't matter who's

50

00:02:15,910 --> 00:02:13,120

actually flying the arm when we grapple

51
00:02:19,510 --> 00:02:15,920
the dragon the important thing is that

52
00:02:21,270 --> 00:02:19,520
we we do our part of the job for this

53
00:02:23,430 --> 00:02:21,280
team effort and you got to remember

54
00:02:25,670 --> 00:02:23,440
there's a heap of folks on the ground

55
00:02:28,150 --> 00:02:25,680
that are all working on this too so it's

56
00:02:31,750 --> 00:02:28,160
not just us it's uh

57
00:02:33,670 --> 00:02:31,760
orchestration of earth and space and

58
00:02:36,550 --> 00:02:33,680
space station and people on space

59
00:02:37,830 --> 00:02:36,560
station to make this happen so it's it's

60
00:02:39,830 --> 00:02:37,840
a big deal

61
00:02:41,430 --> 00:02:39,840
but i hope this becomes so routine that

62
00:02:42,790 --> 00:02:41,440
people won't even pay attention to it

63
00:02:44,790 --> 00:02:42,800

anymore

64

00:02:46,790 --> 00:02:44,800

well that sort of segues into my next

65

00:02:48,710 --> 00:02:46,800

question a few months back i remember

66

00:02:51,110 --> 00:02:48,720

you hearing you compare the commercial

67

00:02:53,910 --> 00:02:51,120

space effort with the wagon trains

68

00:02:55,670 --> 00:02:53,920

moving west in our own country

69

00:02:57,509 --> 00:02:55,680

talk about that a little bit how you see

70

00:02:58,869 --> 00:02:57,519

this in the big history

71

00:03:04,550 --> 00:02:58,879

in the big picture of the history of

72

00:03:09,350 --> 00:03:07,270

uh well right now space exploration is

73

00:03:13,110 --> 00:03:09,360

very expensive and it seems to be the

74

00:03:14,949 --> 00:03:13,120

realm of governments and they are the

75

00:03:17,589 --> 00:03:14,959

ones that are defining what the mission

76

00:03:19,509 --> 00:03:17,599

is and what the mission objectives are

77

00:03:22,949 --> 00:03:19,519

however we're at the point now where

78

00:03:26,229 --> 00:03:22,959

commercial enterprise can help supply

79

00:03:28,550 --> 00:03:26,239

the goods and services needed to keep

80

00:03:31,509 --> 00:03:28,560

the government working in their

81

00:03:33,509 --> 00:03:31,519

forefront activities and

82

00:03:37,110 --> 00:03:33,519

analogy to this is what we do

83

00:03:40,390 --> 00:03:37,120

in antarctica uh the antarctic uh

84

00:03:43,350 --> 00:03:40,400

research program is defined by

85

00:03:45,430 --> 00:03:43,360

the national science foundation

86

00:03:47,830 --> 00:03:45,440

but the goods and services are all

87

00:03:49,910 --> 00:03:47,840

contracted out to commercial people that

88

00:03:51,670 --> 00:03:49,920

provide the food the services the

89

00:03:54,309 --> 00:03:51,680

airplanes the

90

00:03:56,309 --> 00:03:54,319

the housing all of that's contracted out

91

00:03:58,229 --> 00:03:56,319

so so the government's in the business

92

00:04:01,350 --> 00:03:58,239

of exploring the frontier and defining

93

00:04:03,270 --> 00:04:01,360

the mission and they spill off the the

94

00:04:05,429 --> 00:04:03,280

support activities to commercial free

95

00:04:06,630 --> 00:04:05,439

enterprise which is a very american

96

00:04:09,190 --> 00:04:06,640

thing to do

97

00:04:11,750 --> 00:04:09,200

and and that's what happened in in the

98

00:04:13,910 --> 00:04:11,760

settling of the wild west of america

99

00:04:16,229 --> 00:04:13,920

where where the government would run the

100

00:04:17,830 --> 00:04:16,239

forts and define the missions and then

101
00:04:19,749 --> 00:04:17,840
they would get commercial enterprise to

102
00:04:22,629 --> 00:04:19,759
supply the goods and services and to

103
00:04:25,350 --> 00:04:22,639
build the railroads and and i i see this

104
00:04:27,990 --> 00:04:25,360
whole story repeating itself again and

105
00:04:30,150 --> 00:04:28,000
again as we move from low earth orbit

106
00:04:32,950 --> 00:04:30,160
and it'll probably repeat itself when we

107
00:04:34,790 --> 00:04:32,960
go to the moon and elsewhere

108
00:04:37,270 --> 00:04:34,800
dr cooper um

109
00:04:39,590 --> 00:04:37,280
what's your take on that as a european

110
00:04:46,150 --> 00:04:39,600
how momentous do you think this upcoming

111
00:04:50,150 --> 00:04:47,909
well it's it's the next the start of the

112
00:04:52,469 --> 00:04:50,160
next era and it's a

113
00:04:53,430 --> 00:04:52,479

say a natural process uh we've seen this

114

00:04:54,870 --> 00:04:53,440

of course

115

00:04:57,909 --> 00:04:54,880

in the past with all kinds of

116

00:04:59,590 --> 00:04:57,919

transportation with shipping aviation uh

117

00:05:02,310 --> 00:04:59,600

so this will happen in space flight as

118

00:05:04,710 --> 00:05:02,320

well and uh it feels uh it feels very

119

00:05:07,510 --> 00:05:04,720

good to to be part of that

120

00:05:08,870 --> 00:05:07,520

and i look forward to it very much this

121

00:05:11,990 --> 00:05:08,880

is uh

122

00:05:14,790 --> 00:05:12,000

the start of a real new era and uh we

123

00:05:17,029 --> 00:05:14,800

continue uh with the rapid pace i expect

124

00:05:19,350 --> 00:05:17,039

and there's a lot more to come

125

00:05:22,150 --> 00:05:19,360

well um maybe either of you can tell me

126

00:05:25,270 --> 00:05:22,160

are you taking any safety precautions

127

00:05:27,110 --> 00:05:25,280

for this mission that you might not take

128

00:05:28,870 --> 00:05:27,120

for other spacecraft that have come to

129

00:05:31,110 --> 00:05:28,880

visit i'm just wondering if the fact

130

00:05:32,469 --> 00:05:31,120

that it's a commercial vehicle versus a

131

00:05:34,629 --> 00:05:32,479

government vehicle will mean some

132

00:05:36,790 --> 00:05:34,639

changes in the rendezvous practices from

133

00:05:42,070 --> 00:05:36,800

your end

134

00:05:46,629 --> 00:05:44,550

well as you know space flight uh is is

135

00:05:48,710 --> 00:05:46,639

very safe there's a lot of safety

136

00:05:51,110 --> 00:05:48,720

precautions for everything we do

137

00:05:53,350 --> 00:05:51,120

for all the vehicles that that come from

138

00:05:54,230 --> 00:05:53,360

all the nations and and this includes

139

00:05:57,670 --> 00:05:54,240

also

140

00:05:59,350 --> 00:05:57,680

uh the dragon that's coming now so uh a

141

00:06:01,430 --> 00:05:59,360

lot of people on the ground uh are

142

00:06:03,990 --> 00:06:01,440

working on this and it's i can tell you

143

00:06:06,710 --> 00:06:04,000

it's it's very safe we have a lot of uh

144

00:06:08,790 --> 00:06:06,720

of steps where we we check everything uh

145

00:06:11,749 --> 00:06:08,800

the ground and the crew and

146

00:06:13,990 --> 00:06:11,759

everybody so for from that point of view

147

00:06:15,749 --> 00:06:14,000

it's not different than any other one uh

148

00:06:17,029 --> 00:06:15,759

it's it's safe

149

00:06:18,550 --> 00:06:17,039

and and

150

00:06:21,830 --> 00:06:18,560

i'm wondering if either of you have

151
00:06:24,309 --> 00:06:21,840
spoken either by phone or via email with

152
00:06:27,029 --> 00:06:24,319
elon musk is he offering any special

153
00:06:31,430 --> 00:06:27,039
words of wisdom or encouragement as

154
00:06:35,430 --> 00:06:33,590
i don't think either one of us have had

155
00:06:38,550 --> 00:06:35,440
a chance to chat with him i've talked to

156
00:06:40,150 --> 00:06:38,560
him in the past way before this mission

157
00:06:41,749 --> 00:06:40,160
about various aides dealing with space

158
00:06:43,830 --> 00:06:41,759
flight but

159
00:06:46,550 --> 00:06:43,840
i i haven't had any communication with

160
00:06:48,390 --> 00:06:46,560
him since this has started

161
00:06:51,510 --> 00:06:48,400
dr pettit for you in particular

162
00:06:53,589 --> 00:06:51,520
um you know americans are are

163
00:06:55,749 --> 00:06:53,599

are taking rides on the russian rockets

164

00:06:57,430 --> 00:06:55,759

until the commercial industry gets on

165

00:07:00,390 --> 00:06:57,440

its feet so to speak

166

00:07:02,629 --> 00:07:00,400

um do you see the the the future of

167

00:07:03,749 --> 00:07:02,639

astronauts american astronauts space

168

00:07:05,830 --> 00:07:03,759

travel

169

00:07:07,909 --> 00:07:05,840

lying heavily on the upcoming launch as

170

00:07:13,510 --> 00:07:07,919

a proving ground perhaps as to what

171

00:07:17,270 --> 00:07:15,749

i see that that any

172

00:07:19,270 --> 00:07:17,280

enterprise that wants to build a rocket

173

00:07:22,469 --> 00:07:19,280

to fly into space that's a step in the

174

00:07:24,710 --> 00:07:22,479

forward direction and we as as public

175

00:07:27,110 --> 00:07:24,720

watching in on this endeavor need to be

176

00:07:29,110 --> 00:07:27,120

prepared to see a few flops

177

00:07:31,350 --> 00:07:29,120

because that'll happen and think about

178

00:07:33,029 --> 00:07:31,360

what happens in the aviation industry

179

00:07:35,510 --> 00:07:33,039

and you've seen these old pictures of

180

00:07:37,589 --> 00:07:35,520

airplanes with 27 wings that collapse

181

00:07:39,510 --> 00:07:37,599

before it even gets off the runway and

182

00:07:41,830 --> 00:07:39,520

and uh airplanes have things that look

183

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

like umbrellas that vibrate up and down

184

00:07:46,150 --> 00:07:44,160

and and we kind of laugh at those but at

185

00:07:47,189 --> 00:07:46,160

the time these were serious efforts to

186

00:07:50,390 --> 00:07:47,199

try to

187

00:07:53,110 --> 00:07:50,400

to figure out how to fly and uh we'll

188

00:07:56,309 --> 00:07:53,120

probably see that story repeat again and

189

00:07:58,950 --> 00:07:56,319

again and we just can't quit if the

190

00:08:00,710 --> 00:07:58,960

first time or two doesn't work right so

191

00:08:03,029 --> 00:08:00,720

this is just something that it takes a

192

00:08:06,950 --> 00:08:03,039

lot of work we roll up our sleeves we

193

00:08:08,390 --> 00:08:06,960

try if it's successful great we can't

194

00:08:10,230 --> 00:08:08,400

uh

195

00:08:12,150 --> 00:08:10,240

let our heads get swollen up too much

196

00:08:14,230 --> 00:08:12,160

because there's always a failure around

197

00:08:16,629 --> 00:08:14,240

the corner and when one of those happens

198

00:08:19,110 --> 00:08:16,639

we just regroup sharpen our pencils do

199

00:08:21,189 --> 00:08:19,120

some more calculations make some uh

200

00:08:23,909 --> 00:08:21,199

engineering modifications and and keep

201
00:08:26,710 --> 00:08:23,919
going and i hope that that is the

202
00:08:28,230 --> 00:08:26,720
ingenuity in the american process that

203
00:08:31,749 --> 00:08:28,240
uh will

204
00:08:33,430 --> 00:08:31,759
lead to a commercialization of space

205
00:08:35,269 --> 00:08:33,440
well thank you for that answer and by

206
00:08:38,550 --> 00:08:35,279
the way i've been following your space

207
00:08:40,550 --> 00:08:38,560
zucchini broccoli sunflower saga

208
00:08:43,589 --> 00:08:40,560
a question about your coffee though are

209
00:08:45,030 --> 00:08:43,599
you sipping coffee up there uh from one

210
00:08:47,110 --> 00:08:45,040
of your um

211
00:08:49,030 --> 00:08:47,120
mugs that you like to make or are you

212
00:08:50,070 --> 00:08:49,040
using the traditional pouches and straws

213
00:08:52,310 --> 00:08:50,080

i know that's

214

00:08:53,670 --> 00:08:52,320

something you've

215

00:08:58,550 --> 00:08:53,680

toyed with in the past i was just

216

00:09:03,670 --> 00:09:02,070

the the coffee is going great and uh

217

00:09:06,230 --> 00:09:03,680

most of the time i drink it from a bag

218

00:09:09,269 --> 00:09:06,240

because that's a utilitarian thing to do

219

00:09:11,829 --> 00:09:09,279

you can fly around the room with a drink

220

00:09:14,550 --> 00:09:11,839

bag and and

221

00:09:17,269 --> 00:09:14,560

i happen to have one here and then i was

222

00:09:18,949 --> 00:09:17,279

drinking on the robotic workstation here

223

00:09:23,509 --> 00:09:18,959

as i was practicing right before this

224

00:09:26,389 --> 00:09:23,519

event however i do enjoy using my zero

225

00:09:29,430 --> 00:09:26,399

gravity cup and i'll drink tea and

226

00:09:33,269 --> 00:09:29,440

coffee from that uh on occasion just

227

00:09:34,790 --> 00:09:33,279

because we're in space and we can

228

00:09:37,430 --> 00:09:34,800

well good for you

229

00:09:39,430 --> 00:09:37,440

and and best of luck next week and for

230

00:09:41,750 --> 00:09:39,440

the remainder of your journey and god

231

00:09:46,150 --> 00:09:41,760

speed uh safe return to earth in a few

232

00:09:50,230 --> 00:09:47,910

well thanks marcia it's always good to

233

00:09:52,470 --> 00:09:50,240

have a chat with you

234

00:09:54,310 --> 00:09:52,480

and station this is houston acr that

235

00:09:56,630 --> 00:09:54,320

concludes the associated press portion

236

00:09:59,590 --> 00:09:56,640

of the event please stand by for a voice

237

00:10:01,990 --> 00:09:59,600

check from krla radio

238

00:10:05,590 --> 00:10:02,000

station this is krla radio how do you

239

00:10:12,310 --> 00:10:09,670

krl radio we hear you loud and clear

240

00:10:14,790 --> 00:10:12,320

well it's good to talk with you um from

241

00:10:17,269 --> 00:10:14,800

back on earth what's it like up there we

242

00:10:19,750 --> 00:10:17,279

see images to me it always looks like

243

00:10:21,990 --> 00:10:19,760

weightlessness is in slow motion is

244

00:10:26,470 --> 00:10:22,000

there anything to that uh describe what

245

00:10:33,829 --> 00:10:30,470

uh weightlessness it's uh

246

00:10:34,470 --> 00:10:33,839

it's the opposite of being heavy and and

247

00:10:36,310 --> 00:10:34,480

uh

248

00:10:39,190 --> 00:10:36,320

it's it's hard to describe it's

249

00:10:41,750 --> 00:10:39,200

wonderful it's uplifting you can float

250

00:10:44,550 --> 00:10:41,760

around the room as andre is doing here

251

00:10:46,550 --> 00:10:44,560

and we move slow

252

00:10:49,110 --> 00:10:46,560

because if you move fast you can easily

253

00:10:51,269 --> 00:10:49,120

get things out of control and just for

254

00:10:53,430 --> 00:10:51,279

example i've got oh i've got a little

255

00:10:56,310 --> 00:10:53,440

drink bag here and if i give it a fast

256

00:10:58,630 --> 00:10:56,320

push it just disappears it's it's

257

00:11:00,389 --> 00:10:58,640

already in node two now and you don't

258

00:11:02,069 --> 00:11:00,399

want to push saves fast like that

259

00:11:03,509 --> 00:11:02,079

because you'll lose them they'll bang

260

00:11:05,269 --> 00:11:03,519

around on the walls maybe they'll knock

261

00:11:07,670 --> 00:11:05,279

something else loose so one of the

262

00:11:10,470 --> 00:11:07,680

things that that you rapidly learn when

263

00:11:12,949 --> 00:11:10,480

you come into space is that slow

264

00:11:14,389 --> 00:11:12,959

actually gets things done quicker than

265

00:11:16,790 --> 00:11:14,399

fast

266

00:11:18,150 --> 00:11:16,800

what impacts does the weightlessness

267

00:11:19,910 --> 00:11:18,160

have on

268

00:11:22,150 --> 00:11:19,920

normal body functions when you drink

269

00:11:25,269 --> 00:11:22,160

liquid and it goes down into our stomach

270

00:11:29,910 --> 00:11:25,279

is there any sensation of it not feeling

271

00:11:32,949 --> 00:11:31,509

well actually you can try something

272

00:11:35,910 --> 00:11:32,959

yourself you can stand on your head you

273

00:11:37,590 --> 00:11:35,920

can still drink because uh the the body

274

00:11:39,670 --> 00:11:37,600

takes care of it it's pushed down to

275

00:11:41,590 --> 00:11:39,680

your stomach so in that sense we can we

276

00:11:45,030 --> 00:11:41,600

can eat and drink what we want the

277

00:11:46,870 --> 00:11:45,040

control of fluids and food in your mouth

278

00:11:49,269 --> 00:11:46,880

is also very good with your tongue so

279

00:11:51,750 --> 00:11:49,279

there's no no issue there

280

00:11:53,590 --> 00:11:51,760

so from from eating and drinking point

281

00:11:55,509 --> 00:11:53,600

of view it's it's pretty normal but you

282

00:11:59,350 --> 00:11:55,519

have to be careful with the food of

283

00:12:00,470 --> 00:11:59,360

course that things don't escape

284

00:12:03,350 --> 00:12:00,480

because that

285

00:12:06,870 --> 00:12:03,360

that that might well make things a bit

286

00:12:09,509 --> 00:12:06,880

uh dirty and things like that but uh

287

00:12:13,190 --> 00:12:09,519

that is a thing we have to get adjusted

288

00:12:14,949 --> 00:12:13,200

to to deal with uh with floating fluids

289

00:12:16,069 --> 00:12:14,959

with floating food

290

00:12:20,629 --> 00:12:16,079

during

291

00:12:23,750 --> 00:12:20,639

what about the sense of movement or

292

00:12:25,670 --> 00:12:23,760

speed i'm told you're moving it like 17

293

00:12:27,670 --> 00:12:25,680

000 miles an hour up there a couple

294

00:12:29,990 --> 00:12:27,680

hundred miles up but yet you're so far

295

00:12:34,230 --> 00:12:30,000

off the earth is there no real sense or

296

00:12:39,030 --> 00:12:36,470

well that's correct uh you can you can

297

00:12:41,269 --> 00:12:39,040

compare it actually with a flight in a

298

00:12:44,069 --> 00:12:41,279

in an airliner at about uh

299

00:12:48,230 --> 00:12:44,079

10 kilometers at uh altitude because the

300

00:12:50,470 --> 00:12:48,240

angular speed is is the same so the the

301
00:12:53,110 --> 00:12:50,480
the speed of the earth passing by

302
00:12:54,710 --> 00:12:53,120
from a plane is at the the same as

303
00:12:57,670 --> 00:12:54,720
for us at

304
00:12:59,910 --> 00:12:57,680
400 kilometers altitude so

305
00:13:01,829 --> 00:12:59,920
you see that we're moving uh but you

306
00:13:03,670 --> 00:13:01,839
don't really have the feeling of

307
00:13:06,790 --> 00:13:03,680
enormous speed

308
00:13:10,069 --> 00:13:06,800
like you don't have in a plane as well

309
00:13:11,910 --> 00:13:10,079
sound at all up there or is it just the

310
00:13:17,509 --> 00:13:11,920
the fans and things that run what's it

311
00:13:21,910 --> 00:13:19,990
it's kind of like living in the engine

312
00:13:24,790 --> 00:13:21,920
room of a ship

313
00:13:26,550 --> 00:13:24,800

we're surrounded by machinery a space is

314

00:13:28,949 --> 00:13:26,560

a place where human beings cannot

315

00:13:29,670 --> 00:13:28,959

innately live and the only reason we

316

00:13:32,710 --> 00:13:29,680

could

317

00:13:34,870 --> 00:13:32,720

live here is by taking machines with us

318

00:13:37,110 --> 00:13:34,880

to provide all the functions and one of

319

00:13:39,910 --> 00:13:37,120

the things that that we need to have is

320

00:13:41,910 --> 00:13:39,920

air movement because there's no

321

00:13:45,030 --> 00:13:41,920

gravitational driven convection there's

322

00:13:48,389 --> 00:13:45,040

no wind up here and and things can get

323

00:13:51,189 --> 00:13:48,399

pretty stale uh pretty quickly and so we

324

00:13:54,069 --> 00:13:51,199

always have fans blowing and moving air

325

00:13:56,470 --> 00:13:54,079

around and and that adds a certain level

326

00:13:58,470 --> 00:13:56,480

of background noise and then we have

327

00:14:01,350 --> 00:13:58,480

mechanisms like our treadmill and our

328

00:14:04,230 --> 00:14:01,360

stationary bicycle and and other pumps

329

00:14:06,310 --> 00:14:04,240

and equipment for from both systems and

330

00:14:09,030 --> 00:14:06,320

and scientific viewpoint and all these

331

00:14:10,790 --> 00:14:09,040

sayings make uh mechanized machine kind

332

00:14:12,949 --> 00:14:10,800

of noises and when you add it all

333

00:14:15,750 --> 00:14:12,959

together it's uh

334

00:14:16,790 --> 00:14:15,760

it's a reminder that you are living in a

335

00:14:20,790 --> 00:14:16,800

machine

336

00:14:22,150 --> 00:14:20,800

allow you to be here

337

00:14:24,790 --> 00:14:22,160

you have a

338

00:14:26,949 --> 00:14:24,800

commercial supply ship coming

339

00:14:31,269 --> 00:14:26,959

for the first time up there what is the

340

00:14:36,230 --> 00:14:33,030

the importance of

341

00:14:38,790 --> 00:14:36,240

the dragon vehicle coming up is

342

00:14:40,550 --> 00:14:38,800

letting some entity other than the

343

00:14:44,150 --> 00:14:40,560

government

344

00:14:46,389 --> 00:14:44,160

do the supplies for

345

00:14:49,990 --> 00:14:46,399

the space station for moving off into

346

00:14:51,750 --> 00:14:50,000

space so now the governments like uh

347

00:14:54,629 --> 00:14:51,760

government-run agencies like nasa can

348

00:14:56,470 --> 00:14:54,639

concentrate on the frontier aspect of

349

00:14:58,790 --> 00:14:56,480

being in space they can define the

350

00:15:01,110 --> 00:14:58,800

mission they can define where we're

351
00:15:03,110 --> 00:15:01,120
going and what we're going to be doing

352
00:15:06,310 --> 00:15:03,120
and then we can

353
00:15:07,110 --> 00:15:06,320
have the commercial entities supply us

354
00:15:10,710 --> 00:15:07,120
the

355
00:15:13,110 --> 00:15:10,720
in order to

356
00:15:16,230 --> 00:15:13,120
to uh do the mission and and i like to

357
00:15:17,750 --> 00:15:16,240
use the analogy of forts in the old west

358
00:15:19,670 --> 00:15:17,760
in the united states

359
00:15:22,710 --> 00:15:19,680
and the wagon trades that supplied the

360
00:15:25,189 --> 00:15:22,720
forts were run by commercial entities

361
00:15:27,350 --> 00:15:25,199
and later replaced by the train system

362
00:15:30,230 --> 00:15:27,360
but the government defined what the

363
00:15:32,150 --> 00:15:30,240

mission was and ran the forts and and i

364

00:15:33,990 --> 00:15:32,160

think we're going to see that scenario

365

00:15:36,470 --> 00:15:34,000

play itself over and over again as

366

00:15:39,189 --> 00:15:36,480

humanity moves out into space

367

00:15:42,550 --> 00:15:39,199

a little bit now about the

368

00:15:44,470 --> 00:15:42,560

risks up there um space debris sometimes

369

00:15:47,030 --> 00:15:44,480

we'll see stories about uh things that

370

00:15:48,710 --> 00:15:47,040

are done to protect against that

371

00:15:50,710 --> 00:15:48,720

is there's a lot of junk floating up

372

00:15:54,870 --> 00:15:50,720

there or do you ever see anything fly by

373

00:15:57,670 --> 00:15:55,829

uh

374

00:16:00,550 --> 00:15:57,680

there there is a lot of junk if you look

375

00:16:02,310 --> 00:16:00,560

at the radar targets that uh where they

376

00:16:04,470 --> 00:16:02,320

plot them as little dots around earth

377

00:16:06,550 --> 00:16:04,480

that it's like wow we're flying in a

378

00:16:10,230 --> 00:16:06,560

cloud of junk however

379

00:16:12,069 --> 00:16:10,240

space in low earth orbit is a big place

380

00:16:14,470 --> 00:16:12,079

and the chances of actually running into

381

00:16:16,629 --> 00:16:14,480

one is pretty small

382

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

however we do have to watch out for

383

00:16:21,910 --> 00:16:18,720

these saids and every once in a while we

384

00:16:25,110 --> 00:16:21,920

do a debris avoid a debris avoidance

385

00:16:28,629 --> 00:16:25,120

maneuver which is a nasa acronym for dam

386

00:16:32,150 --> 00:16:28,639

so we can actually say dam on the uh

387

00:16:34,069 --> 00:16:32,160

loops now and in the context of debris

388

00:16:37,030 --> 00:16:34,079

you will be understood

389

00:16:39,910 --> 00:16:37,040

and we did we've done a couple of dams

390

00:16:41,269 --> 00:16:39,920

since we've been here and one time we

391

00:16:43,110 --> 00:16:41,279

did not have

392

00:16:47,509 --> 00:16:43,120

enough warning to

393

00:16:50,389 --> 00:16:47,519

do a dam so we uh went into our soyuz as

394

00:16:52,710 --> 00:16:50,399

a safe haven in in case of collision but

395

00:16:55,189 --> 00:16:52,720

there was not one and so we popped out

396

00:16:57,350 --> 00:16:55,199

of our soyuz and and went back to work

397

00:16:58,870 --> 00:16:57,360

and then what about these solar flares

398

00:17:01,990 --> 00:16:58,880

that we've been seeing from time to time

399

00:17:03,910 --> 00:17:02,000

in the news is there any extra radiation

400

00:17:07,750 --> 00:17:03,920

on you guys and is there anything you do

401
00:17:11,110 --> 00:17:10,069
there's probably some extra radiation

402
00:17:13,590 --> 00:17:11,120
however

403
00:17:15,750 --> 00:17:13,600
we're we're exo atmospheric but we're

404
00:17:17,590 --> 00:17:15,760
still protected by earth's magnetosphere

405
00:17:19,429 --> 00:17:17,600
earth earth is like a great big

406
00:17:21,429 --> 00:17:19,439
spherical magnet with a north and a

407
00:17:23,270 --> 00:17:21,439
south pole and the magnetic field

408
00:17:25,429 --> 00:17:23,280
radiates way out into space for

409
00:17:28,630 --> 00:17:25,439
thousands of miles and it intercepts

410
00:17:31,750 --> 00:17:28,640
these solar generated particles and

411
00:17:33,510 --> 00:17:31,760
deflects them it's kind of like

412
00:17:36,230 --> 00:17:33,520
scotty turning up the shields for the

413
00:17:39,510 --> 00:17:36,240

starship enterprise and earth does this

414

00:17:41,750 --> 00:17:39,520

naturally for us and and so

415

00:17:44,230 --> 00:17:41,760

we don't have to worry from a radiation

416

00:17:47,110 --> 00:17:44,240

safety point of view when

417

00:17:48,950 --> 00:17:47,120

most of these solar events occur and the

418

00:17:51,270 --> 00:17:48,960

biggest effect of these is that it makes

419

00:17:52,870 --> 00:17:51,280

beautiful aurora and we like to stick

420

00:17:55,029 --> 00:17:52,880

our noses against the window in the

421

00:17:57,110 --> 00:17:55,039

cupola and and look at these these

422

00:17:59,590 --> 00:17:57,120

spectacular aurora displays that happen

423

00:18:02,630 --> 00:17:59,600

every time the the sun goes burp

424

00:18:05,270 --> 00:18:02,640

lastly um read an article about how the

425

00:18:06,950 --> 00:18:05,280

eyeball uh changes a bit for those who

426

00:18:09,510 --> 00:18:06,960

have gone in space

427

00:18:14,789 --> 00:18:09,520

um do you sense any changes physically

428

00:18:18,150 --> 00:18:16,150

well there's a lot of things happening

429

00:18:20,870 --> 00:18:18,160

with the human body and weightlessness

430

00:18:24,150 --> 00:18:20,880

because of course uh the it functions

431

00:18:26,870 --> 00:18:24,160

best at at one times gravity 1g and the

432

00:18:29,590 --> 00:18:26,880

body adapts uh to uh to the microgravity

433

00:18:32,230 --> 00:18:29,600

environment some things however like uh

434

00:18:33,430 --> 00:18:32,240

like like bone loss and and muscle

435

00:18:35,590 --> 00:18:33,440

atrophy

436

00:18:37,270 --> 00:18:35,600

these are things that that continue on

437

00:18:38,390 --> 00:18:37,280

the long run and we have to do things

438

00:18:41,430 --> 00:18:38,400

against that

439

00:18:43,190 --> 00:18:41,440

now there is indeed some some some new

440

00:18:45,190 --> 00:18:43,200

indications that things happen with the

441

00:18:48,070 --> 00:18:45,200

album and that this investigation is

442

00:18:49,990 --> 00:18:48,080

going on at the moment uh i mean we have

443

00:18:51,669 --> 00:18:50,000

been going to space for long durations

444

00:18:53,909 --> 00:18:51,679

for for many many years many many

445

00:18:55,750 --> 00:18:53,919

decades and so it's it's not that

446

00:18:57,590 --> 00:18:55,760

serious that we

447

00:18:59,990 --> 00:18:57,600

that we cannot go anymore it's just

448

00:19:02,630 --> 00:19:00,000

something new that's being uh being

449

00:19:04,549 --> 00:19:02,640

investigated and see uh if this is

450

00:19:06,390 --> 00:19:04,559

something that we have to uh to find

451

00:19:09,430 --> 00:19:06,400

countermeasures against or something

452

00:19:12,549 --> 00:19:09,440

else so at the moment it's uh it's not

453

00:19:14,549 --> 00:19:12,559

an issue that we are very worried about

454

00:19:18,710 --> 00:19:14,559

well it's been good talking with both of

455

00:19:22,470 --> 00:19:20,870

it's our pleasure and come back and

456

00:19:26,390 --> 00:19:22,480

visit us again

457

00:19:31,830 --> 00:19:28,150

station this is houston acr that

458

00:19:36,789 --> 00:19:34,150

and thank you associated press