



1  
00:00:19,910 --> 00:00:02,300  
hi I'm Steve Lindsey commander of

2  
00:00:24,420 --> 00:00:21,960  
space shuttle Discovery

3  
00:00:26,880 --> 00:00:24,430  
the venerable veteran of America's human

4  
00:00:29,070 --> 00:00:26,890  
spaceflight fleet proudly resting atop

5  
00:00:32,130 --> 00:00:29,080  
launch pad 39a here at NASA's Kennedy

6  
00:00:34,470 --> 00:00:32,140  
Space Center in Florida her wings

7  
00:00:38,390 --> 00:00:34,480  
outstretched and ready to soar into

8  
00:00:41,939 --> 00:00:38,400  
space for the 39th and final time and

9  
00:00:45,840 --> 00:00:41,949  
here we have to prove walking out of

10  
00:00:48,090 --> 00:00:45,850  
quarters this is a very historical

11  
00:00:49,970 --> 00:00:48,100  
walkway it's the same part that the

12  
00:00:52,770 --> 00:00:49,980  
Apollo astronauts took to go to the moon

13  
00:00:54,660 --> 00:00:52,780

and over the last 30 years there's been

14

00:00:56,970 --> 00:00:54,670

a 133 yard

15

00:00:59,670 --> 00:00:56,980

shuttle crews that walked out here to

16

00:01:03,299 --> 00:00:59,680

catch this bus exciting ride out to the

17

00:01:06,810 --> 00:01:03,309

launch pad the crew will step out of the

18

00:01:10,830 --> 00:01:06,820

Astro van and you'll probably see them

19

00:01:14,760 --> 00:01:10,840

step back and look up which is a little

20

00:01:18,240 --> 00:01:14,770

hard to do in the heavy suits that they

21

00:01:20,760 --> 00:01:18,250

have but you get an opportunity to stand

22

00:01:24,600 --> 00:01:20,770

there and see the shuttle from a very

23

00:01:26,280 --> 00:01:24,610

unique perspective the view itself is

24

00:01:27,690 --> 00:01:26,290

spectacular but your perspective is

25

00:01:29,460 --> 00:01:27,700

particularly unique because you know

26

00:01:35,429 --> 00:01:29,470

that it is the ride that's going to take

27

00:01:38,730 --> 00:01:35,439

you out into orbit there you can see the

28

00:01:41,899 --> 00:01:38,740

crew having a group hug and a little

29

00:01:48,039 --> 00:01:41,909

quiet moment for themselves to

30

00:01:57,340 --> 00:01:51,219

wish each other will and then it's back

31

00:02:00,330 --> 00:01:57,350

to work 20 seconds the sound suppression

32

00:02:02,770 --> 00:02:00,340

water system has been activated

33

00:02:07,120 --> 00:02:02,780

protecting discovery and the launch pad

34

00:02:11,400 --> 00:02:07,130

from acoustical energy way go for main

35

00:02:16,990 --> 00:02:11,410

engine start we have main engine start

36

00:02:19,540 --> 00:02:17,000

two one and the final liftoff of

37

00:02:21,759 --> 00:02:19,550

discovery a tribute to the dedication

38

00:02:24,039 --> 00:02:21,769

hard work and pride of America's Space

39

00:02:31,809 --> 00:02:24,049

Shuttle team the shuttle has cleared the

40

00:02:35,920 --> 00:02:33,820

to his back

41

00:02:59,090 --> 00:02:35,930

in orbit discovery now making one last

42

00:03:02,330 --> 00:03:00,530

as Deborah's engines are now throttling

43

00:03:04,010 --> 00:03:02,340

down as the orbiter passes through the

44

00:03:05,660 --> 00:03:04,020

area of maximum pressure reducing the

45

00:03:17,180 --> 00:03:05,670

stress on the shuttle as it goes

46

00:03:27,030 --> 00:03:19,610

discovery Houston you are go at throttle

47

00:03:29,729 --> 00:03:28,229

will commander steve lindsey

48

00:03:31,350 --> 00:03:29,739

acknowledging the call from capcom

49

00:03:36,380 --> 00:03:31,360

Charlie hobaugh as Discovery's three

50

00:03:40,020 --> 00:03:38,399

Lindsay is joined on the flight deck by

51  
00:03:48,149 --> 00:03:40,030  
pilot eric boe and mission specialist

52  
00:03:51,259 --> 00:03:48,159  
algae ruined nicole stott mission

53  
00:03:52,979 --> 00:03:51,269  
specialist mike barratt and steve bowen

54  
00:03:54,180 --> 00:03:52,989  
Discovery's three main engines are

55  
00:03:55,800 --> 00:03:54,190  
burning fuel at a rate that would drain

56  
00:03:58,979 --> 00:03:55,810  
an average swimming pool in about 25

57  
00:04:00,569 --> 00:03:58,989  
seconds the engines combined with the

58  
00:04:04,199 --> 00:04:00,579  
solid rocket boosters produced more than

59  
00:04:05,819 --> 00:04:04,209  
seven million pounds of thrust one

60  
00:04:07,080 --> 00:04:05,829  
minute 50 seconds into the flight we're

61  
00:04:08,940 --> 00:04:07,090  
standing by for separation of the twin

62  
00:04:11,940 --> 00:04:08,950  
solid rocket boosters discovery now

63  
00:04:13,979 --> 00:04:11,950

traveling 2,695 miles an hour it's

64

00:04:28,700 --> 00:04:13,989

altitude twenty four miles downrange

65

00:04:32,820 --> 00:04:31,200

booster separation confirmed Discovery's

66

00:04:34,710 --> 00:04:32,830

guidance is now converging as the

67

00:04:41,670 --> 00:04:34,720

shuttles onboard computers fine-tune the

68

00:04:44,070 --> 00:04:41,680

flight to minutes 25 seconds into the

69

00:04:46,500 --> 00:04:44,080

flight discovery traveling 3,000 189

70

00:04:47,730 --> 00:04:46,510

miles an hour its altitude 37 miles

71

00:05:02,939 --> 00:04:47,740

downrange from the Kennedy Space Center

72

00:05:07,500 --> 00:05:02,949

53 miles great news every time I was

73

00:05:09,029 --> 00:05:07,510

here we've been busy discovery is right

74

00:05:11,879 --> 00:05:09,039

above South America at this point in

75

00:05:13,890 --> 00:05:11,889

time heading to the North East but to

76  
00:05:16,500 --> 00:05:13,900  
cross out over the Atlantic Ocean still

77  
00:05:18,839 --> 00:05:16,510  
trailing back behind the International

78  
00:05:24,480 --> 00:05:18,849  
Space Station now less than 40 miles

79  
00:05:26,040 --> 00:05:24,490  
separating the two spacecraft discovery

80  
00:05:30,170 --> 00:05:26,050  
is heading to a point 600 feet down

81  
00:05:34,500 --> 00:05:32,760  
space shuttle Discovery on its way

82  
00:05:38,159 --> 00:05:34,510  
toward performing this rendezvous pitch

83  
00:05:40,200 --> 00:05:38,169  
maneuver for the final time discovery

84  
00:05:40,920 --> 00:05:40,210  
was the first shuttle to ever do this

85  
00:05:48,480 --> 00:05:40,930  
maneuver

86  
00:05:56,810 --> 00:05:48,490  
back during sts-114 I call initiating

87  
00:06:03,810 --> 00:06:00,090  
SR PM maneuver was created in the wake

88  
00:06:05,400 --> 00:06:03,820

of shuttle Columbia it was put into

89

00:06:08,040 --> 00:06:05,410

every shuttle mission that has visited

90

00:06:11,480 --> 00:06:08,050

the space station since then and it

91

00:06:14,070 --> 00:06:11,490

gives the ground teams here in Houston a

92

00:06:16,020 --> 00:06:14,080

chance to take a look at the shuttle in

93

00:06:19,140 --> 00:06:16,030

detail to make sure that the outer part

94

00:06:26,460 --> 00:06:19,150

of the shuttle and the heat shield is as

95

00:06:29,880 --> 00:06:26,470

they expect it to be discovery putting

96

00:06:32,340 --> 00:06:29,890

on quite a show there as it in the space

97

00:06:33,690 --> 00:06:32,350

station fly over the northeastern part

98

00:06:41,469 --> 00:06:33,700

of South America about to head out over

99

00:06:50,149 --> 00:06:48,589

now just 20 feet away I'm just covered

100

00:06:51,230 --> 00:06:50,159

about to make some history here is it

101  
00:06:53,869 --> 00:06:51,240  
two docks with the International Space

102  
00:06:55,999 --> 00:06:53,879  
Station for the final time this will be

103  
00:06:56,649 --> 00:06:56,009  
the 13th time discovery has visited the

104  
00:06:59,689 --> 00:06:56,659  
station

105  
00:07:03,950 --> 00:06:59,699  
his first knocking ever was mirror back

106  
00:07:05,540 --> 00:07:03,960  
on STS 91 back in June of 98 first time

107  
00:07:21,679 --> 00:07:05,550  
in greeted the space station was on STS

108  
00:07:29,600 --> 00:07:21,689  
96 back in May of 99 docking confirmed

109  
00:07:31,339 --> 00:07:29,610  
in 1:14 p.m. Central Time Discovery has

110  
00:08:29,740 --> 00:07:31,349  
now made its final docking to the

111  
00:08:55,370 --> 00:08:52,730  
well this the next big activity for some

112  
00:08:57,740 --> 00:08:55,380  
of the crew members will be to begin the

113  
00:09:00,320 --> 00:08:57,750

installation of express logistics

114

00:09:03,620 --> 00:09:00,330

carrier 4 on to the Space Station's

115

00:09:06,110 --> 00:09:03,630

trust structure mission specialists Mike

116

00:09:07,790 --> 00:09:06,120

Barrett and nicole stott will be taking

117

00:09:10,790 --> 00:09:07,800

up their station at the controls of

118

00:09:15,200 --> 00:09:10,800

canadarm2 inside the station's cupola

119

00:09:18,110 --> 00:09:15,210

module while eric boe and al drew will

120

00:09:23,550 --> 00:09:18,120

be flying the space shuttle arm from the

121

00:09:30,480 --> 00:09:27,810

Express logistics carrier for now being

122

00:09:33,630 --> 00:09:30,490

held above the shuttle payload Bay by

123

00:09:35,970 --> 00:09:33,640

canadarm2 lifted high enough to have

124

00:09:38,760 --> 00:09:35,980

cleared the OB SS on the starboard sill

125

00:09:41,220 --> 00:09:38,770

as well as the permanent multi-purpose

126

00:09:46,290 --> 00:09:41,230

module in the payload Bay behind it

127

00:09:49,260 --> 00:09:46,300

and this wider perspective shot and see

128

00:09:53,280 --> 00:09:49,270

the shuttle arm poised to begin to move

129

00:09:57,810 --> 00:09:53,290

into a grapple that opened fixture and

130

00:10:01,350 --> 00:09:57,820

you can see the station arm from its

131

00:10:03,180 --> 00:10:01,360

base here on the underside of harmony

132

00:10:06,930 --> 00:10:03,190

module just below and left of the center

133

00:10:09,450 --> 00:10:06,940

in this view holding the ELC out over

134

00:10:13,410 --> 00:10:09,460

the starboard edge of Discovery's

135

00:10:17,820 --> 00:10:13,420

payload Bay and here's a camera view

136

00:10:20,250 --> 00:10:17,830

inside the cupola nicole stott is also

137

00:10:24,450 --> 00:10:20,260

making use of the camera views on the

138

00:10:27,870 --> 00:10:24,460

monitors in front of her as she flies at

139

00:10:28,770 --> 00:10:27,880

Canada arm to to move back into a

140

00:10:32,340 --> 00:10:28,780

regretful

141

00:10:35,130 --> 00:10:32,350

the ELC for this robotics workstation

142

00:10:38,550 --> 00:10:35,140

had previously been installed in the

143

00:10:42,720 --> 00:10:38,560

laboratory and after the delivery of the

144

00:10:46,770 --> 00:10:42,730

cupola was relocated so that shuttle arm

145

00:10:50,190 --> 00:10:46,780

operators in many cases have a direct

146

00:10:54,320 --> 00:10:50,200

eyeball view of the activity of the

147

00:10:58,700 --> 00:10:54,330

robotic arm which they are controlling

148

00:11:01,610 --> 00:10:58,710

now I can see the ELC for in motion

149

00:11:05,970 --> 00:11:01,620

canadarm2 being flown by a nicole stott

150

00:11:08,670 --> 00:11:05,980

now moving the ELC toward it's an

151  
00:11:14,140 --> 00:11:08,680  
installation position on the s3 truss

152  
00:11:20,140 --> 00:11:18,520  
the big was for robotics go ahead yes

153  
00:11:21,970 --> 00:11:20,150  
man I just wanted to thank Mike for

154  
00:11:24,400 --> 00:11:21,980  
being the voice of ELC for up here today

155  
00:11:26,140 --> 00:11:24,410  
and let you guys know how much we

156  
00:11:28,750 --> 00:11:26,150  
appreciate your help and that it was

157  
00:11:31,570 --> 00:11:28,760  
really very impressive working from the

158  
00:11:33,580 --> 00:11:31,580  
cupola and watching out his arms work

159  
00:11:34,980 --> 00:11:33,590  
together and getting ELC birth to the

160  
00:11:37,120 --> 00:11:34,990  
trust

161  
00:11:38,860 --> 00:11:37,130  
thanks those words they call and you

162  
00:11:53,210 --> 00:11:38,870  
guys rock it was wonderful watching you

163  
00:11:58,940 --> 00:11:56,480

okay the class tryout day all right can

164

00:12:00,590 --> 00:11:58,950

you see the cupola yes they can all

165

00:12:02,750 --> 00:12:00,600

right so this is a beautiful place to

166

00:12:03,980 --> 00:12:02,760

work from you'll see we're pointing

167

00:12:06,650 --> 00:12:03,990

towards the earth

168

00:12:08,360 --> 00:12:06,660

just beautiful panoramic windows and

169

00:12:10,610 --> 00:12:08,370

very fortunately we have the robotics

170

00:12:14,510 --> 00:12:10,620

workstation set up in here so that we

171

00:12:17,300 --> 00:12:14,520

can work with both the station arm and

172

00:12:18,980 --> 00:12:17,310

then in partnership with the guys over

173

00:12:22,400 --> 00:12:18,990

on the shuttle who have a shuttle

174

00:12:25,460 --> 00:12:22,410

robotic arm and today Mike and I did

175

00:12:27,460 --> 00:12:25,470

some work moving the big shuttle boo out

176

00:12:31,990 --> 00:12:27,470

and around and handing it off to the

177

00:12:36,800 --> 00:12:35,210

later Katie you know I got to do a Tesla

178

00:12:38,960 --> 00:12:36,810

called a walk off which is where we take

179

00:12:40,790 --> 00:12:38,970

one end of the armor so put it on a

180

00:12:43,480 --> 00:12:40,800

place on the station to the other end

181

00:12:45,950 --> 00:12:43,490

off and now the base of the tip are

182

00:12:47,360 --> 00:12:45,960

exchanged so basically this arm is very

183

00:12:48,680 --> 00:12:47,370

familiar the kiddo could move it all

184

00:12:52,850 --> 00:12:48,690

over the space station to different

185

00:12:56,300 --> 00:12:52,860

spots do all kinds of work across the

186

00:12:58,540 --> 00:12:56,310

space station so here we have be elven

187

00:13:00,920 --> 00:12:58,550

drew and Steve Bowen

188

00:13:02,390 --> 00:13:00,930

uncharacteristically speechless actually

189

00:13:05,450 --> 00:13:02,400

they can't talk because they're wearing

190

00:13:07,010 --> 00:13:05,460

masks and the reason they're wearing

191

00:13:10,760 --> 00:13:07,020

masks is because they're terribly

192

00:13:12,530 --> 00:13:10,770

comfortable and they're starting to pre

193

00:13:13,790 --> 00:13:12,540

breathe oxygen to watch the nitrogen

194

00:13:16,280 --> 00:13:13,800

down on their bodies getting ready for

195

00:13:17,930 --> 00:13:16,290

their spacewalk tomorrow in about a half

196

00:13:21,860 --> 00:13:17,940

hour we're gonna shut the door here and

197

00:13:24,230 --> 00:13:21,870

they're gonna depress down to about 10.2

198

00:13:26,810 --> 00:13:24,240

PSI roughly about 10,000 feet in

199

00:13:29,600 --> 00:13:26,820

altitude they'll spend the night there

200

00:13:32,360 --> 00:13:29,610

and we'll let him out for a short time

201  
00:13:33,770 --> 00:13:32,370  
in the morning - I hit the bathroom and

202  
00:13:35,570 --> 00:13:33,780  
clean up a little bit and then we'll go

203  
00:13:37,940 --> 00:13:35,580  
back in here and they'll be on masks for

204  
00:13:39,470 --> 00:13:37,950  
that and once they get back in here

205  
00:13:42,070 --> 00:13:39,480  
we'll get them all dressed up in their

206  
00:13:46,150 --> 00:13:42,080  
spacesuits and ready to go out the door

207  
00:13:50,120 --> 00:13:46,160  
Michael and Nicole and Paula are getting

208  
00:13:54,230 --> 00:13:50,130  
Steve ready and here on the right it's

209  
00:13:56,559 --> 00:13:54,240  
the Alvin over here on the left it

210  
00:13:59,449 --> 00:13:56,569  
really create one

211  
00:14:01,759 --> 00:13:59,459  
last few millimeters mercury and

212  
00:14:05,900 --> 00:14:01,769  
pressure drop are the slowest we're

213  
00:14:07,730 --> 00:14:05,910

coming through about 1/2 psi it's taking

214

00:14:10,670 --> 00:14:07,740

forever to get down there so that'll be

215

00:14:13,100 --> 00:14:10,680

able to have children but we're about 45

216

00:14:14,869 --> 00:14:13,110

minutes ahead of the timeline okay we're

217

00:14:18,019 --> 00:14:14,879

on the flight deck and I am reading out

218

00:14:36,769 --> 00:14:18,029

of thank you out alright Nicole I think

219

00:14:53,600 --> 00:14:36,779

even at the day of done there's an up

220

00:14:55,299 --> 00:14:53,610

close for the end of the station zero to

221

00:14:58,299 --> 00:14:55,309

one pick

222

00:15:00,669 --> 00:14:58,309

this is a view from Alger helmet cam

223

00:15:03,199 --> 00:15:00,679

he's moving around outside the station

224

00:15:05,030 --> 00:15:03,209

you can see some of those gaps banners

225

00:15:09,180 --> 00:15:05,040

there that the crew members used to move

226

00:15:12,420 --> 00:15:11,220

steve bowen they're getting the view of

227

00:15:14,250 --> 00:15:12,430

a lifetime down at the earth below and

228

00:15:24,460 --> 00:15:14,260

the entire International Space Station

229

00:15:29,200 --> 00:15:27,140

feeling good out there spending and

230

00:15:33,890 --> 00:15:29,210

stretching it I gotta wake up sometime

231

00:15:39,700 --> 00:15:33,900

go through the rough song in my head I'd

232

00:15:43,370 --> 00:15:42,020

bang behind bowen in this view is

233

00:15:45,170 --> 00:15:43,380

shuttle discovery which you can

234

00:15:47,960 --> 00:15:45,180

obviously see there the nose of the

235

00:15:51,680 --> 00:15:47,970

orbiter down below him is a Japanese HTV

236

00:15:53,330 --> 00:15:51,690

cargo craft you can also see the

237

00:16:03,980 --> 00:15:53,340

Columbus laboratory there toward the

238

00:16:12,590 --> 00:16:03,990

right-hand side your left pane in the

239

00:16:44,030 --> 00:16:12,600

guide you have a nickel into the guy

240

00:16:46,760 --> 00:16:44,040

happy folks inside okay okay you can now

241

00:16:48,470 --> 00:16:46,770

move over to pull the t-handle out to

242

00:16:51,040 --> 00:16:48,480

the unlock position and you should see

243

00:16:56,519 --> 00:16:51,050

two white lines visible to do that

244

00:17:03,340 --> 00:17:01,210

but step are you guys up like right now

245

00:17:05,049 --> 00:17:03,350

they've they're in work bolting the

246

00:17:10,290 --> 00:17:05,059

pom-poms all over the place on this new

247

00:17:15,900 --> 00:17:12,480

so that's great we got an awfully hot

248

00:17:21,420 --> 00:17:15,910

onto the sp2 and if you clean up steps

249

00:17:25,170 --> 00:17:21,430

and connections and caps this space

250

00:17:27,720 --> 00:17:25,180

station camera view shows us ELC for

251  
00:17:30,480 --> 00:17:27,730  
newly installed on the nadir side of the

252  
00:17:32,580 --> 00:17:30,490  
starboard truss and the space stations

253  
00:17:34,680 --> 00:17:32,590  
robotic arm which has moved out of the

254  
00:17:37,440 --> 00:17:34,690  
way just in the upper edge of the frame

255  
00:17:40,140 --> 00:17:37,450  
you can see the spacewalkers translating

256  
00:17:42,300 --> 00:17:40,150  
out to near that ELC for that's where

257  
00:17:44,580 --> 00:17:42,310  
they'll be installing a wedge on a

258  
00:17:49,050 --> 00:17:44,590  
camera platform in order to tilt that

259  
00:17:51,540 --> 00:17:49,060  
tamer stanchion away from the new spare

260  
00:18:16,530 --> 00:17:51,550  
parts platform to provide clearance for

261  
00:18:54,200 --> 00:18:16,540  
parts to be stored on it I think you got

262  
00:19:02,640 --> 00:18:57,540  
hope you get in here yeah that's gonna

263  
00:19:05,340 --> 00:19:02,650

fall and stand by Al Kiefer you agree

264

00:19:07,230 --> 00:19:05,350

we're gonna let Steve finish up the lip

265

00:19:08,850 --> 00:19:07,240

extender task and then head back to the

266

00:19:36,630 --> 00:19:08,860

airlock and then we'll be ready for

267

00:19:48,789 --> 00:19:46,659

okay we'll be working in a bottleneck at

268

00:19:52,630 --> 00:19:48,799

Steve Bowen in the center of this camera

269

00:19:55,779 --> 00:19:52,640

view to get himself as stabilized with

270

00:19:58,390 --> 00:19:55,789

the camera to get close-up pictures of

271

00:20:04,510 --> 00:19:58,400

all drew on the right as he performs the

272

00:20:07,029 --> 00:20:04,520

message in a bottle activity and now

273

00:20:10,029 --> 00:20:07,039

from Al Drew's helmet camera you can see

274

00:20:16,250 --> 00:20:10,039

in the lower right hand corner his right

275

00:20:21,950 --> 00:20:19,549

here he comes the Alvin drew first BBA

276

00:20:25,430 --> 00:20:21,960

what are you gonna do ow ow I'm gonna

277

00:20:26,630 --> 00:20:25,440

have dinner like a quarter horse how was

278

00:20:28,400 --> 00:20:26,640

it that was awesome

279

00:20:30,320 --> 00:20:28,410

oh man that was great that views are

280

00:20:33,740 --> 00:20:30,330

outstanding you looked fantastic out

281

00:20:35,480 --> 00:20:33,750

there looks totally natural it really

282

00:20:38,810 --> 00:20:35,490

will bacon in a little bit all right go

283

00:20:40,549 --> 00:20:38,820

get some food all right I write in back

284

00:20:42,140 --> 00:20:40,559

there already pulling out his sleeping

285

00:20:43,250 --> 00:20:42,150

bag because I think sleeping is

286

00:20:44,500 --> 00:20:43,260

something he wants to do more than

287

00:20:47,419 --> 00:20:44,510

eating baby

288

00:20:49,130 --> 00:20:47,429

Steve how was it he ate well actually

289

00:20:50,539 --> 00:20:49,140

was pretty well I thought I mean I was

290

00:20:53,560 --> 00:20:50,549

awesome the first time out the door that

291

00:20:56,720 --> 00:20:53,570

was incredible yeah great very present

292

00:20:58,970 --> 00:20:56,730

here's Mike Barrett us Bordeaux who has

293

00:21:02,090 --> 00:20:58,980

about 18 things for breakfast what are

294

00:21:03,650 --> 00:21:02,100

you having this morning well Steve Bowen

295

00:21:05,659 --> 00:21:03,660

stopped at the Starbucks and bonsall

296

00:21:07,820 --> 00:21:05,669

coffee oh good that's where we're

297

00:21:11,110 --> 00:21:07,830

starting gran let's see we're having

298

00:21:13,640 --> 00:21:11,120

granola crunchy until you rehydrated

299

00:21:16,340 --> 00:21:13,650

scrambled eggs pretty much everything is

300

00:21:20,720 --> 00:21:16,350

crunchy so they rehydrated

301  
00:21:24,530 --> 00:21:20,730  
see what else we don't down here citrus

302  
00:21:26,780 --> 00:21:24,540  
fruit salad how about you BIM I got some

303  
00:21:29,750 --> 00:21:26,790  
of the tasty stuff that Alan had water

304  
00:21:32,930 --> 00:21:29,760  
water good I've also got in the heater

305  
00:21:35,450 --> 00:21:32,940  
over here got some eggs going on taking

306  
00:21:38,780 --> 00:21:35,460  
what Mike has of putting water in it eat

307  
00:21:47,830 --> 00:21:38,790  
it up material and I'm gonna have

308  
00:21:53,420 --> 00:21:50,870  
what are you doing today well today Mike

309  
00:21:55,400 --> 00:21:53,430  
and I are gonna remove or move the PMM

310  
00:21:58,190 --> 00:21:55,410  
which is the big module that's currently

311  
00:22:00,340 --> 00:21:58,200  
in payload Bay of discovery over to the

312  
00:22:03,830 --> 00:22:00,350  
station and that will complete the

313  
00:22:04,460 --> 00:22:03,840

Assembly of the ISS and what's your

314

00:22:11,420 --> 00:22:04,470

motivation

315

00:22:14,000 --> 00:22:11,430

today well we want to make sure that

316

00:22:16,760 --> 00:22:14,010

station can continue through 2020 at

317

00:22:18,620 --> 00:22:16,770

least and that would be to continue with

318

00:22:21,980 --> 00:22:18,630

the science and great stuff is gone

319

00:22:23,600 --> 00:22:21,990

what's your deal first I thought I

320

00:22:25,640 --> 00:22:23,610

thought Alison motivation was better

321

00:22:28,160 --> 00:22:25,650

than that what's our mission here he's

322

00:22:29,990 --> 00:22:28,170

set up in here he didn't do a good job

323

00:22:34,260 --> 00:22:30,000

because I told him if you didn't do a

324

00:22:45,240 --> 00:22:42,660

they gotta stand uh next year on the big

325

00:22:46,380 --> 00:22:45,250

loop for Robo and if you guys are sad

326

00:22:48,390 --> 00:22:46,390

we'll go ahead and start marching

327

00:22:50,610 --> 00:22:48,400

through step one of the DMM unbirth

328

00:22:55,570 --> 00:22:50,620

menthol

329

00:22:58,150 --> 00:22:55,580

this pmm is a fairly large in size is 21

330

00:22:59,620 --> 00:22:58,160

feet long 15 feet in diameter it's

331

00:23:02,920 --> 00:22:59,630

bringing up quite a number of supplies

332

00:23:04,510 --> 00:23:02,930

it has 14 racks inside which includes

333

00:23:07,270 --> 00:23:04,520

Express track number 8 which is an

334

00:23:08,380 --> 00:23:07,280

experiment rack there are six resupply

335

00:23:11,590 --> 00:23:08,390

stowage platforms

336

00:23:13,450 --> 00:23:11,600

five resupply stowage racks and two

337

00:23:14,950 --> 00:23:13,460

integrated storage platforms are quite a

338

00:23:17,980 --> 00:23:14,960

bit of equipment coming up including

339

00:23:29,560 --> 00:23:17,990

Robonaut 2 but it is bound for the

340

00:23:32,230 --> 00:23:29,570

earth-facing side of unity so here's a

341

00:23:34,780 --> 00:23:32,240

shot of our PMM coming in you can see

342

00:23:36,130 --> 00:23:34,790

it's just a got in position the red

343

00:23:39,010 --> 00:23:36,140

glowing light in the bottom of the

344

00:23:43,450 --> 00:23:39,020

screen is the CBC s the target with the

345

00:23:45,310 --> 00:23:43,460

light that is going to these we have a

346

00:23:48,910 --> 00:23:45,320

camera that helps that's mounted there

347

00:23:50,380 --> 00:23:48,920

that here's at the top of the cook

348

00:24:01,690 --> 00:23:50,390

little and you can see the rest of the

349

00:24:04,360 --> 00:24:01,700

PMM coming in this empty bay is worth

350

00:24:08,200 --> 00:24:04,370

just can't out of here's where my

351

00:24:09,880 --> 00:24:08,210

Kenickie are working on it just put it

352

00:24:11,530 --> 00:24:09,890

into its position they're gonna drive it

353

00:24:13,240 --> 00:24:11,540

in manually there shortly

354

00:24:15,100 --> 00:24:13,250

there's a look at this beautiful

355

00:24:18,550 --> 00:24:15,110

robotics workstations

356

00:24:20,830 --> 00:24:18,560

can you see it pretty good

357

00:24:24,470 --> 00:24:20,840

there's the controls that Mike's working

358

00:24:26,359 --> 00:24:24,480

those hands down on the end

359

00:24:27,739 --> 00:24:26,369

we're positioned Paul but we're still

360

00:24:30,799 --> 00:24:27,749

damping a little bit so let's just give

361

00:24:32,299 --> 00:24:30,809

it a couple potatoes got a little tiny

362

00:24:35,210 --> 00:24:32,309

bit of ankle bells but it's pretty

363

00:24:37,820 --> 00:24:35,220

stable and here's a shot of Our Heroes

364

00:24:41,690 --> 00:24:37,830

at work which is really hard to shoot

365

00:24:44,950 --> 00:24:41,700

there is my wave to the camera big smile

366

00:24:47,479 --> 00:24:44,960

so nice people look happy happy

367

00:24:50,340 --> 00:24:47,489

happiness that's right they're doing

368

00:24:56,020 --> 00:24:54,010

so mike barratt and nicole stott roll so

369

00:24:59,710 --> 00:24:56,030

far on hold they've done a good job of

370

00:25:04,870 --> 00:24:59,720

getting the PMM over to unity for first

371

00:25:06,820 --> 00:25:04,880

stage capture happy go maneuvers

372

00:25:11,760 --> 00:25:06,830

complete CR Keo and go for first stage

373

00:25:13,930 --> 00:25:11,770

capture and good job Nicole my thank you

374

00:25:15,040 --> 00:25:13,940

Eric BOE and Cady Coleman are going to

375

00:25:16,150 --> 00:25:15,050

be working on the common berthing

376

00:25:20,350 --> 00:25:16,160

mechanism this is what will actually

377

00:25:25,779 --> 00:25:22,269

and Nicole and Mike on the big move for

378

00:25:29,200 --> 00:25:25,789

the SSRMS you are go for SSRMS mode to

379

00:25:31,180 --> 00:25:29,210

them copy go promote the limp

380

00:25:45,220 --> 00:25:31,190

I'll stop position pressurization vowel

381

00:25:50,260 --> 00:25:47,590

you got that one this guy pulled up yep

382

00:26:17,340 --> 00:25:50,270

I actually know you know pull it in you

383

00:26:25,690 --> 00:26:23,249

okay catch that handle right there if

384

00:26:38,070 --> 00:26:34,860

all right lock it yep okay careful sir

385

00:26:41,520 --> 00:26:38,080

all right now the fun comes robonaut

386

00:26:43,080 --> 00:26:41,530

still hopefully with the secret hey I

387

00:26:45,870 --> 00:26:43,090

think he's in the window you look at the

388

00:26:53,490 --> 00:26:45,880

witnesses yeah let they never spin for

389

00:26:55,080 --> 00:26:53,500

months you guys so long as Lindsay

390

00:26:57,450 --> 00:26:55,090

and Bo get ready to open the hatch and

391

00:27:01,470 --> 00:26:57,460

the PMM they're our crew mates who are

392

00:27:05,040 --> 00:27:01,480

nearby in the quest airlock for the EBA

393

00:27:14,700 --> 00:27:05,050

procedure review I have called a timeout

394

00:27:29,490 --> 00:27:14,710

and come out to watch you have the

395

00:27:31,470 --> 00:27:29,500

speech 5:17 p.m. Houston time the hatch

396

00:27:34,620 --> 00:27:31,480

is open into the permanent multi-purpose

397

00:27:36,270 --> 00:27:34,630

module a final pressurized module of the

398

00:27:57,230 --> 00:27:36,280

u.s. section of the International Space

399

00:28:22,120 --> 00:28:08,330

forty get in there the hadith Lovejoy

400

00:28:22,130 --> 00:28:40,050

this is we have three named Michelangelo

401  
00:29:00,940 --> 00:28:42,340  
what's the maximum occupancy in this

402  
00:29:05,490 --> 00:29:00,950  
once you're over top yep put your head

403  
00:29:10,980 --> 00:29:08,789  
so you guys whose names are these all

404  
00:29:14,009 --> 00:29:10,990  
the people our age Wow

405  
00:29:20,240 --> 00:29:14,019  
you guys need a son

406  
00:29:33,259 --> 00:29:31,379  
now oh there's my calls here working out

407  
00:29:39,580 --> 00:29:33,269  
on the mid-deck get ready for a day

408  
00:29:39,590 --> 00:29:42,930  
it's about 30 minutes

409  
00:29:48,110 --> 00:29:45,610  
we have as a bike

410  
00:29:51,090 --> 00:29:48,120  
some stress cues

411  
00:29:52,970 --> 00:29:51,100  
he darts out a little bit

412  
00:29:55,650 --> 00:29:52,980  
it

413  
00:29:58,650 --> 00:29:55,660

you like to get the muscles go on

414

00:30:00,990 --> 00:29:58,660

good way to start today so the guys are

415

00:30:04,710 --> 00:30:01,000

all suited up we have a little leak

416

00:30:06,600 --> 00:30:04,720

problem with Steve's suit and enough

417

00:30:08,850 --> 00:30:06,610

being traced to an o-ring not one of

418

00:30:12,630 --> 00:30:08,860

them I draw exciting canisters we use to

419

00:30:15,090 --> 00:30:12,640

scrub the co2 lowering a bite taken out

420

00:30:18,000 --> 00:30:15,100

of it for whatever reason it is making

421

00:30:20,130 --> 00:30:18,010

the whole suit leak so we found that out

422

00:30:24,480 --> 00:30:20,140

we are lucky to have a spare of the

423

00:30:27,060 --> 00:30:24,490

airlock here put that on seal him up and

424

00:30:30,090 --> 00:30:27,070

he's good and tight right now I knew I

425

00:30:31,980 --> 00:30:30,100

was going to check out mom's tools bags

426

00:30:37,680 --> 00:30:31,990

to make sure everything is exactly where

427

00:30:51,720 --> 00:30:37,690

it should be nice nobody happy she has

428

00:31:01,340 --> 00:30:53,190

what do you think what are you gonna do

429

00:31:06,480 --> 00:31:04,680

this way there's really with an

430

00:31:08,160 --> 00:31:06,490

assortment of bags and ready to go out

431

00:31:12,770 --> 00:31:08,170

the door that's good just like here's a

432

00:31:19,830 --> 00:31:12,780

hard-working team of my little bit Paolo

433

00:31:23,010 --> 00:31:19,840

and Nicole who's always got a smile okay

434

00:31:27,480 --> 00:31:23,020

and when you are ready you can lift a

435

00:31:30,450 --> 00:31:27,490

walk off from the Fram soap opera is off

436

00:31:31,680 --> 00:31:30,460

the frame and in my hands all right and

437

00:31:33,420 --> 00:31:31,690

when you're comfortable you can get Mike

438

00:31:34,800 --> 00:31:33,430

to go to the back opposition Mike you

439

00:31:35,490 --> 00:31:34,810

have to go to proceed to the back off

440

00:31:37,950 --> 00:31:35,500

position

441

00:31:42,880 --> 00:31:37,960

Abbey that'd be great work arm is coming

442

00:31:47,409 --> 00:31:44,830

here's a shot of steve bowen still on

443

00:31:49,210 --> 00:31:47,419

the end of the station's robotic arm he

444

00:31:52,600 --> 00:31:49,220

is on his way over to Discovery's

445

00:31:56,360 --> 00:31:52,610

payload Bay to install this lightweight

446

00:32:01,590 --> 00:31:59,010

and about a meter to go Steve that

447

00:32:05,760 --> 00:32:01,600

sounds fun right like I've got a good

448

00:32:08,670 --> 00:32:05,770

eye on all right one the flight deck

449

00:32:11,040 --> 00:32:08,680

watching Evie a two and Nicole is

450

00:32:12,780 --> 00:32:11,050

working as the quarterback they thing

451  
00:32:14,190 --> 00:32:12,790  
have happened how where are we and how

452  
00:32:15,840 --> 00:32:14,200  
are we doing we're doing really well

453  
00:32:27,480 --> 00:32:15,850  
they've been following instructions

454  
00:32:28,860 --> 00:32:27,490  
exceptionally well today several of the

455  
00:32:30,570 --> 00:32:28,870  
things that we thought we might have

456  
00:32:32,370 --> 00:32:30,580  
issues with just because the way the

457  
00:32:35,340 --> 00:32:32,380  
hardware is when we worked in the pool

458  
00:32:36,570 --> 00:32:35,350  
just went so smoothly here today and how

459  
00:32:38,190 --> 00:32:36,580  
is he moving back to the airlock to

460  
00:32:40,380 --> 00:32:38,200  
point into some oxygen for a little bit

461  
00:32:42,750 --> 00:32:40,390  
and pick up another bag to move on to

462  
00:32:44,610 --> 00:32:42,760  
another task and Steve is out still on

463  
00:32:47,240 --> 00:32:44,620

the end of the arm finishing up some

464

00:32:50,190 --> 00:32:47,250

work that he was doing out on the spdm

465

00:32:51,840 --> 00:32:50,200

this is Robonaut being introduced to his

466

00:32:56,240 --> 00:32:51,850

new home aboard the space station

467

00:33:08,750 --> 00:33:01,249

he's very sneaky hopefully even take

468

00:33:08,760 --> 00:33:37,490

go get something

469

00:33:41,030 --> 00:33:39,650

his snare line on space to ground to

470

00:33:50,570 --> 00:33:41,040

with a good lead check we're gonna go

471

00:34:06,380 --> 00:33:54,480

they're only two

472

00:34:12,020 --> 00:34:10,760

that's it mediate to you but you're

473

00:34:31,060 --> 00:34:12,030

going to put it on a leash Steve did a

474

00:34:36,830 --> 00:34:35,450

smell smell space smell skin they look

475

00:34:39,290 --> 00:34:36,840

almost as fresh as they did in the

476  
00:34:41,150 --> 00:34:39,300  
beginning of things joe said about again

477  
00:34:49,930 --> 00:34:41,160  
ready to send sent amount again I'm just

478  
00:34:55,310 --> 00:34:52,640  
here's the hardest part is getting out

479  
00:34:56,510 --> 00:34:55,320  
of the suit Apple yes are you still

480  
00:34:57,860 --> 00:34:56,520  
gonna go to Disney World how are you

481  
00:34:58,760 --> 00:34:57,870  
gonna do something different oh I'm

482  
00:35:01,910 --> 00:34:58,770  
going to Disney World

483  
00:35:05,780 --> 00:35:01,920  
alright let's check your mind and your

484  
00:35:11,910 --> 00:35:08,400  
discovery on ISS please stand by for the

485  
00:35:13,050 --> 00:35:11,920  
president hello everybody hello mr.

486  
00:35:15,960 --> 00:35:13,060  
president welcome aboard the

487  
00:35:17,390 --> 00:35:15,970  
International Space Station well look I

488  
00:35:20,160 --> 00:35:17,400

wanted to call and just say how

489

00:35:23,220 --> 00:35:20,170

personally proud I am of you and all

490

00:35:25,710 --> 00:35:23,230

that you're accomplishing you know we

491

00:35:28,470 --> 00:35:25,720

are always inspired by the images of you

492

00:35:31,920 --> 00:35:28,480

guys at work as you put some of the

493

00:35:35,670 --> 00:35:31,930

final pieces a place to make ISS fully

494

00:35:37,950 --> 00:35:35,680

operational and you are setting such a

495

00:35:42,530 --> 00:35:37,960

great example with your dedication your

496

00:35:45,570 --> 00:35:42,540

courage your commitment to exploration

497

00:35:49,520 --> 00:35:45,580

you know these are traits that built

498

00:35:51,690 --> 00:35:49,530

America and you guys personify them and

499

00:35:55,830 --> 00:35:51,700

Colonel Lindsay it must be a great honor

500

00:35:58,380 --> 00:35:55,840

to be the last commander of the

501  
00:35:59,970 --> 00:35:58,390  
discovery you know it's uh it's traveled

502  
00:36:01,560 --> 00:35:59,980  
more distance in space and spent more

503  
00:36:05,010 --> 00:36:01,570  
time in orbit than any of its peers the

504  
00:36:08,550 --> 00:36:05,020  
shuttle fleet so it's appropriate that

505  
00:36:15,390 --> 00:36:08,560  
it's performing this critical and iconic

506  
00:36:20,550 --> 00:36:15,400  
mission and adding to the legacy by by

507  
00:36:21,530 --> 00:36:20,560  
working on this ISS assembly to full

508  
00:36:24,270 --> 00:36:21,540  
operations

509  
00:36:25,590 --> 00:36:24,280  
well thank thank you sir on being on

510  
00:36:27,360 --> 00:36:25,600  
behalf of the crew it's you know it's a

511  
00:36:30,720 --> 00:36:27,370  
real privilege for us to get to fly

512  
00:36:32,280 --> 00:36:30,730  
discovery on her final mission and we

513  
00:36:34,350 --> 00:36:32,290

were actually trying to calculate with

514

00:36:36,090 --> 00:36:34,360

the now we're gonna land on Wednesday

515

00:36:38,250 --> 00:36:36,100

and we're calculating we think that when

516

00:36:41,310 --> 00:36:38,260

we land we'll discovery will have flown

517

00:36:43,290 --> 00:36:41,320

in space for 365 days so for a whole

518

00:36:46,190 --> 00:36:43,300

year which is pretty incredible for a

519

00:36:49,530 --> 00:36:46,200

vehicle and and she's been into space

520

00:36:51,810 --> 00:36:49,540

like 38 39 times and that's a pretty

521

00:36:55,450 --> 00:36:51,820

incredible record and and she won't be

522

00:36:58,579 --> 00:36:55,460

forgotten for a long long time we hope

523

00:37:00,530 --> 00:36:58,589

now we're entering into the lab module

524

00:37:05,050 --> 00:37:00,540

the u.s. lab module

525

00:37:07,370 --> 00:37:05,060

and down on the deck will find I believe

526

00:37:09,260 --> 00:37:07,380

dr. Mike Barrett you could be in the

527

00:37:12,260 --> 00:37:09,270

commander steve lindsey ability to call

528

00:37:13,760 --> 00:37:12,270

to make them out right here but what

529

00:37:16,790 --> 00:37:13,770

they're doing is they have just

530

00:37:17,390 --> 00:37:16,800

transferred this big large rag with my

531

00:37:19,400 --> 00:37:17,400

mark

532

00:37:22,250 --> 00:37:19,410

yeah mmm the new module that has

533

00:37:31,190 --> 00:37:22,260

installed transferred if you're into the

534

00:37:33,680 --> 00:37:31,200

lab module or operation either science

535

00:37:37,250 --> 00:37:33,690

lockers as well oh look there's

536

00:37:39,620 --> 00:37:37,260

commander lindsay coming out bailey rash

537

00:37:41,780 --> 00:37:39,630

horribly no just tell us a little bit

538

00:37:44,330 --> 00:37:41,790

about what you're doing there I have no

539

00:37:47,180 --> 00:37:44,340

idea oh come on no we're uh we're trying

540

00:37:48,740 --> 00:37:47,190

to rotate into position we got a bracket

541

00:37:53,240 --> 00:37:48,750

in the way and I'm trying to take it off

542

00:37:55,250 --> 00:37:53,250

and that's just sometimes the simplest

543

00:37:57,560 --> 00:37:55,260

things writers I was I was pulling it

544

00:38:01,310 --> 00:37:57,570

with the out force and cranking it you

545

00:38:05,720 --> 00:38:01,320

know but it's like to behave and drew

546

00:38:09,300 --> 00:38:05,730

coming out of the newest and as we know

547

00:38:11,220 --> 00:38:09,310

right now final us module

548

00:38:13,830 --> 00:38:11,230

to be attached to the International

549

00:38:15,930 --> 00:38:13,840

Space Station what's going on in down in

550

00:38:20,040 --> 00:38:15,940

there today oh we're installing brackets

551

00:38:21,390 --> 00:38:20,050

brackets brackets rack is for racks all

552

00:38:23,070 --> 00:38:21,400

right because there's a lot of racks out

553

00:38:26,370 --> 00:38:23,080

in there aren't a lot of Rex letter rack

554

00:38:30,180 --> 00:38:26,380

space down there so this is a nice big

555

00:38:31,890 --> 00:38:30,190

new closet storage area yep alright and

556

00:38:36,450 --> 00:38:31,900

we're gonna move things from the station

557

00:38:48,210 --> 00:38:36,460

in here and take some stuff back I'll

558

00:38:53,070 --> 00:38:48,220

just show you a nice big major Ridge and

559

00:38:57,480 --> 00:38:53,080

back in the corner there is a Steve

560

00:38:59,520 --> 00:38:57,490

Bowen working hard on a bracket he's

561

00:39:02,140 --> 00:38:59,530

gonna have to say a few words to us even

562

00:39:04,700 --> 00:39:02,150

do it

563

00:39:17,480 --> 00:39:04,710

just like a Saturday afternoon in the

564

00:39:23,060 --> 00:39:17,490

garage the lovely Katie Collman entering

565

00:39:27,110 --> 00:39:23,070

the PMM maybe it's the right tools well

566

00:39:30,350 --> 00:39:27,120

we're trying a selfie to glacier

567

00:39:33,350 --> 00:39:30,360

transfer of samples is cold very cold

568

00:39:35,600 --> 00:39:33,360

and it's got some ice packs were to put

569

00:39:37,010 --> 00:39:35,610

these in this little bag here and then

570

00:39:39,980 --> 00:39:37,020

we're gonna collect some samples and

571

00:39:41,750 --> 00:39:39,990

move them out of Melfi the big freezer

572

00:39:43,400 --> 00:39:41,760

on the space station and over to the

573

00:39:45,400 --> 00:39:43,410

little breezy that we just removed on to

574

00:39:47,780 --> 00:39:45,410

the Space Shuttle Springer

575

00:39:52,250 --> 00:39:47,790

ok back at Melfi here's one of the cool

576  
00:39:54,090 --> 00:39:52,260  
things at no fee very refreshing a

577  
00:39:56,850 --> 00:39:54,100  
little frost

578  
00:39:59,130 --> 00:39:56,860  
we're back with the PMM there's action

579  
00:40:01,620 --> 00:39:59,140  
going on in here there's so much action

580  
00:40:05,190 --> 00:40:01,630  
look every corner every corner you go to

581  
00:40:08,490 --> 00:40:05,200  
there's somebody it's working on a rack

582  
00:40:10,370 --> 00:40:08,500  
this is al again now I'm not doing

583  
00:40:15,720 --> 00:40:10,380  
anything

584  
00:40:19,410 --> 00:40:15,730  
okay look he's still in that State

585  
00:40:21,660 --> 00:40:19,420  
Quarter where we left him it's a

586  
00:40:29,070 --> 00:40:21,670  
beautiful thing he finds ways to occupy

587  
00:40:39,130 --> 00:40:29,080  
himself minutes and minutes that have

588  
00:40:44,650 --> 00:40:42,900

zero to babies zero - yep is it good

589

00:40:48,130 --> 00:40:44,660

yeah good for you

590

00:40:54,140 --> 00:40:48,140

yeah nothing like some pure o2 after

591

00:41:06,089 --> 00:40:59,630

the dachshund bargeman bet you guys

592

00:41:09,339 --> 00:41:08,259

all right well welcome aboard the space

593

00:41:12,400 --> 00:41:09,349

station

594

00:41:14,140 --> 00:41:12,410

we've spent how many days here I don't

595

00:41:16,569 --> 00:41:14,150

know seven days eight days something

596

00:41:18,700 --> 00:41:16,579

like that we delivered the last

597

00:41:20,440 --> 00:41:18,710

pressurized module we delivered the ELC

598

00:41:22,839 --> 00:41:20,450

for we did a whole bunch of transfer and

599

00:41:25,390 --> 00:41:22,849

we outfitted the PMM as best we could

600

00:41:26,829 --> 00:41:25,400

with the time available and Scott it was

601  
00:41:28,509 --> 00:41:26,839  
a pleasure to be up here we appreciate

602  
00:41:29,950 --> 00:41:28,519  
your hospitality we appreciate you

603  
00:41:32,410 --> 00:41:29,960  
putting up with us knocking your stuff

604  
00:41:34,809 --> 00:41:32,420  
off the walls and generally trashing

605  
00:41:37,539 --> 00:41:34,819  
your station doubling doubling the

606  
00:41:38,950 --> 00:41:37,549  
number of people and we appreciate you

607  
00:41:40,450 --> 00:41:38,960  
guys letting us float down to the

608  
00:41:43,750 --> 00:41:40,460  
service module and get in your way as

609  
00:41:45,730 --> 00:41:43,760  
well and on behalf of the crew we had a

610  
00:41:48,370 --> 00:41:45,740  
great time we appreciate the hospitality

611  
00:41:50,620 --> 00:41:48,380  
and enjoyed the crew meals together and

612  
00:41:55,690 --> 00:41:50,630  
and we're gonna miss you guys and so

613  
00:41:59,380 --> 00:41:55,700

thanks thanks for everything I'd like to

614

00:42:01,150 --> 00:41:59,390

say that it was a very successful time

615

00:42:04,240 --> 00:42:01,160

on board with you guys we really enjoyed

616

00:42:07,809 --> 00:42:04,250

having guests this is the first group of

617

00:42:10,690 --> 00:42:07,819

guests I've had in about 150 days since

618

00:42:13,210 --> 00:42:10,700

I've been up here and we're gonna miss

619

00:42:16,299 --> 00:42:13,220

you but most of all we're going to miss

620

00:42:19,299 --> 00:42:16,309

discovery and discovery has been a great

621

00:42:21,759 --> 00:42:19,309

ship and has really supported the

622

00:42:24,220 --> 00:42:21,769

international space station more so than

623

00:42:28,329 --> 00:42:24,230

I think any other any other space

624

00:42:35,279 --> 00:42:28,339

shuttle and we wish her fair winds and

625

00:42:43,150 --> 00:42:40,120

discovery in station this is Houston bad

626  
00:42:44,740 --> 00:42:43,160  
flight but I didn't want to take an

627  
00:42:46,329 --> 00:42:44,750  
opportunity while we have the whole crew

628  
00:42:47,950 --> 00:42:46,339  
there just to tell everybody it's been

629  
00:42:50,200 --> 00:42:47,960  
an honor and a privilege to work this

630  
00:42:51,730 --> 00:42:50,210  
mission with you and we really look

631  
00:42:54,400 --> 00:42:51,740  
forward to seeing everybody back on the

632  
00:42:55,839 --> 00:42:54,410  
ground couple folks have asked me

633  
00:42:57,940 --> 00:42:55,849  
recently what I would feel at this

634  
00:43:00,220 --> 00:42:57,950  
moment and I think the answer is just

635  
00:43:02,740 --> 00:43:00,230  
feel really proud to take discovery home

636  
00:43:04,509 --> 00:43:02,750  
at the very top of your game and a lot

637  
00:43:08,410 --> 00:43:04,519  
of that credit goes to the onboard crew

638  
00:43:10,480 --> 00:43:08,420

you guys Rock yep right and uh you know

639

00:43:12,490 --> 00:43:10,490

of course we're we are really proud of

640

00:43:14,170 --> 00:43:12,500

you guys and the amount of teamwork it

641

00:43:17,380 --> 00:43:14,180

takes to pull this kind of

642

00:43:20,770 --> 00:43:17,390

it really was a incredible effort on

643

00:43:23,830 --> 00:43:20,780

your part and you know you guys are

644

00:43:24,970 --> 00:43:23,840

really the unsung heroes in this and you

645

00:43:26,700 --> 00:43:24,980

know it's so much going on

646

00:43:29,230 --> 00:43:26,710

simultaneously

647

00:43:31,270 --> 00:43:29,240

I would imagine these last couple of

648

00:43:32,500 --> 00:43:31,280

days not today but the day before and

649

00:43:34,450 --> 00:43:32,510

the day before that were probably the

650

00:43:36,840 --> 00:43:34,460

two most busiest days of the Space

651

00:43:39,640 --> 00:43:36,850

Station program so in all your folks

652

00:43:41,710 --> 00:43:39,650

that have worked on this in both

653

00:43:46,960 --> 00:43:41,720

programs general and station should be

654

00:43:48,910 --> 00:43:46,970

very proud we copy you guys have a safe

655

00:43:50,410 --> 00:43:48,920

trip home we'll see some of your sooner

656

00:43:53,620 --> 00:43:50,420

but we're looking forward to seeing all

657

00:43:55,690 --> 00:43:53,630

of y'all back on terra firma and Royce

658

00:43:58,240 --> 00:43:55,700

from Steve you know I watched you work

659

00:44:00,850 --> 00:43:58,250

this mission from the very beginning and

660

00:44:03,130 --> 00:44:00,860

I watched your team working I watched

661

00:44:05,500 --> 00:44:03,140

you guys knock down every little problem

662

00:44:07,690 --> 00:44:05,510

in every little detail flat I watched

663

00:44:09,010 --> 00:44:07,700

the planners replan this mission for

664

00:44:11,560 --> 00:44:09,020

four months

665

00:44:14,890 --> 00:44:11,570

with varying timelines as well as the

666

00:44:17,110 --> 00:44:14,900

shuttle site and I've got to say is is

667

00:44:20,320 --> 00:44:17,120

real testimony to your team and your

668

00:44:22,450 --> 00:44:20,330

leads and all that you did to keep that

669

00:44:24,520 --> 00:44:22,460

keep us organized keep us focused on the

670

00:44:25,990 --> 00:44:24,530

task at hand and get it done that made

671

00:44:27,760 --> 00:44:26,000

this a success we were just the

672

00:44:29,920 --> 00:44:27,770

executors but you guys are the ones that

673

00:44:32,800 --> 00:44:29,930

really put this all together so thank

674

00:44:45,320 --> 00:44:32,810

you from from both crews for all that

675

00:44:45,330 --> 00:44:57,559

discovery departing o michiga

676

00:44:57,569 --> 00:45:00,950

discovery

677

00:45:07,460 --> 00:45:05,090

good that yes see this you guys are

678

00:45:08,900 --> 00:45:07,470

heading home I want to stay one last

679

00:45:11,210 --> 00:45:08,910

time that we really enjoyed your company

680

00:45:14,420 --> 00:45:11,220

on board and I'm really proud of what we

681

00:45:17,720 --> 00:45:14,430

accomplished together as a team here on

682

00:45:20,150 --> 00:45:17,730

the space station but also including the

683

00:45:21,710 --> 00:45:20,160

larger team in Houston and all the

684

00:45:24,560 --> 00:45:21,720

control centers around the world

685

00:45:26,780 --> 00:45:24,570

this space program and doing something

686

00:45:28,760 --> 00:45:26,790

as complicated as this really takes a

687

00:45:31,640 --> 00:45:28,770

team effort and I think what we've

688

00:45:33,890 --> 00:45:31,650

proven here this last week like to wish

689

00:45:36,650 --> 00:45:33,900

you guys a safe rest year flight and a

690

00:45:40,000 --> 00:45:36,660

safe landing and I will see you all back

691

00:45:42,320 --> 00:45:40,010

and he's been here in about a week or so

692

00:45:44,630 --> 00:45:42,330

it's gone I couldn't agree more I think

693

00:45:46,670 --> 00:45:44,640

the team over between our two crews and

694

00:45:48,440 --> 00:45:46,680

the larger ground team that plan this

695

00:45:51,560 --> 00:45:48,450

and put it all together I think enabled

696

00:45:53,180 --> 00:45:51,570

us together to get well over 100% of our

697

00:45:55,130 --> 00:45:53,190

objectives are not percentage but is a

698

00:45:56,720 --> 00:45:55,140

lot more than we planned on doing and

699

00:45:58,460 --> 00:45:56,730

it's been a pleasure working with your

700

00:46:00,680 --> 00:45:58,470

team and look forward to seeing you guys

701  
00:46:03,680 --> 00:46:00,690  
they've travel for everybody on board

702  
00:46:09,090 --> 00:46:03,690  
and we will see you in about a week okay

703  
00:46:16,540 --> 00:46:13,660  
we waited long for this day to come

704  
00:46:20,680 --> 00:46:16,550  
the robber men not Lots but into the

705  
00:46:23,560 --> 00:46:20,690  
ball and son I can't wait to see y'all

706  
00:46:28,520 --> 00:46:23,570  
sweet mysteries the moon the stars our

707  
00:46:45,030 --> 00:46:33,810  
flat home on your silver wings yo new

708  
00:46:50,430 --> 00:46:45,040  
song for the world yes you can change

709  
00:46:52,890 --> 00:46:50,440  
the world and you wake up music this

710  
00:46:57,240 --> 00:46:52,900  
morning was brought to you live by

711  
00:47:01,020 --> 00:46:57,250  
bighead Todd and the monster well good

712  
00:47:03,600 --> 00:47:01,030  
morning and thanks to them and they were

713  
00:47:05,760 --> 00:47:03,610

the number one vote getter and the

714

00:47:08,520 --> 00:47:05,770

little program song contest whoo

715

00:47:11,400 --> 00:47:08,530

congratulations them and thanks for that

716

00:47:13,980 --> 00:47:11,410

that's for recording it's a good to be

717

00:47:16,100 --> 00:47:13,990

up here looking forward to the day well

718

00:47:18,240 --> 00:47:16,110

on behalf of bigot on the monsters and

719

00:47:20,070 --> 00:47:18,250

songwriters and artists everywhere we

720

00:47:22,350 --> 00:47:20,080

just want to thank you so much for your

721

00:47:26,220 --> 00:47:22,360

courage and your bravery and your effort

722

00:47:29,280 --> 00:47:26,230

in just giving all of us a better shot

723

00:47:32,220 --> 00:47:29,290

at knowing more and it's very

724

00:47:35,370 --> 00:47:32,230

inspirational to the arts as well so

725

00:47:37,470 --> 00:47:35,380

thank you very much and and well well

726  
00:47:39,120 --> 00:47:37,480  
wish you could see what we can see we

727  
00:47:41,160 --> 00:47:39,130  
look at it the earth and hopefully

728  
00:47:43,440 --> 00:47:41,170  
everybody will be able to do that one of

729  
00:47:46,579 --> 00:47:43,450  
these days hopefully sooner rather than

730  
00:47:52,050 --> 00:47:49,349  
discovery has contributed greatly the

731  
00:47:54,150 --> 00:47:52,060  
space shuttle program she's flown a good

732  
00:47:55,859 --> 00:47:54,160  
portion of the major most significant

733  
00:47:58,040 --> 00:47:55,869  
flights in the space shuttle program she

734  
00:48:00,140 --> 00:47:58,050  
she deployed the Hubble Space Telescope

735  
00:48:03,300 --> 00:48:00,150  
13 trips to the space station

736  
00:48:05,339 --> 00:48:03,310  
contributing the Assembly of the space

737  
00:48:07,410 --> 00:48:05,349  
station in a very big way he's been in

738  
00:48:10,290 --> 00:48:07,420

the MIR space station she's done science

739

00:48:12,089 --> 00:48:10,300

missions she's done all of the return to

740

00:48:14,339 --> 00:48:12,099

flight test missions both after

741

00:48:16,290 --> 00:48:14,349

Challenger and after Columbia bringing

742

00:48:19,200 --> 00:48:16,300

us back into space after those tragedies

743

00:48:20,790 --> 00:48:19,210

on this final day on orbit when I think

744

00:48:22,109 --> 00:48:20,800

about Discoverer I think about all that

745

00:48:25,260 --> 00:48:22,119

I think about all the people that went

746

00:48:27,540 --> 00:48:25,270

before them before us on this vehicle

747

00:48:29,339 --> 00:48:27,550

but mostly what I think about are the

748

00:48:31,170 --> 00:48:29,349

thousands and thousands of people across

749

00:48:34,589 --> 00:48:31,180

the space shuttle program these past 30

750

00:48:36,270 --> 00:48:34,599

years who designed this vehicle built

751

00:48:38,490 --> 00:48:36,280

this vehicle have taken care of this

752

00:48:40,740 --> 00:48:38,500

vehicle in operating this vehicle not

753

00:48:42,570 --> 00:48:40,750

just from the cockpit but also those who

754

00:48:44,760 --> 00:48:42,580

operated this vehicle from the ground

755

00:48:49,950 --> 00:48:44,770

and that that is for greatest legacy to

756

00:48:51,540 --> 00:48:49,960

me our first views a space shuttle

757

00:48:53,310 --> 00:48:51,550

Discovery as it bears down on the

758

00:48:54,930 --> 00:48:53,320

Kennedy Space Center the to air data

759

00:48:58,500 --> 00:48:54,940

probes on the left and right side of

760

00:48:59,670 --> 00:48:58,510

Discovery's nose have been deployed they

761

00:49:01,349 --> 00:48:59,680

were measuring the speed of the wind

762

00:49:03,120 --> 00:49:01,359

around the vehicle and updating the air

763

00:49:06,780 --> 00:49:03,130

speed and rate of descent to the onboard

764

00:49:10,520 --> 00:49:06,790

computers discover you are on energy

765

00:49:15,060 --> 00:49:10,530

approach on the hack latest winds now

766

00:49:16,109 --> 00:49:15,070

1/7 peak to 5 out of 1 5 0 so it's

767

00:49:19,800 --> 00:49:16,119

straight down the runway

768

00:49:21,570 --> 00:49:19,810

we ran the energy numbers with a higher

769

00:49:23,550 --> 00:49:21,580

peak wind that we gave you earlier which

770

00:49:26,270 --> 00:49:23,560

was the 18 peak 28 still getting you

771

00:49:38,460 --> 00:49:26,280

2200 feet down so we'll call it that

772

00:49:39,990 --> 00:49:38,470

2100 at 195 discovery now approaching

773

00:49:41,310 --> 00:49:40,000

the heading alignment circle this is an

774

00:49:43,740 --> 00:49:41,320

imaginary circle created by the

775

00:49:45,060 --> 00:49:43,750

microwave landing system it sits at the

776

00:49:47,460 --> 00:49:45,070

end of the runway and is about seven

777

00:49:48,720 --> 00:49:47,470

miles in diameter commander steve

778

00:49:50,250 --> 00:49:48,730

lindsey will take over the flight of the

779

00:49:52,589 --> 00:49:50,260

shuttle around this circle which will

780

00:49:54,180 --> 00:49:52,599

set it up for final approach sonic booms

781

00:49:56,070 --> 00:49:54,190

now heard at the Kennedy Space Center

782

00:50:07,290 --> 00:49:56,080

announcing Discovery's arrival three and

783

00:50:09,150 --> 00:50:07,300

a half minutes to touchdown discovery

784

00:50:10,440 --> 00:50:09,160

beginning this left-hand turn around

785

00:50:22,410 --> 00:50:10,450

this heading alignment circle this will

786

00:50:24,210 --> 00:50:22,420

be a 252 degree left-hand turn pilot

787

00:50:26,010 --> 00:50:24,220

eric boe has taken over control of the

788

00:50:31,220 --> 00:50:26,020

flight at this point discovery traveling

789

00:50:31,230 --> 00:50:38,180

discovery we see you on at the 180

790

00:50:42,180 --> 00:50:40,260

discovery crossing out over the Atlantic

791

00:50:50,400 --> 00:50:42,190

then back over the eastern edge of

792

00:50:52,079 --> 00:50:50,410

Florida commander steve lindsey back in

793

00:50:53,430 --> 00:50:52,089

control of discovery for the remainder

794

00:50:55,430 --> 00:50:53,440

of this heading alignment circle two

795

00:50:58,260 --> 00:50:55,440

minutes 30 seconds to touchdown

796

00:51:09,030 --> 00:50:58,270

discovery traveling 440 miles an hour in

797

00:51:28,450 --> 00:51:26,530

discover you are on at the 92 minutes to

798

00:51:31,620 --> 00:51:28,460

touchdown discovery traveling 400 miles

799

00:51:35,740 --> 00:51:33,550

discovery beginning to line up with

800

00:51:37,270 --> 00:51:35,750

runway one-five this is the Northwest to

801  
00:51:44,140 --> 00:51:37,280  
Southeast approach at the Kennedy Space

802  
00:51:45,670 --> 00:51:44,150  
Center during this point in the flight

803  
00:51:47,500 --> 00:51:45,680  
the shuttles descent rate is 20 times

804  
00:51:50,400 --> 00:51:47,510  
higher in the glide slope is 7 times

805  
00:51:52,780 --> 00:51:50,410  
steeper than a commercial airliner

806  
00:51:54,850 --> 00:51:52,790  
discovery speed 400 miles an hour its

807  
00:51:59,890 --> 00:51:54,860  
altitude 2 miles continuing to line up

808  
00:52:06,540 --> 00:51:59,900  
with the runway there at KSC we agree

809  
00:52:10,060 --> 00:52:08,560  
the heads-up display will allow

810  
00:52:11,740 --> 00:52:10,070  
commander steve lindsey to line up

811  
00:52:13,330 --> 00:52:11,750  
Discovery's nose with a runway you will

812  
00:52:14,860 --> 00:52:13,340  
see two arrows approach from the bottom

813  
00:52:22,200 --> 00:52:14,870

he will continue to lift the nose of the

814

00:52:26,620 --> 00:52:25,180

discovery speed 370 miles an hour this

815

00:52:46,870 --> 00:52:26,630

is Space Shuttle Discovery's final

816

00:52:48,640 --> 00:52:46,880

minutes of flight space shuttle

817

00:52:51,370 --> 00:52:48,650

Discovery now on final approach to the

818

00:53:02,710 --> 00:52:51,380

Kennedy Space Center just more than 30

819

00:53:02,720 --> 00:53:16,540

discoveries gear is down and locked

820

00:53:21,020 --> 00:53:19,550

ming gear touchdown the nose of the

821

00:53:26,230 --> 00:53:21,030

shuttle being rotated down toward the

822

00:53:33,200 --> 00:53:30,440

and nose gear touchdown in the end of a

823

00:53:35,930 --> 00:53:33,210

historic journey and to the ship that

824

00:54:12,670 --> 00:53:35,940

has led the way time and time again we

825

00:54:20,019 --> 00:54:15,309

and Houston distillery for the final

826  
00:54:22,120 --> 00:54:20,029  
time wheels dot discovery Houston Pinto

827  
00:54:23,319 --> 00:54:22,130  
a great job by you and your crew that

828  
00:54:26,049 --> 00:54:23,329  
was a great landing in tough conditions

829  
00:54:28,210 --> 00:54:26,059  
and it was an awesome docked mission

830  
00:54:31,210 --> 00:54:28,220  
that y'all had you were able to take

831  
00:54:34,120 --> 00:54:31,220  
discovery up to a full 365 degree hour

832  
00:54:35,710 --> 00:54:34,130  
365 days of actual time on-orbit I think

833  
00:54:38,260 --> 00:54:35,720  
that you'd call that a fleet leader and

834  
00:55:06,130 --> 00:54:38,270  
a leader of any manned vehicle for time

835  
00:55:12,099 --> 00:55:06,140  
in orbit so job well done well fed on

836  
00:55:14,079 --> 00:55:12,109  
all and we totally agree thank you wow

837  
00:55:16,510 --> 00:55:14,089  
it's great to be back I am so thankful

838  
00:55:18,809 --> 00:55:16,520

that we got to land back here at Kennedy

839

00:55:22,059 --> 00:55:18,819

Space Center to the home of discovery

840

00:55:24,579 --> 00:55:22,069

Charlie mentioned 39 flights we believe

841

00:55:28,240 --> 00:55:24,589

if we did our math right which we may

842

00:55:31,620 --> 00:55:28,250

not have this is 365 days on orbit for

843

00:55:36,010 --> 00:55:31,630

discovery an entire year in space

844

00:55:38,289 --> 00:55:36,020

discovery launched and came back on this

845

00:55:41,380 --> 00:55:38,299

flight just like my previous two flights

846

00:55:44,079 --> 00:55:41,390

on discovery with absolutely no liens

847

00:55:46,089 --> 00:55:44,089

against you're no single system with any

848

00:55:48,849 --> 00:55:46,099

problems whatsoever and if you think

849

00:55:51,160 --> 00:55:48,859

about a vehicle that's 26 27 years old

850

00:55:54,549 --> 00:55:51,170

been flying for that long to come back

851  
00:55:56,349 --> 00:55:54,559  
perfect I have never seen an airplane be

852  
00:55:58,599 --> 00:55:56,359  
able to do that but because of the

853  
00:56:00,760 --> 00:55:58,609  
Kennedy Space Center workforce here that

854  
00:56:03,910 --> 00:56:00,770  
takes care of this vehicle it came back

855  
00:56:06,819 --> 00:56:03,920  
as perfect on his final flight as it did

856  
00:56:10,150 --> 00:56:06,829  
on his first flight I'm extremely proud

857  
00:56:12,880 --> 00:56:10,160  
of this crew here my crew did a

858  
00:56:15,069 --> 00:56:12,890  
fantastic job the ground teams did a

859  
00:56:17,349 --> 00:56:15,079  
fantastic job we accomplished every

860  
00:56:19,720 --> 00:56:17,359  
objective we set out to do then and plus

861  
00:56:23,049 --> 00:56:19,730  
a whole bunch more but it was these

862  
00:56:24,549 --> 00:56:23,059  
folks on orbit that did it and I'm

863  
00:56:25,819 --> 00:56:24,559

extremely proud of them and the job that

864

00:56:27,170 --> 00:56:25,829

they did

865

00:56:30,499 --> 00:56:27,180

as Charlie mentioned it's a pretty

866

00:56:32,329 --> 00:56:30,509

bittersweet moment for all of us it's as

867

00:56:33,799 --> 00:56:32,339

the minutes past I'm getting actually

868

00:56:35,749 --> 00:56:33,809

getting sadder and sadder about this

869

00:56:37,249 --> 00:56:35,759

being the last fight and I know I know

870

00:56:40,249 --> 00:56:37,259

all the folks involved in shuttle

871

00:56:41,749 --> 00:56:40,259

program feel the same way but the kind

872

00:56:45,709 --> 00:56:41,759

of end this I would like to thank Bob

873

00:56:47,719 --> 00:56:45,719

Cabana in the Kennedy Space Center for

874

00:56:50,989 --> 00:56:47,729

giving us just a fantastic vehicle to

875

00:56:52,699 --> 00:56:50,999

fly it was a privilege to to be able to

876

00:56:56,150 --> 00:56:52,709

be in charge of her for just a couple of

877

00:56:57,709 --> 00:56:56,160

weeks and I'm sad to give her back but I

878

00:56:59,440 --> 00:56:57,719

could imagine giving her back into

879

00:57:02,660 --> 00:56:59,450

better hands in this group right here