



1
00:00:05,190 --> 00:00:03,350
good morning thank you for joining us

2
00:00:08,110 --> 00:00:05,200
here at nasa's kennedy space center in

3
00:00:10,709 --> 00:00:08,120
florida at launch pad 39a for the

4
00:00:13,190 --> 00:00:10,719
sts-133 terminal countdown demonstration

5
00:00:15,509 --> 00:00:13,200
test pad q a it's my pleasure to

6
00:00:19,510 --> 00:00:15,519
introduce the commander of space shuttle

7
00:00:21,189 --> 00:00:19,520
discovery commander steve lindsey thanks

8
00:00:23,509 --> 00:00:21,199
well good morning thanks for coming out

9
00:00:27,509 --> 00:00:23,519
this morning it's great to be here for

10
00:00:29,029 --> 00:00:27,519
uh tcdt and to go through that again and

11
00:00:31,269 --> 00:00:29,039
vehicle's looking great all of our

12
00:00:33,190 --> 00:00:31,279
activities are going great we are

13
00:00:34,470 --> 00:00:33,200

basically trained and ready to fly just

14

00:00:37,430 --> 00:00:34,480

a few more

15

00:00:38,869 --> 00:00:37,440

to go through and then we'll be uh

16

00:00:41,510 --> 00:00:38,879

hopefully back here for an on-time

17

00:00:44,069 --> 00:00:41,520

launch on november 1st

18

00:00:45,830 --> 00:00:44,079

on the commander the mission and uh what

19

00:00:47,190 --> 00:00:45,840

i would like to do is just kind of pass

20

00:00:49,830 --> 00:00:47,200

it down to each crew member and let each

21

00:00:50,790 --> 00:00:49,840

one talk a little bit about uh

22

00:00:51,670 --> 00:00:50,800

what they're gonna be doing on their

23

00:00:53,350 --> 00:00:51,680

flight a little bit about their

24

00:00:55,270 --> 00:00:53,360

background and so first thing i'm gonna

25

00:00:56,869 --> 00:00:55,280

hand it over to eric bowe who's a pilot

26

00:00:59,349 --> 00:00:56,879

on the flight

27

00:01:01,349 --> 00:00:59,359

thanks steve good morning uh name's eric

28

00:01:02,310 --> 00:01:01,359

bowe i'm the pilot uh from atlanta

29

00:01:04,469 --> 00:01:02,320

georgia

30

00:01:05,990 --> 00:01:04,479

uh background air force test pilot

31

00:01:07,270 --> 00:01:06,000

on the mission i'm gonna be working as a

32

00:01:08,789 --> 00:01:07,280

pilot be working with steve on all the

33

00:01:10,550 --> 00:01:08,799

piloting tasks for asset entry

34

00:01:12,950 --> 00:01:10,560

rendezvous and docking looking forward

35

00:01:14,630 --> 00:01:12,960

to do the undocking and fly around

36

00:01:17,190 --> 00:01:14,640

also be working with alvin and steve on

37

00:01:19,830 --> 00:01:17,200

the shuttle robotic arm

38

00:01:21,749 --> 00:01:19,840

and also the pmm outfitting once we have

39

00:01:23,510 --> 00:01:21,759

a birth to uh station

40

00:01:25,350 --> 00:01:23,520

and now i'd like to hand it off to uh

41

00:01:27,270 --> 00:01:25,360

alvin

42

00:01:29,270 --> 00:01:27,280

thanks eric good morning everybody

43

00:01:31,350 --> 00:01:29,280

i'm alvin drew and i'll be working as

44

00:01:33,350 --> 00:01:31,360

mission specialist one uh working on the

45

00:01:36,069 --> 00:01:33,360

flight deck for ascent for the mission

46

00:01:37,749 --> 00:01:36,079

and then working along with um tim copra

47

00:01:39,910 --> 00:01:37,759

as our two space walkers doing the two

48

00:01:41,429 --> 00:01:39,920

evas during the mission as well as eric

49

00:01:43,670 --> 00:01:41,439

mentioned steve eric and i will be

50

00:01:45,109 --> 00:01:43,680

working the shuttle robotic arm for

51
00:01:48,149 --> 00:01:45,119
inspections and helping off with the

52
00:01:50,230 --> 00:01:48,159
handoff of elc-4 to the space station's

53
00:01:51,910 --> 00:01:50,240
robotic arm for installation

54
00:01:54,230 --> 00:01:51,920
i'm going to hand off now to tim we'll

55
00:01:55,190 --> 00:01:54,240
talk about what he's going to do hi

56
00:01:56,709 --> 00:01:55,200
everybody

57
00:01:59,109 --> 00:01:56,719
really uh looking forward to this

58
00:02:00,630 --> 00:01:59,119
mission my name is tim copra and i'm a

59
00:02:03,190 --> 00:02:00,640
mission specialist too i'll be working

60
00:02:05,190 --> 00:02:03,200
on the flight deck for accent and entry

61
00:02:07,109 --> 00:02:05,200
and then uh on flight days five and

62
00:02:09,749 --> 00:02:07,119
seven be working with alvin drew for our

63
00:02:12,710 --> 00:02:09,759

two space walks we also operating the

64

00:02:14,949 --> 00:02:12,720

robotic arm with mike and nicole on on

65

00:02:17,270 --> 00:02:14,959

some of the the mission uh components to

66

00:02:18,790 --> 00:02:17,280

install to the payloads and uh we're

67

00:02:21,030 --> 00:02:18,800

looking forward to it gonna pass it off

68

00:02:22,470 --> 00:02:21,040

to mike barrett

69

00:02:23,990 --> 00:02:22,480

well good morning uh thanks everybody

70

00:02:26,150 --> 00:02:24,000

for coming i assume if you know what

71

00:02:28,869 --> 00:02:26,160

tcdd stands for you're already a rabid

72

00:02:30,630 --> 00:02:28,879

space fan so uh thanks for coming uh

73

00:02:32,309 --> 00:02:30,640

i'll be on the mid deck as one of the

74

00:02:34,710 --> 00:02:32,319

mission specialists i'll be working

75

00:02:37,509 --> 00:02:34,720

rendezvous and a lot of robotics i'll

76

00:02:39,430 --> 00:02:37,519

get to spend uh four fractions of four

77

00:02:41,910 --> 00:02:39,440

days in the cupola working that

78

00:02:43,270 --> 00:02:41,920

magnificent station robotic arm two of

79

00:02:44,550 --> 00:02:43,280

which i'll be flying tim around on the

80

00:02:46,949 --> 00:02:44,560

arm as you mentioned i'm really looking

81

00:02:48,550 --> 00:02:46,959

forward to that and working also as load

82

00:02:49,910 --> 00:02:48,560

master to get things transferred to and

83

00:02:52,070 --> 00:02:49,920

from the station it'll be great to get

84

00:02:55,270 --> 00:02:52,080

back there i'm going to pass it off to

85

00:02:59,190 --> 00:02:57,509

good morning everybody nicole stott also

86

00:03:01,910 --> 00:02:59,200

one of the mission specialists really

87

00:03:02,790 --> 00:03:01,920

happy to be here my primary background

88

00:03:04,309 --> 00:03:02,800

is

89

00:03:07,030 --> 00:03:04,319

and i think that has helped prepare me

90

00:03:08,869 --> 00:03:07,040

the most for uh flying in space is the

91

00:03:10,630 --> 00:03:08,879

time i had here at kennedy space center

92

00:03:12,070 --> 00:03:10,640

and shuttle operations uh had the

93

00:03:14,070 --> 00:03:12,080

opportunity to work here for about 10

94

00:03:16,550 --> 00:03:14,080

years

95

00:03:18,630 --> 00:03:16,560

on this flight discovery which i'm

96

00:03:20,949 --> 00:03:18,640

really excited to be flying on again

97

00:03:21,670 --> 00:03:20,959

i'll be working with mike

98

00:03:23,750 --> 00:03:21,680

for

99

00:03:26,789 --> 00:03:23,760

getting the the vehicle ready after we

100

00:03:28,710 --> 00:03:26,799

get to orbit and then working some of

101
00:03:31,830 --> 00:03:28,720
the docking system activities for

102
00:03:34,630 --> 00:03:31,840
rendezvous and docking and then with uh

103
00:03:36,229 --> 00:03:34,640
tim and al i'll be uh i get to be the

104
00:03:37,110 --> 00:03:36,239
boss of them from the inside while

105
00:03:39,670 --> 00:03:37,120
they're

106
00:03:41,990 --> 00:03:39,680
outside doing their evas so uh they have

107
00:03:43,430 --> 00:03:42,000
to listen to me for that and then uh

108
00:03:44,949 --> 00:03:43,440
like these guys mentioned we'll be doing

109
00:03:46,949 --> 00:03:44,959
some of the the major robotics

110
00:03:49,589 --> 00:03:46,959
activities moving the uh

111
00:03:50,949 --> 00:03:49,599
elc 4 from the payload bay so really

112
00:03:56,070 --> 00:03:50,959
looking forward to it and thanks for

113
00:04:00,710 --> 00:03:58,149

okay with that i guess we're ready to

114

00:04:03,110 --> 00:04:00,720

take any questions you might have for us

115

00:04:04,309 --> 00:04:03,120

uh thanks uh bill harwood cbs news uh

116

00:04:06,229 --> 00:04:04,319

i'll start with you commander it's the

117

00:04:08,070 --> 00:04:06,239

last flight of discovery there's only i

118

00:04:10,229 --> 00:04:08,080

guess two flights after yours

119

00:04:12,070 --> 00:04:10,239

uh maybe some perspective on discovery

120

00:04:16,150 --> 00:04:12,080

uh

121

00:04:18,390 --> 00:04:16,160

bittersweet you've probably heard that a

122

00:04:20,949 --> 00:04:18,400

lot uh you know for me personally this

123

00:04:23,270 --> 00:04:20,959

will be my third flight on discovery um

124

00:04:26,150 --> 00:04:23,280

flown it twice before uh first one was

125

00:04:27,830 --> 00:04:26,160

sds 95 which was when we took john

126
00:04:29,670 --> 00:04:27,840
senator john glenn back into space and

127
00:04:31,270 --> 00:04:29,680
then flew it again on the second return

128
00:04:32,150 --> 00:04:31,280
to flight test mission after columbia

129
00:04:34,469 --> 00:04:32,160
and uh

130
00:04:36,310 --> 00:04:34,479
you know uh discovery is a workhorse uh

131
00:04:38,070 --> 00:04:36,320
fleet leader a number of flights done a

132
00:04:39,990 --> 00:04:38,080
lot of famous flights all the return to

133
00:04:41,590 --> 00:04:40,000
flight test missions uh that have been

134
00:04:44,070 --> 00:04:41,600
involved and uh

135
00:04:45,830 --> 00:04:44,080
and yet when you uh i was telling some

136
00:04:48,310 --> 00:04:45,840
employees here yesterday when you walk

137
00:04:49,830 --> 00:04:48,320
inside at a discovery and see it it

138
00:04:52,230 --> 00:04:49,840

still looks like a new car even after

139

00:04:54,310 --> 00:04:52,240

almost 30 years of service and uh

140

00:04:56,310 --> 00:04:54,320

so it's a great it's a great machine a

141

00:04:57,830 --> 00:04:56,320

great vehicle with a each one has its

142

00:04:59,830 --> 00:04:57,840

own personality and discoveries no

143

00:05:01,590 --> 00:04:59,840

different than that but as far as the

144

00:05:03,029 --> 00:05:01,600

last flight it's a privilege i think for

145

00:05:04,469 --> 00:05:03,039

us to be able to fly it on the last

146

00:05:06,310 --> 00:05:04,479

flight and it's a real tribute to the

147

00:05:08,629 --> 00:05:06,320

folks here and in the other manned

148

00:05:09,990 --> 00:05:08,639

spacecraft centers

149

00:05:12,310 --> 00:05:10,000

for all they've done to keep these

150

00:05:13,909 --> 00:05:12,320

vehicles flying and and uh and allowing

151
00:05:16,310 --> 00:05:13,919
the you know being able to do all the

152
00:05:18,230 --> 00:05:16,320
things they do so if i think for us it's

153
00:05:20,070 --> 00:05:18,240
a privilege to be able to fly that last

154
00:05:21,830 --> 00:05:20,080
flight on discovery but it's also sad

155
00:05:23,350 --> 00:05:21,840
because after that it's retired i just

156
00:05:25,510 --> 00:05:23,360
hope that when it goes to the

157
00:05:27,749 --> 00:05:25,520
smithsonian that that it's it's laid out

158
00:05:29,749 --> 00:05:27,759
in a way such that the public

159
00:05:31,189 --> 00:05:29,759
can actually go through it and see and

160
00:05:33,110 --> 00:05:31,199
get a feeling of what it was really like

161
00:05:34,950 --> 00:05:33,120
to fly it and uh that's something that

162
00:05:36,310 --> 00:05:34,960
it'll always be in our memories

163
00:05:38,310 --> 00:05:36,320

thanks and one more for me and it's

164

00:05:40,230 --> 00:05:38,320

really for both tim and al if you guys

165

00:05:42,710 --> 00:05:40,240

could give us a little synopsis of eva's

166

00:05:43,830 --> 00:05:42,720

one and two uh the content maybe one of

167

00:05:45,350 --> 00:05:43,840

you do one and one do the other i'd

168

00:05:47,909 --> 00:05:45,360

appreciate that thanks yeah that sounds

169

00:05:49,990 --> 00:05:47,919

great i'll talk about uh uva one

170

00:05:51,830 --> 00:05:50,000

so uh it's interesting how this all

171

00:05:52,950 --> 00:05:51,840

evolved we started out with an eight day

172

00:05:55,189 --> 00:05:52,960

mission it was going to be a long

173

00:05:57,510 --> 00:05:55,199

weekend on space station and uh then it

174

00:05:59,510 --> 00:05:57,520

evolved into two pretty uh demanding

175

00:06:00,870 --> 00:05:59,520

spacewalks and uh really excited about

176
00:06:02,230 --> 00:06:00,880
especially because it's so integrated

177
00:06:04,710 --> 00:06:02,240
with robotics

178
00:06:07,430 --> 00:06:04,720
so the the first dva as as many of you

179
00:06:09,350 --> 00:06:07,440
know the the stage crew the the folks on

180
00:06:11,590 --> 00:06:09,360
space station replaced a pump module

181
00:06:13,270 --> 00:06:11,600
when it broke and did a great job doing

182
00:06:15,670 --> 00:06:13,280
that and they left the

183
00:06:17,350 --> 00:06:15,680
the disabled pump module installed on a

184
00:06:19,510 --> 00:06:17,360
place on station that's not great for

185
00:06:21,350 --> 00:06:19,520
bringing it back home so mike is going

186
00:06:23,590 --> 00:06:21,360
to fly me up to that location and we'll

187
00:06:25,110 --> 00:06:23,600
install that back on a place on space

188
00:06:27,430 --> 00:06:25,120

station where they can pull that off and

189

00:06:28,629 --> 00:06:27,440

put it in the payload bay on a future uh

190

00:06:30,469 --> 00:06:28,639

shuttle flight

191

00:06:31,909 --> 00:06:30,479

so uh while i'm doing that al is going

192

00:06:33,350 --> 00:06:31,919

to be working with venting this pump

193

00:06:35,029 --> 00:06:33,360

module because

194

00:06:37,110 --> 00:06:35,039

since this module has some residual

195

00:06:39,029 --> 00:06:37,120

ammonia inside the tank we need to get

196

00:06:40,629 --> 00:06:39,039

rid of that to put it in the payload bay

197

00:06:42,309 --> 00:06:40,639

on a future mission so we'll be working

198

00:06:44,710 --> 00:06:42,319

with that now it's going to get that all

199

00:06:46,390 --> 00:06:44,720

set up and then after we do that that

200

00:06:48,629 --> 00:06:46,400

coordinated activity al and i are going

201
00:06:51,270 --> 00:06:48,639
to go out to the starboard side of space

202
00:06:53,830 --> 00:06:51,280
station and install a wedge that allows

203
00:06:54,790 --> 00:06:53,840
this this boom to be in a position that

204
00:06:56,469 --> 00:06:54,800
allows

205
00:06:58,629 --> 00:06:56,479
future vehicles to come up and that

206
00:07:00,710 --> 00:06:58,639
won't be in the way for those missions

207
00:07:03,670 --> 00:07:00,720
and then finally the the big task we

208
00:07:06,469 --> 00:07:03,680
have is installing this this extension

209
00:07:08,469 --> 00:07:06,479
on the rail on the the truss elements

210
00:07:10,469 --> 00:07:08,479
and that allows the mobile transporter

211
00:07:12,230 --> 00:07:10,479
to move the entire length of the vehicle

212
00:07:13,909 --> 00:07:12,240
for future maintenance activities so

213
00:07:17,670 --> 00:07:13,919

that in a nutshell is what we plan on

214

00:07:20,309 --> 00:07:17,680

doing on eva one

215

00:07:22,070 --> 00:07:20,319

for eva2 what we'll do is that we're

216

00:07:24,150 --> 00:07:22,080

gonna set up preventing that pump module

217

00:07:25,909 --> 00:07:24,160

during eva one the first thing we'll do

218

00:07:27,350 --> 00:07:25,919

after getting out the door on eva2 is to

219

00:07:29,510 --> 00:07:27,360

actually vent that

220

00:07:30,469 --> 00:07:29,520

module allowing it to clean up so we can

221

00:07:32,309 --> 00:07:30,479

get it cleaned up later on in the

222

00:07:34,550 --> 00:07:32,319

mission itself while that's going on

223

00:07:37,270 --> 00:07:34,560

tim's going to head out to the outboard

224

00:07:38,230 --> 00:07:37,280

side of the columbus module and retrieve

225

00:07:40,629 --> 00:07:38,240

the

226
00:07:41,909 --> 00:07:40,639
el wapa lw apa payload that's been out

227
00:07:43,909 --> 00:07:41,919
there for a while they need to get that

228
00:07:45,830 --> 00:07:43,919
back he'll get to ride the robot arm out

229
00:07:47,909 --> 00:07:45,840
to the payload bay and install that and

230
00:07:50,469 --> 00:07:47,919
then come back and clean up from there

231
00:07:52,710 --> 00:07:50,479
tim will do further work on the

232
00:07:54,070 --> 00:07:52,720
special purpose dexter's manipulator

233
00:07:56,070 --> 00:07:54,080
putting working with the camera

234
00:07:58,390 --> 00:07:56,080
stanchions and putting lens covers on it

235
00:07:59,990 --> 00:07:58,400
and meantime i'll be out working up on

236
00:08:05,350 --> 00:08:00,000
the

237
00:08:07,589 --> 00:08:05,360
so i'll get that back off of that and

238
00:08:10,230 --> 00:08:07,599

bag it up i'll continue to clean up from

239

00:08:12,629 --> 00:08:10,240

the stage eva that doug wheelock and

240

00:08:14,710 --> 00:08:12,639

tracy caldwell dyson did they left some

241

00:08:16,230 --> 00:08:14,720

bags out there on the front part of the

242

00:08:18,150 --> 00:08:16,240

mobile service system

243

00:08:19,830 --> 00:08:18,160

i'll get those bagged up as well and get

244

00:08:22,710 --> 00:08:19,840

ready to bring those back

245

00:08:25,110 --> 00:08:22,720

finally i'll head over to the

246

00:08:26,950 --> 00:08:25,120

starboard side and install a work light

247

00:08:28,230 --> 00:08:26,960

it's called a cedar light to light up

248

00:08:30,150 --> 00:08:28,240

the interior of the truss for internal

249

00:08:31,510 --> 00:08:30,160

maintenance and then we'll get rid of

250

00:08:32,949 --> 00:08:31,520

some of the

251

00:08:34,389 --> 00:08:32,959

insulation outside on the outside of

252

00:08:36,230 --> 00:08:34,399

node three

253

00:08:38,070 --> 00:08:36,240

and then we'll tim and i will tag back

254

00:08:39,750 --> 00:08:38,080

up towards the end of the mission there

255

00:08:40,870 --> 00:08:39,760

and uh and get ready to head back in

256

00:08:43,670 --> 00:08:40,880

since i missed something else you had

257

00:08:46,550 --> 00:08:45,110

oh and last but not least of course we

258

00:08:48,230 --> 00:08:46,560

have a japanese payload it's called

259

00:08:49,750 --> 00:08:48,240

message in a bottle where we're going to

260

00:08:55,590 --> 00:08:49,760

capture some of the vacuum of space to

261

00:08:59,509 --> 00:08:57,030

hi i'm jim siegel i'm with the

262

00:09:02,389 --> 00:08:59,519

celebration independent newspaper and

263

00:09:04,710 --> 00:09:02,399

this being the last voyage of discovery

264

00:09:07,190 --> 00:09:04,720

i wondered if you had any special events

265

00:09:09,430 --> 00:09:07,200

or ceremonies planned while you're

266

00:09:12,070 --> 00:09:09,440

up in space or are you bringing any

267

00:09:15,190 --> 00:09:12,080

special mementos with you to commemorate

268

00:09:15,200 --> 00:09:19,430

or is it a surprise

269

00:09:23,350 --> 00:09:21,350

well i don't think you can take the

270

00:09:25,030 --> 00:09:23,360

final voyage of a ship of exploration

271

00:09:27,430 --> 00:09:25,040

and not take some moments to celebrate

272

00:09:29,190 --> 00:09:27,440

its history and i think many people know

273

00:09:31,990 --> 00:09:29,200

that our ship discovery which is a ship

274

00:09:34,070 --> 00:09:32,000

of exploration was named after several

275

00:09:36,389 --> 00:09:34,080

predecessor ships also named discovery

276

00:09:38,070 --> 00:09:36,399

all ships of exploration so it's a

277

00:09:39,750 --> 00:09:38,080

culmination of a great heritage really

278

00:09:41,110 --> 00:09:39,760

and we hope there are future ships

279

00:09:44,310 --> 00:09:41,120

bearing that name

280

00:09:46,150 --> 00:09:44,320

uh we will be carrying a medallion from

281

00:09:47,990 --> 00:09:46,160

the royal society that was struck in

282

00:09:49,350 --> 00:09:48,000

honor of captain cook

283

00:09:50,550 --> 00:09:49,360

and uh we'll be doing a little

284

00:09:55,269 --> 00:09:50,560

commemorative

285

00:09:57,110 --> 00:09:55,279

and uh on cook's third voyage there was

286

00:09:59,030 --> 00:09:57,120

a ship called discovery and uh that's

287

00:10:01,110 --> 00:09:59,040

the main ship for which our ship

288

00:10:02,710 --> 00:10:01,120

discovery uh took its name

289

00:10:04,389 --> 00:10:02,720

and we'll be doing a few other tape

290

00:10:06,949 --> 00:10:04,399

commemoratives on it as well

291

00:10:08,790 --> 00:10:06,959

but again you cannot not celebrate the

292

00:10:10,470 --> 00:10:08,800

history and the heritage of this ship

293

00:10:12,230 --> 00:10:10,480

and we plan to continue that certainly

294

00:10:15,670 --> 00:10:12,240

after we land

295

00:10:17,670 --> 00:10:15,680

great and uh second question um

296

00:10:19,430 --> 00:10:17,680

this is this being the last voyage again

297

00:10:22,230 --> 00:10:19,440

when you return to earth are you going

298

00:10:25,509 --> 00:10:22,240

to be doing anything special to

299

00:10:27,910 --> 00:10:25,519

to button it up to prepare for

300

00:10:29,590 --> 00:10:27,920

you know whatever for storage uh

301

00:10:31,509 --> 00:10:29,600

anything special compared to other

302

00:10:33,829 --> 00:10:31,519

flights that you might have been on

303

00:10:36,150 --> 00:10:33,839

um we're probably not the best ones to

304

00:10:38,710 --> 00:10:36,160

be able to answer that question uh the

305

00:10:39,590 --> 00:10:38,720

way the way it works is uh kennedy space

306

00:10:41,670 --> 00:10:39,600

center

307

00:10:43,829 --> 00:10:41,680

basically gives us the vehicle at launch

308

00:10:45,430 --> 00:10:43,839

and we only get it while we're on orbit

309

00:10:46,949 --> 00:10:45,440

and as soon as we wheel stop it goes

310

00:10:48,389 --> 00:10:46,959

back to kennedy space center and they

311

00:10:50,150 --> 00:10:48,399

own it again so we're just borrowing it

312

00:10:52,150 --> 00:10:50,160

from them but after it lands they're

313

00:10:54,710 --> 00:10:52,160

gonna have to go through some processing

314

00:10:56,230 --> 00:10:54,720

uh to to safe all the systems to get all

315

00:10:57,750 --> 00:10:56,240

the hazardous chemicals off and all

316

00:10:59,670 --> 00:10:57,760

those sorts of things and they're gonna

317

00:11:01,910 --> 00:10:59,680

do some additional preparations but the

318

00:11:05,269 --> 00:11:01,920

the plan for discovery right now the

319

00:11:08,949 --> 00:11:07,670

museum has laid claim to discovery and

320

00:11:10,870 --> 00:11:08,959

as i understand it that's where it's

321

00:11:12,389 --> 00:11:10,880

going to head

322

00:11:14,949 --> 00:11:12,399

and so they have to do some preparations

323

00:11:16,710 --> 00:11:14,959

i have to put it back on the 747 carrier

324

00:11:19,350 --> 00:11:16,720

aircraft to bring it there and but as

325

00:11:20,790 --> 00:11:19,360

far as all of the detailed

326

00:11:22,389 --> 00:11:20,800

preparations are going to happen i'm not

327

00:11:30,630 --> 00:11:22,399

familiar with exactly what all those are

328

00:11:35,430 --> 00:11:33,430

hi dan billow from wesh tv a question

329

00:11:37,430 --> 00:11:35,440

for nicole you mentioned your experience

330

00:11:39,110 --> 00:11:37,440

here at the kennedy space center

331

00:11:40,550 --> 00:11:39,120

and uh

332

00:11:43,190 --> 00:11:40,560

you're obviously aware that a lot of

333

00:11:45,190 --> 00:11:43,200

people are getting laid off

334

00:11:47,110 --> 00:11:45,200

can you just give me your perspective on

335

00:11:49,030 --> 00:11:47,120

that your thoughts on on that as far as

336

00:11:50,870 --> 00:11:49,040

the end maybe from a perspective of

337

00:11:52,069 --> 00:11:50,880

someone who knows the people here so

338

00:11:55,750 --> 00:11:52,079

well

339

00:11:57,430 --> 00:11:55,760

you can't answer that question without

340

00:11:59,670 --> 00:11:57,440

the word sad coming to mind i think it

341

00:12:02,389 --> 00:11:59,680

is certainly going to be a

342

00:12:03,750 --> 00:12:02,399

you know a sad time we've already seen

343

00:12:05,350 --> 00:12:03,760

quite a few people

344

00:12:06,790 --> 00:12:05,360

walk out the door

345

00:12:08,230 --> 00:12:06,800

we've had the chance to come down here

346

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

and visit

347

00:12:11,110 --> 00:12:10,160

several times throughout our training

348

00:12:13,269 --> 00:12:11,120

flow

349

00:12:15,030 --> 00:12:13,279

and i think what impresses me the most

350

00:12:16,389 --> 00:12:15,040

is the spirit

351

00:12:18,069 --> 00:12:16,399

that is here with these people and it's

352

00:12:20,389 --> 00:12:18,079

been here forever i mean this is

353

00:12:22,389 --> 00:12:20,399

definitely one of these places where

354

00:12:24,550 --> 00:12:22,399

people come to work because it's a heart

355

00:12:27,829 --> 00:12:24,560

and soul thing it's not just

356

00:12:30,550 --> 00:12:27,839

a job for them and you see that in every

357

00:12:31,590 --> 00:12:30,560

aspect of the work that goes on here and

358

00:12:34,310 --> 00:12:31,600

we are

359

00:12:37,190 --> 00:12:34,320

truly thankful for that and i think it

360

00:12:39,750 --> 00:12:37,200

gives us confidence in the vehicle and

361

00:12:40,870 --> 00:12:39,760

and the workforce and uh in the mission

362

00:12:43,910 --> 00:12:40,880

that we're going to fly and know that

363

00:12:46,230 --> 00:12:43,920

we'll have success because of them

364

00:12:48,310 --> 00:12:46,240

and i and i think you know it's it's

365

00:12:51,670 --> 00:12:48,320

just really nice to see

366

00:12:53,269 --> 00:12:51,680

uh when when we go out to a facility

367

00:12:54,710 --> 00:12:53,279

knowing that

368

00:12:57,110 --> 00:12:54,720

some of these very special people are

369

00:12:59,670 --> 00:12:57,120

going to be leaving and to still to talk

370

00:13:01,829 --> 00:12:59,680

to them and feel their excitement about

371

00:13:04,069 --> 00:13:01,839

the participation and the opportunity

372

00:13:06,150 --> 00:13:04,079

that they've had to work on this

373

00:13:08,389 --> 00:13:06,160

magnificent program i mean you know look

374

00:13:10,310 --> 00:13:08,399

at the vehicle behind us you cannot

375

00:13:11,990 --> 00:13:10,320

be anything but impressed by what you

376

00:13:13,269 --> 00:13:12,000

see here both in the hardware and the

377

00:13:15,750 --> 00:13:13,279

people so

378

00:13:16,949 --> 00:13:15,760

um yes sad but it's it's really nice to

379

00:13:18,870 --> 00:13:16,959

see the uh

380

00:13:24,949 --> 00:13:18,880

um the the real spirit that comes from

381

00:13:29,430 --> 00:13:26,629

kevin oliver with wftv another question

382

00:13:31,030 --> 00:13:29,440

for nicole before the atlantis had the

383

00:13:33,190 --> 00:13:31,040

extra mission you were scheduled to be

384

00:13:34,790 --> 00:13:33,200

the last female to ride on a space

385

00:13:37,269 --> 00:13:34,800

shuttle does that distinction carry

386

00:13:38,629 --> 00:13:37,279

anything to you i mean anything

387

00:13:41,430 --> 00:13:38,639

well for me personally it's really nice

388

00:13:43,829 --> 00:13:41,440

to have the opportunity to uh to fly

389

00:13:44,870 --> 00:13:43,839

again on the shuttle i um

390

00:13:46,230 --> 00:13:44,880

you know i'd like to think that we're

391

00:13:47,990 --> 00:13:46,240

not really looking at it that way

392

00:13:50,790 --> 00:13:48,000

anymore in terms of you know women

393

00:13:53,590 --> 00:13:50,800

flying or men flying it's um you know we

394

00:13:56,150 --> 00:13:53,600

work as a really nicely integrated crew

395

00:13:57,350 --> 00:13:56,160

and for me it's it's personally nice to

396

00:14:01,670 --> 00:13:57,360

know that

397

00:14:03,829 --> 00:14:01,680

i don't feel that as as a distinction

398

00:14:06,230 --> 00:14:03,839

i hope that that what we do with these

399

00:14:08,310 --> 00:14:06,240

final missions is celebrate this program

400

00:14:10,389 --> 00:14:08,320

and and the vehicles and you know kind

401

00:14:12,550 --> 00:14:10,399

of instead of looking at um

402

00:14:15,430 --> 00:14:12,560

you know individuals uh and their last

403

00:14:17,350 --> 00:14:15,440

opportunity to fly on it

404

00:14:19,269 --> 00:14:17,360

hi michelle spitzer with florida today

405

00:14:21,189 --> 00:14:19,279

nicole you can keep the mic

406

00:14:23,509 --> 00:14:21,199

we're coming up on the 10th anniversary

407

00:14:25,189 --> 00:14:23,519

of the iss being continuously occupied i

408

00:14:26,870 --> 00:14:25,199

know you spent some time up there can

409

00:14:28,949 --> 00:14:26,880

you talk about what was the hardest

410

00:14:30,949 --> 00:14:28,959

adjustment for you to life up there was

411

00:14:32,629 --> 00:14:30,959

it eating sleeping communicating with

412

00:14:33,750 --> 00:14:32,639

family

413

00:14:35,670 --> 00:14:33,760

you know

414

00:14:38,230 --> 00:14:35,680

everything about

415

00:14:40,550 --> 00:14:38,240

the station experience for me was better

416

00:14:42,470 --> 00:14:40,560

than i expected it to be and i had

417

00:14:43,670 --> 00:14:42,480

very high expectations of what it was

418

00:14:45,430 --> 00:14:43,680

going to be like

419

00:14:47,430 --> 00:14:45,440

and there's a couple other guys here who

420

00:14:48,230 --> 00:14:47,440

could speak to this as well but

421

00:14:50,069 --> 00:14:48,240

um

422

00:14:52,150 --> 00:14:50,079

i think ultimately the most difficult

423

00:14:53,750 --> 00:14:52,160

thing is just not having your family

424

00:14:55,670 --> 00:14:53,760

there i mean

425

00:14:57,350 --> 00:14:55,680

that was it although our communications

426

00:14:58,870 --> 00:14:57,360

that we have set up there now are really

427

00:15:00,550 --> 00:14:58,880

wonderful you can call down on

428

00:15:02,550 --> 00:15:00,560

essentially on a phone to talk to your

429

00:15:05,590 --> 00:15:02,560

family we have video conferences once a

430

00:15:07,509 --> 00:15:05,600

week there's email so there's really an

431

00:15:09,430 --> 00:15:07,519

open line of communication that that

432

00:15:11,269 --> 00:15:09,440

certainly helps

433

00:15:13,430 --> 00:15:11,279

i've always been one that in in these

434

00:15:15,030 --> 00:15:13,440

training uh experiences that we have and

435

00:15:16,949 --> 00:15:15,040

getting ready to fly

436

00:15:17,829 --> 00:15:16,959

there's such cool things that we get to

437

00:15:19,750 --> 00:15:17,839

do

438

00:15:22,389 --> 00:15:19,760

and it could be i think you could use

439

00:15:23,750 --> 00:15:22,399

the word perfect if you could have um

440

00:15:29,590 --> 00:15:23,760

those special people in your life

441

00:15:33,430 --> 00:15:31,110

open question for any of the crew i'm

442

00:15:35,030 --> 00:15:33,440

mark raderon from talking space and my

443

00:15:36,550 --> 00:15:35,040

question is about how you do the

444

00:15:38,389 --> 00:15:36,560

impossible

445

00:15:40,389 --> 00:15:38,399

if a friend or a neighbor may be a

446

00:15:42,389 --> 00:15:40,399

student in school or university

447

00:15:44,790 --> 00:15:42,399

ask how to move beyond what seems

448

00:15:47,189 --> 00:15:44,800

difficult or impossible from your

449

00:15:49,110 --> 00:15:47,199

experience and success

450

00:15:50,230 --> 00:15:49,120

your education training what advice

451
00:15:52,710 --> 00:15:50,240
would you give

452
00:15:53,990 --> 00:15:52,720
how do you do the impossible

453
00:15:55,189 --> 00:15:54,000
that's that's a really good question you

454
00:15:56,550 --> 00:15:55,199
know really

455
00:15:58,069 --> 00:15:56,560
i think we don't look at this as the

456
00:15:59,590 --> 00:15:58,079
impossible because the way we've trained

457
00:16:00,550 --> 00:15:59,600
and everything else and and that's kind

458
00:16:01,749 --> 00:16:00,560
of the

459
00:16:03,189 --> 00:16:01,759
things out in life that look like

460
00:16:04,710 --> 00:16:03,199
impossible you do them one step at a

461
00:16:06,310 --> 00:16:04,720
time you know you kind of set your goals

462
00:16:08,230 --> 00:16:06,320
you kind of look at the big picture see

463
00:16:10,150 --> 00:16:08,240

how things that you want to do and then

464

00:16:11,350 --> 00:16:10,160

you just attack those problems day in

465

00:16:12,550 --> 00:16:11,360

and day out and i think that's probably

466

00:16:14,310 --> 00:16:12,560

the hardest things is that every day you

467

00:16:15,749 --> 00:16:14,320

got to get up and do your best and as

468

00:16:17,110 --> 00:16:15,759

you keep doing that especially with the

469

00:16:18,710 --> 00:16:17,120

team you kind of get the synergistic

470

00:16:20,470 --> 00:16:18,720

effect you know one person could do one

471

00:16:21,829 --> 00:16:20,480

thing but you know when you have a group

472

00:16:23,430 --> 00:16:21,839

of people i mean every time we look at

473

00:16:25,269 --> 00:16:23,440

this amazing machine

474

00:16:26,550 --> 00:16:25,279

and you go it's amazing that humans can

475

00:16:28,230 --> 00:16:26,560

build something like that that we can

476

00:16:29,749 --> 00:16:28,240

take this ship up into space and make it

477

00:16:31,509 --> 00:16:29,759

happen and so to me

478

00:16:32,790 --> 00:16:31,519

the thing that really makes that

479

00:16:34,230 --> 00:16:32,800

difference is that we have a whole group

480

00:16:35,829 --> 00:16:34,240

of people that are working together that

481

00:16:37,030 --> 00:16:35,839

are trying to do these hard things and

482

00:16:38,949 --> 00:16:37,040

then they're no longer hard they're not

483

00:16:40,389 --> 00:16:38,959

impossible they become easy so you know

484

00:16:41,509 --> 00:16:40,399

for the people out there trying to do

485

00:16:43,590 --> 00:16:41,519

those things

486

00:16:45,189 --> 00:16:43,600

you know set your your goals high and

487

00:16:50,710 --> 00:16:45,199

keep working hard and you'll get there

488

00:16:56,710 --> 00:16:53,509

and one more question from me for um the

489

00:16:59,749 --> 00:16:56,720

commander or pilot would you mind uh

490

00:17:02,069 --> 00:16:59,759

describing an rtls for me uh go through

491

00:17:04,309 --> 00:17:02,079

it step by step if you would and you

492

00:17:05,990 --> 00:17:04,319

know flying backwards what would that be

493

00:17:07,590 --> 00:17:06,000

like

494

00:17:09,029 --> 00:17:07,600

well it's obviously something we hope

495

00:17:10,549 --> 00:17:09,039

never to have to do and just to kind of

496

00:17:12,470 --> 00:17:10,559

explain in our tls is that for some

497

00:17:14,309 --> 00:17:12,480

reason we normally what would get us

498

00:17:16,870 --> 00:17:14,319

into this it's a return to launch site

499

00:17:18,069 --> 00:17:16,880

uh profile if for some normally what

500

00:17:19,829 --> 00:17:18,079

gets you into this kind of scenario

501
00:17:21,029 --> 00:17:19,839
would be a loss of an engine a main

502
00:17:22,390 --> 00:17:21,039
engine we have the three main engines

503
00:17:23,829 --> 00:17:22,400
plus the solid rocket boosters one of

504
00:17:26,949 --> 00:17:23,839
those main engines failed very early in

505
00:17:29,270 --> 00:17:26,959
flight uh we'd be returning back to

506
00:17:30,950 --> 00:17:29,280
back here at kennedy space center and

507
00:17:32,310 --> 00:17:30,960
basically the profile is a pretty

508
00:17:33,669 --> 00:17:32,320
interesting one you kind of alluded to

509
00:17:35,430 --> 00:17:33,679
it you basically fly up and what we're

510
00:17:36,789 --> 00:17:35,440
trying to do is basically burn out all

511
00:17:38,070 --> 00:17:36,799
the fuel in the tank so that we can

512
00:17:39,350 --> 00:17:38,080
separate from it safely and then

513
00:17:41,430 --> 00:17:39,360

obviously being a profile that we can

514

00:17:43,669 --> 00:17:41,440

come back and land the space shuttle

515

00:17:45,110 --> 00:17:43,679

back here the orbiter back at kennedy

516

00:17:46,390 --> 00:17:45,120

space center so there's definitely a lot

517

00:17:48,390 --> 00:17:46,400

of dynamic

518

00:17:49,909 --> 00:17:48,400

phases of flight it would be a pretty

519

00:17:51,669 --> 00:17:49,919

exciting ride and like i said hopefully

520

00:17:53,270 --> 00:17:51,679

it will be one that we don't have to do

521

00:17:54,630 --> 00:17:53,280

but we're well trained in it it's

522

00:17:56,789 --> 00:17:54,640

amazing the amount of detail that we've

523

00:17:57,990 --> 00:17:56,799

gone into to actually make it happen

524

00:17:59,750 --> 00:17:58,000

there's some interesting parts of the

525

00:18:01,190 --> 00:17:59,760

flight as you're going away from this

526

00:18:02,390 --> 00:18:01,200

you're actually pointing

527

00:18:03,830 --> 00:18:02,400

back towards the site but flying

528

00:18:06,070 --> 00:18:03,840

backwards because we've already built up

529

00:18:08,390 --> 00:18:06,080

so much speed leaving the launch site

530

00:18:09,669 --> 00:18:08,400

and then eventually our velocity turns

531

00:18:11,830 --> 00:18:09,679

around and we start flying back towards

532

00:18:13,350 --> 00:18:11,840

the launch site again all the timing is

533

00:18:15,270 --> 00:18:13,360

working to get the external tank empty

534

00:18:17,110 --> 00:18:15,280

so that we can separate from it and then

535

00:18:18,310 --> 00:18:17,120

we come back into land stevie anything

536

00:18:20,549 --> 00:18:18,320

dan

537

00:18:22,390 --> 00:18:20,559

yeah i would say the uh the thing that's

538

00:18:24,150 --> 00:18:22,400

the most unique about it is as eric

539

00:18:25,510 --> 00:18:24,160

mentioned was the um

540

00:18:27,830 --> 00:18:25,520

was a part where you're where you're

541

00:18:29,270 --> 00:18:27,840

you're essentially flying backwards uh

542

00:18:30,789 --> 00:18:29,280

you're you're well out of the atmosphere

543

00:18:33,029 --> 00:18:30,799

so you're not really flying into your

544

00:18:35,270 --> 00:18:33,039

plume per se but you're flying backwards

545

00:18:37,029 --> 00:18:35,280

and as you slow as your as your relative

546

00:18:38,950 --> 00:18:37,039

velocity to the launch site gets slower

547

00:18:40,310 --> 00:18:38,960

and slower and slower

548

00:18:41,750 --> 00:18:40,320

you're continually dropping the whole

549

00:18:43,990 --> 00:18:41,760

time you eventually reach a point which

550

00:18:45,669 --> 00:18:44,000

we call v-rail or relative velocity of

551

00:18:48,549 --> 00:18:45,679

zero where you're actually dropping

552

00:18:51,750 --> 00:18:48,559

straight down at about

553

00:18:52,870 --> 00:18:51,760

yeah almost a thousand feet per second

554

00:18:54,390 --> 00:18:52,880

so you're dropping straight down and

555

00:18:56,310 --> 00:18:54,400

then eventually you thrust out of this

556

00:18:58,549 --> 00:18:56,320

and you start climbing and climbing and

557

00:19:00,150 --> 00:18:58,559

we usually hit about mach six and a half

558

00:19:01,830 --> 00:19:00,160

or something like that right when the

559

00:19:03,590 --> 00:19:01,840

engine's cut off with the tank empty as

560

00:19:05,590 --> 00:19:03,600

eric mentioned because the most critical

561

00:19:06,870 --> 00:19:05,600

part of that is making sure we separate

562

00:19:08,950 --> 00:19:06,880

with an empty tank so we don't

563

00:19:10,390 --> 00:19:08,960

re-contact with the tank once you do

564

00:19:12,549 --> 00:19:10,400

that and you're off the tank

565

00:19:14,150 --> 00:19:12,559

successfully then you kind of hit a

566

00:19:15,430 --> 00:19:14,160

standard profile coming in to enter and

567

00:19:17,350 --> 00:19:15,440

when you come in and land just like we

568

00:19:19,669 --> 00:19:17,360

would on a on a regular flight so it's

569

00:19:21,590 --> 00:19:19,679

very dynamic it's a certified flight

570

00:19:23,590 --> 00:19:21,600

mode which means uh the vehicle is

571

00:19:26,549 --> 00:19:23,600

certified to do this if we were ever to

572

00:19:29,029 --> 00:19:26,559

need to and hopefully we never will

573

00:19:32,390 --> 00:19:29,039

and just quickly are you heads up at v

574

00:19:34,070 --> 00:19:32,400

rel yes yeah you stay uh

575

00:19:35,510 --> 00:19:34,080

you're essentially your head's down as

576

00:19:36,310 --> 00:19:35,520

we go out over the water we're heads

577

00:19:39,029 --> 00:19:36,320

down

578

00:19:41,029 --> 00:19:39,039

and uh in this rtls once once we declare

579

00:19:42,789 --> 00:19:41,039

it it gets it goes to what it does is

580

00:19:44,630 --> 00:19:42,799

we're still thrusting away

581

00:19:45,990 --> 00:19:44,640

and and the system is calculating how

582

00:19:47,830 --> 00:19:46,000

much fuel

583

00:19:49,750 --> 00:19:47,840

at what how much percentage of fuel

584

00:19:51,669 --> 00:19:49,760

remaining we should pitch back and start

585

00:19:52,950 --> 00:19:51,679

thrusting back and once we hit that

586

00:19:54,710 --> 00:19:52,960

place it's called powered pitch around

587

00:19:57,830 --> 00:19:54,720

the vehicle actually pitches over the

588

00:19:58,950 --> 00:19:57,840

top so now we're heads up heading back

589

00:20:00,230 --> 00:19:58,960

even though we're flying backwards

590

00:20:01,990 --> 00:20:00,240

that's how it works

591

00:20:04,070 --> 00:20:02,000

that sounds like a piece of cake

592

00:20:05,350 --> 00:20:04,080

escape i really don't even know how to

593

00:20:07,270 --> 00:20:05,360

follow that question let me ask this one

594

00:20:08,950 --> 00:20:07,280

though for the commander um

595

00:20:10,870 --> 00:20:08,960

you guys originally had a very different

596

00:20:12,870 --> 00:20:10,880

flight uh you were going to be the last

597

00:20:14,470 --> 00:20:12,880

mission in the program and then

598

00:20:16,230 --> 00:20:14,480

for no fault of anyone's it ended up

599

00:20:17,270 --> 00:20:16,240

being the next the next the last flight

600

00:20:19,190 --> 00:20:17,280

in the program how did that affect

601
00:20:20,789 --> 00:20:19,200
training and how difficult was it to

602
00:20:23,750 --> 00:20:20,799
shift gears like that kind of in mid

603
00:20:24,470 --> 00:20:23,760
flow to get ready for this flight um

604
00:20:26,549 --> 00:20:24,480
well

605
00:20:28,950 --> 00:20:26,559
as uh i think tim mentioned we started

606
00:20:31,190 --> 00:20:28,960
out as an eight-day mission with no evas

607
00:20:33,190 --> 00:20:31,200
our our objective in a nutshell at that

608
00:20:35,270 --> 00:20:33,200
point was we're still going to carry the

609
00:20:38,070 --> 00:20:35,280
the permanent multi-purpose module we're

610
00:20:39,990 --> 00:20:38,080
going to carry the elc up and uh our job

611
00:20:41,990 --> 00:20:40,000
was to outfit station and leave space

612
00:20:44,070 --> 00:20:42,000
station the best possible configuration

613
00:20:45,909 --> 00:20:44,080

for after we left logistically and that

614

00:20:50,070 --> 00:20:45,919

was our whole mission uh

615

00:20:52,230 --> 00:20:50,080

the we had uh the ams flight uh magnetic

616

00:20:53,990 --> 00:20:52,240

alpha magnetic spectrometer flight got

617

00:20:55,669 --> 00:20:54,000

the payload got delayed so they moved

618

00:20:57,190 --> 00:20:55,679

out past us and then there now there's

619

00:21:00,310 --> 00:20:57,200

uh the authorization bill at least is

620

00:21:01,830 --> 00:21:00,320

authorized a final flight um so for as

621

00:21:03,990 --> 00:21:01,840

far as our preparations go we actually

622

00:21:05,510 --> 00:21:04,000

took a launch slip uh because of some of

623

00:21:07,750 --> 00:21:05,520

the changes going on and spreading out

624

00:21:10,230 --> 00:21:07,760

the flights a little bit um and then we

625

00:21:11,909 --> 00:21:10,240

added the two space walks so the last

626
00:21:13,750 --> 00:21:11,919
cup two three months have gotten a lot

627
00:21:15,990 --> 00:21:13,760
busier uh as we had to add in these

628
00:21:18,070 --> 00:21:16,000
spacewalks we didn't plan to train for

629
00:21:19,750 --> 00:21:18,080
um but all in all we've been able to

630
00:21:21,830 --> 00:21:19,760
keep a pretty consistent schedule and as

631
00:21:23,270 --> 00:21:21,840
far as as a crew getting ready to do a

632
00:21:25,350 --> 00:21:23,280
different mission

633
00:21:27,909 --> 00:21:25,360
really not a big deal for us

634
00:21:30,310 --> 00:21:27,919
you know you expect changes late things

635
00:21:32,630 --> 00:21:30,320
change on space station we're trained to

636
00:21:35,270 --> 00:21:32,640
to to deal with those changes we even

637
00:21:36,630 --> 00:21:35,280
uh specifically train more skills based

638
00:21:38,710 --> 00:21:36,640

these days than we used to we used to

639

00:21:40,149 --> 00:21:38,720

train more task-based and through all

640

00:21:42,070 --> 00:21:40,159

the skills-based training that we've

641

00:21:44,710 --> 00:21:42,080

done particularly in the eva area we're

642

00:21:47,029 --> 00:21:44,720

able to adapt to late changes and and

643

00:21:48,710 --> 00:21:47,039

handle that in our flow so for from a

644

00:21:52,390 --> 00:21:48,720

preparation standpoint it really hasn't

645

00:21:53,830 --> 00:21:52,400

been uh been that big of a deal

646

00:21:55,590 --> 00:21:53,840

that's all the time for questions we

647

00:21:57,190 --> 00:21:55,600

have if we please have the crew stand