



1  
00:00:07,749 --> 00:00:05,430  
view here of the hatch opening on the

2  
00:00:09,270 --> 00:00:07,759  
quest airlock

3  
00:00:11,270 --> 00:00:09,280  
reminder again that the spacewalk

4  
00:00:29,189 --> 00:00:11,280  
doesn't officially start until the crew

5  
00:00:32,630 --> 00:00:30,390  
gentlemen the weather's beautiful

6  
00:00:36,150 --> 00:00:32,640  
outside it's a great day for an eva

7  
00:00:37,590 --> 00:00:36,160  
we're complete with the uh

8  
00:00:38,709 --> 00:00:37,600  
patches open

9  
00:00:41,830 --> 00:00:38,719  
okay i'm going to hand you over to

10  
00:00:45,350 --> 00:00:41,840  
dottie for the post press

11  
00:00:47,430 --> 00:00:45,360  
guys thank you good job

12  
00:00:49,590 --> 00:00:47,440  
rick and clay this is daddy how do you

13  
00:00:51,590 --> 00:00:49,600

hear me daddy loud and clear loud and

14

00:00:52,790 --> 00:00:51,600

clear dot

15

00:00:55,910 --> 00:00:52,800

awesome

16

00:01:02,790 --> 00:00:59,830

we're in the post and

17

00:01:05,189 --> 00:01:02,800

we're gonna take our on our dcm

18

00:01:09,190 --> 00:01:05,199

take switch power to battery stagger the

19

00:01:11,190 --> 00:01:09,200

switch throws and expect a warning tone

20

00:01:13,270 --> 00:01:11,200

if you move forward a little bit yeah

21

00:01:14,710 --> 00:01:13,280

hold on this is used

22

00:01:19,350 --> 00:01:14,720

yeah when i get out you'll have a lot

23

00:01:22,390 --> 00:01:20,630

there we go

24

00:01:23,990 --> 00:01:22,400

thank you

25

00:01:26,230 --> 00:01:24,000

mission specialist rick mastracchio here

26  
00:01:27,670 --> 00:01:26,240  
making his way outside and the space

27  
00:01:29,749 --> 00:01:27,680  
suit marked with a red stripe to

28  
00:01:31,350 --> 00:01:29,759  
designate his status as the lead space

29  
00:01:32,390 --> 00:01:31,360  
walker for the mission

30  
00:01:33,510 --> 00:01:32,400  
all right

31  
00:01:34,469 --> 00:01:33,520  
then

32  
00:01:36,069 --> 00:01:34,479  
rick

33  
00:01:37,429 --> 00:01:36,079  
you're going to

34  
00:01:40,069 --> 00:01:37,439  
exit

35  
00:02:01,270 --> 00:01:40,079  
and attach your safety to the aft

36  
00:02:04,709 --> 00:02:02,789  
mission specialist clay anderson making

37  
00:02:06,950 --> 00:02:04,719  
his way still back to the shuttle's

38  
00:02:09,830 --> 00:02:06,960

cargo bay while mission specialist rick

39

00:02:11,589 --> 00:02:09,840

mastracchio works to begin releasing the

40

00:02:13,270 --> 00:02:11,599

bolts that were required to get the

41

00:02:33,110 --> 00:02:13,280

ammonia tank assembly out of the cargo

42

00:02:37,670 --> 00:02:35,110

you hear from anderson's helmet camera

43

00:02:39,589 --> 00:02:37,680

as he makes his way back into the

44

00:02:40,869 --> 00:02:39,599

shuttle's cargo bay over the pressurized

45

00:02:42,309 --> 00:02:40,879

mating adapter where the shuttle's

46

00:02:44,070 --> 00:02:42,319

docked to the station

47

00:02:46,070 --> 00:02:44,080

he'll be installing once he gets to the

48

00:02:47,670 --> 00:02:46,080

ammonium tank assembly a uh foot

49

00:02:49,670 --> 00:02:47,680

restraint on the

50

00:02:52,309 --> 00:02:49,680

lightweight mission peculiar equipment

51  
00:02:54,710 --> 00:02:52,319  
support structure carrier which the

52  
00:02:56,150 --> 00:02:54,720  
ammonia tank was carried into space on

53  
00:03:00,149 --> 00:02:56,160  
that'll give him the reach he needs to

54  
00:03:03,270 --> 00:03:00,159  
get to the bolt that he'll be releasing

55  
00:03:09,030 --> 00:03:05,190  
we are we're set up with cameras for

56  
00:03:17,670 --> 00:03:13,910  
okay daddy i'm at the o.d.s handrail

57  
00:03:19,110 --> 00:03:17,680  
okay you want to fairlead here

58  
00:03:25,350 --> 00:03:19,120  
using your other

59  
00:03:28,869 --> 00:03:26,949  
you can just make out here admission

60  
00:03:31,030 --> 00:03:28,879  
specialist rick mastracchio at the

61  
00:03:33,430 --> 00:03:31,040  
bottom center of the screen and at the

62  
00:03:35,830 --> 00:03:33,440  
top right hand corner the

63  
00:03:37,509 --> 00:03:35,840

station's robotic arm ready to be called

64

00:03:39,190 --> 00:03:37,519

into service to move the ammonia tank

65

00:03:41,589 --> 00:03:39,200

assembly out of the shuttle's cargo bay

66

00:03:43,830 --> 00:03:41,599

once they get all the bolts

67

00:03:49,830 --> 00:03:43,840

released

68

00:03:51,990 --> 00:03:49,840

he installed the fixed grapple bar the

69

00:03:54,149 --> 00:03:52,000

handle for the robotic arm and just

70

00:04:03,270 --> 00:03:54,159

released the second that leaves two to

71

00:04:06,309 --> 00:04:04,309

one minute

72

00:04:09,990 --> 00:04:06,319

an hour and a half in today's six and a

73

00:04:20,150 --> 00:04:12,630

and three days 20 hours and 39 minutes

74

00:04:27,110 --> 00:04:23,030

hey daddy it's my next task to break the

75

00:04:32,230 --> 00:04:30,870

uh your next test is actually full too

76

00:04:33,189 --> 00:04:32,240

really

77

00:04:35,189 --> 00:04:33,199

yes

78

00:04:36,870 --> 00:04:35,199

okay

79

00:04:38,469 --> 00:04:36,880

you hear from cameras on the exterior of

80

00:04:40,230 --> 00:04:38,479

the space station you can see mission

81

00:04:41,430 --> 00:04:40,240

specialist clay anderson making his way

82

00:04:43,189 --> 00:04:41,440

along the

83

00:04:44,870 --> 00:04:43,199

sill of the shuttle's cargo bay towards

84

00:04:45,909 --> 00:04:44,880

the back where the ammonite assembly

85

00:04:48,150 --> 00:04:45,919

waits

86

00:04:50,150 --> 00:04:48,160

and he has all those ratchets so

87

00:04:52,310 --> 00:04:50,160

we'll just stand by

88

00:04:54,150 --> 00:04:52,320

quickly you're clear you can come down

89

00:05:07,189 --> 00:04:54,160

okay okay you actually got one more to

90

00:05:11,189 --> 00:05:08,950

anderson working to get the foot

91

00:05:13,590 --> 00:05:11,199

restraint installed on the

92

00:05:15,990 --> 00:05:13,600

carrier holding

93

00:05:17,350 --> 00:05:16,000

the ammonia tank assembly

94

00:05:19,430 --> 00:05:17,360

it's called the lightweight mission

95

00:05:20,710 --> 00:05:19,440

peculiar equipment support structure

96

00:05:22,710 --> 00:05:20,720

carrier

97

00:05:28,390 --> 00:05:22,720

don't worry about it

98

00:05:46,710 --> 00:05:31,830

it's oscar golf one

99

00:05:50,710 --> 00:05:48,070

once he does get installed that'll give

100

00:05:52,870 --> 00:05:50,720

him the reach he needs to

101  
00:05:54,710 --> 00:05:52,880  
get to bolt number three that's holding

102  
00:05:56,550 --> 00:05:54,720  
the ammonia tank assembly down just that

103  
00:05:59,430 --> 00:05:56,560  
one and bolt number two left to release

104  
00:06:02,710 --> 00:06:01,029  
space shuttle space station's robotic

105  
00:06:06,629 --> 00:06:02,720  
arm will be able to lift it out of the

106  
00:06:10,150 --> 00:06:08,309  
you can see the

107  
00:06:13,110 --> 00:06:10,160  
end of the shuttle's rope at stations or

108  
00:06:16,230 --> 00:06:13,120  
body farm here at the top

109  
00:06:20,550 --> 00:06:16,240  
right hand corner of the screen

110  
00:06:26,629 --> 00:06:22,070  
installed at the beginning of the

111  
00:06:29,189 --> 00:06:27,990  
that's correct

112  
00:06:31,189 --> 00:06:29,199  
okay

113  
00:06:32,790 --> 00:06:31,199

um

114

00:06:34,710 --> 00:06:32,800

probably took about nine or ten turns

115

00:07:08,230 --> 00:06:34,720

i'm guessing

116

00:07:08,240 --> 00:07:18,070

all the white lines are good so far

117

00:07:23,189 --> 00:07:20,390

views from rick mastracchio's camera as

118

00:07:24,469 --> 00:07:23,199

he makes his way to the airlock and

119

00:07:26,150 --> 00:07:24,479

mission specialist clay anderson

120

00:07:27,749 --> 00:07:26,160

meanwhile is making his way to the

121

00:07:30,150 --> 00:07:27,759

harmony node to

122

00:07:49,749 --> 00:07:30,160

stow the foot restraint he used in the

123

00:07:49,759 --> 00:08:08,230

all right another swap spot

124

00:08:08,240 --> 00:08:15,350

i gotta go down

125

00:08:19,670 --> 00:08:17,749

and also you want the fair lead on the

126  
00:08:21,189 --> 00:08:19,680  
esp2 trunnion

127  
00:08:47,269 --> 00:08:21,199  
okay

128  
00:08:47,279 --> 00:08:54,790  
thanks

129  
00:08:58,630 --> 00:08:56,389  
both spacewalkers are going to meet back

130  
00:09:01,030 --> 00:08:58,640  
at the external stowage platform where

131  
00:09:04,949 --> 00:09:01,040  
the robotic arm is waiting

132  
00:09:06,630 --> 00:09:04,959  
to install another handle on the

133  
00:09:08,790 --> 00:09:06,640  
ammonia tank assembly that will be used

134  
00:09:12,710 --> 00:09:08,800  
to attach it to the it's exterior

135  
00:09:34,630 --> 00:09:15,430  
and that's affirmative and you are going

136  
00:09:38,710 --> 00:09:36,389  
view here of the ammonia tech assembly

137  
00:09:42,150 --> 00:09:38,720  
waiting as the

138  
00:09:56,389 --> 00:09:42,160

shuttle in station and two space walkers

139

00:09:56,399 --> 00:10:16,710

here we go

140

00:10:23,030 --> 00:10:19,470

there's 3.8 and uh

141

00:10:25,030 --> 00:10:23,040

4.67 on the tour green light

142

00:10:27,829 --> 00:10:25,040

rick do you want to give it a shake fist

143

00:10:35,190 --> 00:10:27,839

yeah oh you want me to go

144

00:10:42,790 --> 00:10:37,269

oh yeah beautiful

145

00:10:49,269 --> 00:10:44,550

meanwhile the robotics officers are

146

00:10:54,230 --> 00:10:51,269

ammonia tank assembly

147

00:10:56,710 --> 00:10:54,240

from where it was and on the

148

00:10:59,269 --> 00:10:56,720

at the external stowage platform 2 where

149

00:11:01,990 --> 00:10:59,279

the spacewalkers were working with it to

150

00:11:05,190 --> 00:11:02,000

its temporary stowage location on the

151  
00:11:06,949 --> 00:11:05,200  
base of the mobile servicer platform

152  
00:11:08,870 --> 00:11:06,959  
that's the platform that allows the

153  
00:11:10,310 --> 00:11:08,880  
shuttle's robotic arm to move from one

154  
00:11:13,269 --> 00:11:10,320  
location to another on the truss and

155  
00:11:16,630 --> 00:11:14,710  
at the station robotic arm will be

156  
00:11:18,630 --> 00:11:16,640  
moving to following this spacewalk to

157  
00:11:21,030 --> 00:11:18,640  
give it the reach it needs to get

158  
00:11:29,829 --> 00:11:21,040  
the ammonia tank assembly installed in

159  
00:11:32,710 --> 00:11:31,190  
and

160  
00:11:34,949 --> 00:11:32,720  
play when

161  
00:11:48,230 --> 00:11:34,959  
when abel will you give me a glove check

162  
00:11:51,509 --> 00:11:49,750  
as mission specialist dottie metcalf

163  
00:11:53,670 --> 00:11:51,519

lindenberger indicated this is a bit of

164

00:11:55,509 --> 00:11:53,680

a different plan than the spacewalkers

165

00:11:58,389 --> 00:11:55,519

had originally intended to

166

00:12:00,949 --> 00:11:58,399

work through today they were going to do

167

00:12:03,030 --> 00:12:00,959

some work to get the

168

00:12:05,829 --> 00:12:03,040

batteries on the p6 solar array ready

169

00:12:07,750 --> 00:12:05,839

for replacement but instead due to some

170

00:12:09,990 --> 00:12:07,760

concerns about electrical shocks in that

171

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

area the planned activity that plant

172

00:12:14,550 --> 00:12:12,320

activity uh was removed and instead the

173

00:12:17,110 --> 00:12:14,560

crew is going to be working to

174

00:12:19,829 --> 00:12:17,120

in clay's case remove some or loosen

175

00:12:21,509 --> 00:12:19,839

some pea clamps that are on uh holding

176

00:12:34,470 --> 00:12:21,519

down the flex holes rotary coupler on

177

00:12:38,550 --> 00:12:36,790

this is a shot of rick mastracchio he is

178

00:12:39,990 --> 00:12:38,560

the space walker wearing the red stripes

179

00:12:41,910 --> 00:12:40,000

on a spacesuit that you see there on his

180

00:12:43,350 --> 00:12:41,920

legs

181

00:12:49,269 --> 00:12:43,360

clay anderson is the one that has the

182

00:12:53,670 --> 00:12:50,949

he is getting very close to wrapping up

183

00:12:55,509 --> 00:12:53,680

this rate gyro assembly replacement

184

00:13:00,069 --> 00:12:55,519

the team here in houston just got the go

185

00:13:04,069 --> 00:13:01,750

so mastracchio is wrapping up that

186

00:13:05,750 --> 00:13:04,079

activity as we mentioned the crew is

187

00:13:11,030 --> 00:13:05,760

right on the timeline uh this morning

188

00:13:15,910 --> 00:13:12,870

oh i'm sorry go ahead

189

00:13:19,430 --> 00:13:15,920

i'm working vote too

190

00:13:21,990 --> 00:13:20,629

let's see

191

00:13:24,949 --> 00:13:22,000

uh

192

00:13:26,470 --> 00:13:24,959

that's you clay yes okay that's what i

193

00:13:28,470 --> 00:13:26,480

thought but for a second i was like well

194

00:13:31,110 --> 00:13:28,480

there's no numbers on it

195

00:13:32,870 --> 00:13:31,120

okay so you're probably off of like 169

196

00:13:34,629 --> 00:13:32,880

or 168.

197

00:13:35,829 --> 00:13:34,639

well it's actually got label it says

198

00:13:39,590 --> 00:13:35,839

volt 2.

199

00:13:39,600 --> 00:14:41,110

all right well even better

200

00:14:45,350 --> 00:14:42,949

as we look at rick mastracchio's helmet

201  
00:14:47,189 --> 00:14:45,360  
cam view we also received word from the

202  
00:14:48,150 --> 00:14:47,199  
robotics officer here inside mission

203  
00:14:49,829 --> 00:14:48,160  
control

204  
00:14:53,389 --> 00:14:49,839  
that the station's robotic arm has

205  
00:14:55,990 --> 00:14:53,399  
wrapped up its activity for the day

206  
00:14:58,629 --> 00:14:56,000  
sts-131 pilot jim dutton and mission

207  
00:15:00,550 --> 00:14:58,639  
specialist stephanie wilson were at the

208  
00:15:02,949 --> 00:15:00,560  
controls of that arm as it moved the

209  
00:15:04,710 --> 00:15:02,959  
ammonia tank assembly the brand new one

210  
00:15:06,949 --> 00:15:04,720  
that was lifted up out of discovery's

211  
00:15:09,269 --> 00:15:06,959  
payload bay and moved it over to a

212  
00:15:11,269 --> 00:15:09,279  
temporary storage location on the

213  
00:15:13,990 --> 00:15:11,279

station's mobile base structure so that

214

00:15:16,069 --> 00:15:14,000

handoff has occurred and as we mentioned

215

00:15:43,590 --> 00:15:16,079

the robotic arm is

216

00:15:52,829 --> 00:15:48,550

yeah green light uh good torque 13 turns

217

00:15:56,069 --> 00:15:52,839

happy strain light third turns and

218

00:15:58,310 --> 00:15:56,079

uh i just cleared it i'm sorry 31

219

00:16:02,389 --> 00:15:58,320

something maybe

220

00:16:05,269 --> 00:16:03,749

you heard just a few minutes ago that

221

00:16:08,069 --> 00:16:05,279

the ground team here in houston is

222

00:16:10,069 --> 00:16:08,079

reporting that this brand new rate gyro

223

00:16:11,749 --> 00:16:10,079

assembly has been checked out is up and

224

00:16:13,350 --> 00:16:11,759

running as expected

225

00:16:18,470 --> 00:16:13,360

this device is part of the station's

226

00:16:24,150 --> 00:16:21,269

strangio had spent

227

00:16:25,269 --> 00:16:24,160

a sizable portion of today's spacewalk

228

00:16:27,350 --> 00:16:25,279

removing

229

00:16:29,189 --> 00:16:27,360

a failed raid gyro assembly and

230

00:16:31,269 --> 00:16:29,199

installing a brand new one

231

00:16:36,949 --> 00:16:31,279

so that seems to be working

232

00:16:40,389 --> 00:16:38,550

here's a shot of rick mastracchio

233

00:16:42,550 --> 00:16:40,399

outside the international space station

234

00:16:43,749 --> 00:16:42,560

as he works to install this

235

00:16:45,670 --> 00:16:43,759

extender

236

00:16:47,350 --> 00:16:45,680

for a worksite interface this is

237

00:16:49,110 --> 00:16:47,360

basically just an attachment point for

238

00:16:51,110 --> 00:16:49,120

different types of equipment

239

00:16:53,110 --> 00:16:51,120

and restraints and other items that are

240

00:16:55,030 --> 00:16:53,120

needed anytime the astronauts are

241

00:16:56,629 --> 00:16:55,040

outside conducting these spacewalks this

242

00:16:59,509 --> 00:16:56,639

is a get ahead task

243

00:17:08,630 --> 00:16:59,519

in advance of sts-132 which is coming up

244

00:17:08,640 --> 00:17:28,870

oh

245

00:17:28,880 --> 00:17:38,310

and discovery for eda

246

00:17:38,320 --> 00:17:43,110

and that's to keep clear of the sasa

247

00:17:43,120 --> 00:17:47,909

yeah can i do that next one right there

248

00:17:54,870 --> 00:17:50,549

i think it's a great plan

249

00:18:12,830 --> 00:17:56,470

and discovery for daddy the starboard

250

00:18:18,070 --> 00:18:16,230

okay i'll head in and see if i can yeah

251

00:18:19,669 --> 00:18:18,080

go in and i'll uh i'll wait for your

252

00:18:22,950 --> 00:18:19,679

call put those true locks under the

253

00:18:22,960 --> 00:18:28,070

yeah there's seeds in there too okay

254

00:18:31,830 --> 00:18:30,150

dad you might see my waist tether is

255

00:18:33,669 --> 00:18:31,840

locked closed and locked

256

00:18:36,950 --> 00:18:33,679

clay's spaced each other closed and

257

00:18:36,960 --> 00:18:39,830

awesome

258

00:18:48,549 --> 00:18:43,669

okay so um with that

259

00:18:49,990 --> 00:18:48,559

i think you can uh disconnect from him

260

00:18:51,990 --> 00:18:50,000

um

261

00:18:57,029 --> 00:18:52,000

i could just connect my safety feather

262

00:19:02,150 --> 00:18:59,990

i agree i'll just wait for his call

263

00:19:03,029 --> 00:19:02,160

and that bag's big

264

00:19:05,350 --> 00:19:03,039

yes

265

00:19:10,470 --> 00:19:05,360

a lot easier when everything's stable

266

00:19:13,909 --> 00:19:11,750

and uh

267

00:19:16,150 --> 00:19:13,919

you did a double check on your uh hooked

268

00:19:18,950 --> 00:19:16,160

lock and gates closed

269

00:19:20,789 --> 00:19:18,960

i'll double check them

270

00:19:28,230 --> 00:19:20,799

both

271

00:19:28,240 --> 00:19:42,230

ugh

272

00:19:47,190 --> 00:19:44,789

okay they're under the rat or under the

273

00:19:47,200 --> 00:19:53,750

bungie

274

00:20:05,190 --> 00:19:54,549

okay

275

00:20:18,390 --> 00:20:07,830

ready for me come on in

276

00:20:22,630 --> 00:20:19,909

so the crew easing their way into the

277

00:20:24,149 --> 00:20:22,640

quest airlock is a sort of a tight fit

278

00:20:25,510 --> 00:20:24,159

in that hatch

279

00:20:27,830 --> 00:20:25,520

once they get inside they will close

280

00:20:29,590 --> 00:20:27,840

that thermal cover that you see there

281

00:20:31,909 --> 00:20:29,600

as the great lakes region of north

282

00:20:33,430 --> 00:20:31,919

america passes below them

283

00:20:36,630 --> 00:20:33,440

the station in the shuttle currently at

284

00:20:40,549 --> 00:20:36,640

an altitude of 218 miles

285

00:20:41,830 --> 00:20:40,559

continuing to pass to the northeast

286

00:20:43,510 --> 00:20:41,840

once they get inside they will close

287

00:20:45,590 --> 00:20:43,520

that flap which you will see they'll

288

00:20:47,110 --> 00:20:45,600

shut the hatch plug themselves back into

289

00:20:48,630 --> 00:20:47,120

the station's power and communication

290

00:20:50,669 --> 00:20:48,640

supply

291

00:20:53,669 --> 00:20:50,679

the rest of the expedition 23 and

292

00:20:55,750 --> 00:20:53,679

sts-131 crew are eagerly awaiting uh

293

00:20:57,110 --> 00:20:55,760

their return to the station and they

294

00:20:59,029 --> 00:20:57,120

will begin to

295

00:21:01,190 --> 00:20:59,039

repressurize the quest airlock and that

296

00:21:03,510 --> 00:21:01,200

will signal the end of today's spacewalk

297

00:21:06,549 --> 00:21:03,520

right now we're at six hours in 16

298

00:21:09,430 --> 00:21:06,559

minutes and continuing to count

299

00:21:14,070 --> 00:21:11,669

i don't want to be unasked

300

00:21:26,230 --> 00:21:14,080

you wanna yeah abs and high with your

301

00:21:36,390 --> 00:21:27,669

all right let me just get this thermal

302

00:21:40,630 --> 00:21:38,390

all right i show the airlock thermal