



1
00:00:35,190 --> 00:00:32,709
all right so we're just about 21 minutes

2
00:00:36,870 --> 00:00:35,200
away from our arrival at waypoint one so

3
00:00:39,270 --> 00:00:36,880
if you're just tuning in we're already

4
00:00:41,830 --> 00:00:39,280
well into our kind of final rendezvous

5
00:00:44,069 --> 00:00:41,840
steps uh we passed waypoint zero which

6
00:00:45,830 --> 00:00:44,079
was just 400 meters below the station

7
00:00:47,910 --> 00:00:45,840
and dragon right now is executing the

8
00:00:50,549 --> 00:00:47,920
maneuver that's swinging it out front

9
00:00:52,950 --> 00:00:50,559
and over top until we're directly in

10
00:00:54,709 --> 00:00:52,960
front of that docking port on the space

11
00:00:56,790 --> 00:00:54,719
facing side of the harmony module so

12
00:00:57,750 --> 00:00:56,800
we've got about 20 minutes until we get

13
00:01:00,630 --> 00:00:57,760

there

14

00:01:02,630 --> 00:01:00,640

the teams here in hawthorne

15

00:01:03,750 --> 00:01:02,640

monitoring the crew on board dragon

16

00:01:05,270 --> 00:01:03,760

monitoring we're looking over their

17

00:01:07,670 --> 00:01:05,280

shoulders right now

18

00:01:10,390 --> 00:01:07,680

and the teams out in

19

00:01:12,390 --> 00:01:10,400

mission control houston also standing by

20

00:01:15,109 --> 00:01:12,400

as we're well into our integrated

21

00:01:17,190 --> 00:01:15,119

operations let's do a quick check in

22

00:01:18,950 --> 00:01:17,200

with everybody over there

23

00:01:20,789 --> 00:01:18,960

shanique give us an update how's the

24

00:01:22,230 --> 00:01:20,799

team in mission control houston doing

25

00:01:26,310 --> 00:01:22,240

how's the crew doing as we get through

26

00:01:31,190 --> 00:01:29,030

yeah thanks dan um so far uh this

27

00:01:33,109 --> 00:01:31,200

afternoon the crew on the station is

28

00:01:34,630 --> 00:01:33,119

doing good and so is the flight

29

00:01:36,230 --> 00:01:34,640

directors and the flight controllers in

30

00:01:39,350 --> 00:01:36,240

housto uh mission control houston

31

00:01:42,550 --> 00:01:39,360

currently crew woke up on station around

32

00:01:45,030 --> 00:01:42,560

3 30 p.m central time after a nap period

33

00:01:47,270 --> 00:01:45,040

and began per begin preparations for

34

00:01:49,350 --> 00:01:47,280

crew 4's arrival

35

00:01:51,429 --> 00:01:49,360

this included as you discussed earlier

36

00:01:53,590 --> 00:01:51,439

some casas or some temporary living

37

00:01:55,590 --> 00:01:53,600

quarters for the additional crew members

38

00:01:57,510 --> 00:01:55,600

and setting up that special software in

39

00:01:59,749 --> 00:01:57,520

the station's cupola to track dragon's

40

00:02:02,550 --> 00:01:59,759

approach and docking nasa astronaut and

41

00:02:04,149 --> 00:02:02,560

current station commander tom marshburn

42

00:02:06,069 --> 00:02:04,159

will be the prime

43

00:02:08,150 --> 00:02:06,079

be prime for monitoring and making sure

44

00:02:10,070 --> 00:02:08,160

dragon freedom stays in the expected

45

00:02:12,150 --> 00:02:10,080

zones

46

00:02:14,309 --> 00:02:12,160

once dragon is docked it will join five

47

00:02:17,030 --> 00:02:14,319

parked um vehicles at the international

48

00:02:19,670 --> 00:02:17,040

space station including spacex dragon

49

00:02:21,510 --> 00:02:19,680

endurance which was which is what

50

00:02:24,550 --> 00:02:21,520

brought up crew 3 astronauts back in

51
00:02:28,470 --> 00:02:26,229
the northrop grumman cygnus space

52
00:02:31,670 --> 00:02:28,480
freighter the russians and russia's

53
00:02:34,070 --> 00:02:31,680
soyuz ms-21 cruise ship and progress 79

54
00:02:36,390 --> 00:02:34,080
and 80 resupply ships

55
00:02:39,350 --> 00:02:36,400
again after doc marshman will also be

56
00:02:41,350 --> 00:02:39,360
primed to start hatch opening operations

57
00:02:43,830 --> 00:02:41,360
he'll start by up opening the large

58
00:02:45,430 --> 00:02:43,840
hatch on the node 2 zenith port giving

59
00:02:47,509 --> 00:02:45,440
him access to the pressurized mating

60
00:02:49,509 --> 00:02:47,519
adapter the crew will then have to

61
00:02:51,270 --> 00:02:49,519
pressurize the vestibule which is that

62
00:02:53,589 --> 00:02:51,280
small space between the hatches on the

63
00:02:55,430 --> 00:02:53,599

dragon and the space station

64

00:02:57,350 --> 00:02:55,440

this was previously exposed to vacuum

65

00:02:59,270 --> 00:02:57,360

prior to docking so the crew will need

66

00:03:01,270 --> 00:02:59,280

to fill it with air and make sure its

67

00:03:03,270 --> 00:03:01,280

pressure is nearly equal to that of the

68

00:03:04,470 --> 00:03:03,280

atmospheric pressure on the dragon and

69

00:03:08,949 --> 00:03:04,480

the station

70

00:03:10,550 --> 00:03:08,959

again dan mentioned 14.7 psi

71

00:03:12,550 --> 00:03:10,560

marshburn will also

72

00:03:14,229 --> 00:03:12,560

allow will have us

73

00:03:15,910 --> 00:03:14,239

release a small valve on the station's

74

00:03:17,750 --> 00:03:15,920

hatch to slowly introduce the air on the

75

00:03:19,350 --> 00:03:17,760

station's festival and flight

76

00:03:21,270 --> 00:03:19,360

controllers here in mission control

77

00:03:23,030 --> 00:03:21,280

houston will monitor and verify the

78

00:03:24,470 --> 00:03:23,040

pressure readings to make sure

79

00:03:26,949 --> 00:03:24,480

everything is leak-free before we get

80

00:03:28,630 --> 00:03:26,959

ready to open up the hatches

81

00:03:30,149 --> 00:03:28,640

currently nasa flight director audi

82

00:03:32,149 --> 00:03:30,159

boulos is leading the team here in

83

00:03:34,630 --> 00:03:32,159

mission control houston for dragon's

84

00:03:36,869 --> 00:03:34,640

approach and docking

85

00:03:38,550 --> 00:03:36,879

right next to him is the capcom

86

00:03:40,309 --> 00:03:38,560

alex kanellinkos who will be

87

00:03:43,509 --> 00:03:40,319

communicating with the crew aboard the

88

00:03:47,270 --> 00:03:44,949

right now there are currently seven

89

00:03:48,470 --> 00:03:47,280

astronauts and cosmonauts living and

90

00:03:52,070 --> 00:03:48,480

working on the international space

91

00:03:54,949 --> 00:03:52,080

station including nasa's kayla baron

92

00:03:57,270 --> 00:03:54,959

raja achary tom marshburn

93

00:03:58,470 --> 00:03:57,280

european space agency astronaut matthias

94

00:04:01,030 --> 00:03:58,480

maurer

95

00:04:03,910 --> 00:04:01,040

and ross cosma's cosmonauts sergey

96

00:04:05,910 --> 00:04:03,920

korsakoff oleg artemyev and denise

97

00:04:07,670 --> 00:04:05,920

modvayev

98

00:04:10,390 --> 00:04:07,680

crew 4 joining will bring the crew

99

00:04:12,550 --> 00:04:10,400

compliment to 11.

100

00:04:15,830 --> 00:04:12,560

again we're very excited to get the crew

101
00:04:16,870 --> 00:04:15,840
aboard and that's it dan we're looking

102
00:04:18,310 --> 00:04:16,880
good over here in mission control

103
00:04:20,069 --> 00:04:18,320
houston back over to you guys in

104
00:04:22,469 --> 00:04:20,079
hawthorne

105
00:04:25,350 --> 00:04:22,479
all right thanks so much anika and for

106
00:04:28,629 --> 00:04:25,360
everybody just now tuning in across nasa

107
00:04:30,550 --> 00:04:28,639
social media accounts welcome we got

108
00:04:32,790 --> 00:04:30,560
this view just for you

109
00:04:35,270 --> 00:04:32,800
this is a look at the international

110
00:04:38,150 --> 00:04:35,280
space station from the dragon spacecraft

111
00:04:39,350 --> 00:04:38,160
freedom as it's in the final stages of

112
00:04:42,310 --> 00:04:39,360
its approach

113
00:04:44,629 --> 00:04:42,320

we've essentially moved out directly in

114

00:04:45,830 --> 00:04:44,639

front of the space station right now so

115

00:04:48,469 --> 00:04:45,840

we're looking

116

00:04:50,150 --> 00:04:48,479

uh right at a docking port on the no two

117

00:04:53,030 --> 00:04:50,160

forward where another dragon is

118

00:04:55,990 --> 00:04:53,040

currently docked we're gonna continue up

119

00:04:58,870 --> 00:04:56,000

about 90 degrees until dragons directly

120

00:05:01,270 --> 00:04:58,880

over top of the station just 220 meters

121

00:05:03,670 --> 00:05:01,280

away from its docking port and then at

122

00:05:05,749 --> 00:05:03,680

that point we'll be at what's known as

123

00:05:08,310 --> 00:05:05,759

waypoint one

124

00:05:10,710 --> 00:05:08,320

pretty soon the teams are going to do

125

00:05:13,830 --> 00:05:10,720

just a final go no go to proceed past

126
00:05:16,230 --> 00:05:13,840
waypoint one and on to waypoint two

127
00:05:18,390 --> 00:05:16,240
at which point we'll stop just 20 meters

128
00:05:21,270 --> 00:05:18,400
away from the space station's docking

129
00:05:24,230 --> 00:05:21,280
port do a final check on dragon systems

130
00:05:26,710 --> 00:05:24,240
spacex on dragging the ground no status

131
00:05:28,629 --> 00:05:26,720
update to report just checking in

132
00:05:53,990 --> 00:05:28,639
vehicle continues to look healthy as we

133
00:05:58,309 --> 00:05:56,150
we're getting a look at the the core

134
00:06:08,710 --> 00:05:58,319
jake vendel who's

135
00:06:12,150 --> 00:06:11,189
and right on cue here comes the sun

136
00:06:21,110 --> 00:06:12,160
we're now

137
00:06:26,469 --> 00:06:23,749
if you uh look closely there you can see

138
00:06:29,270 --> 00:06:26,479

the various draco thrusters

139

00:06:31,189 --> 00:06:29,280

uh firing there's a total of 16 of them

140

00:06:34,309 --> 00:06:31,199

on board dragon

141

00:06:36,629 --> 00:06:34,319

12 of them are located around the body

142

00:06:38,790 --> 00:06:36,639

or the base of dragon

143

00:06:40,469 --> 00:06:38,800

and then there are four located

144

00:06:49,029 --> 00:06:40,479

around the forward hash those are the

145

00:06:55,670 --> 00:06:52,230

since dragon is approaching the space

146

00:06:58,469 --> 00:06:55,680

station uh whenever you see those uh

147

00:07:00,870 --> 00:06:58,479

those forward thrusters uh fire it's

148

00:07:03,270 --> 00:07:00,880

basically you know course correcting

149

00:07:04,950 --> 00:07:03,280

almost like slowing dragon down

150

00:07:07,749 --> 00:07:04,960

but it looks like we're primarily

151
00:07:09,909 --> 00:07:07,759
utilizing the bulkhead thrusters we're

152
00:07:13,589 --> 00:07:09,919
not the volca bulkhead the um the side

153
00:07:17,589 --> 00:07:15,270
yeah we'll be using those service

154
00:07:19,350 --> 00:07:17,599
sections for

155
00:07:21,909 --> 00:07:19,360
because we're doing what's essentially a

156
00:07:23,830 --> 00:07:21,919
translational maneuver so in

157
00:07:26,309 --> 00:07:23,840
in your orbital mechanics it's moving

158
00:07:28,309 --> 00:07:26,319
side to side up down

159
00:07:29,990 --> 00:07:28,319
and then we'll use the we've used those

160
00:07:31,110 --> 00:07:30,000
forward bulkheads for all of our kind of

161
00:07:33,510 --> 00:07:31,120
pushing

162
00:07:35,350 --> 00:07:33,520
for us as we as we were chasing down the

163
00:07:37,270 --> 00:07:35,360

space station so

164

00:07:39,110 --> 00:07:37,280

as we're in this sunrise lighting

165

00:07:40,950 --> 00:07:39,120

conditions are perfect to see some of

166

00:07:43,430 --> 00:07:40,960

those thruster firings you're saying it

167

00:07:45,029 --> 00:07:43,440

is dragon just autonomously fine tunes

168

00:07:47,909 --> 00:07:45,039

its path

169

00:07:53,270 --> 00:07:47,919

right up until we hit waypoint one in a

170

00:07:59,670 --> 00:07:56,869

the propellants that we use on dragon

171

00:08:01,830 --> 00:07:59,680

are actually loaded onto dragon several

172

00:08:04,309 --> 00:08:01,840

days a couple weeks actually prior to

173

00:08:06,869 --> 00:08:04,319

launch itself we do all of that uh prop

174

00:08:11,670 --> 00:08:06,879

loading over at a place called area

175

00:08:13,189 --> 00:08:11,680

59 or dragon land which is um at

176
00:08:15,430 --> 00:08:13,199
kennedy and

177
00:08:16,950 --> 00:08:15,440
uh those propellants are are

178
00:08:20,629 --> 00:08:16,960
monomethylhydrazine

179
00:08:22,869 --> 00:08:20,639
and nitrogen tetroxide and they

180
00:08:25,350 --> 00:08:22,879
combust instantaneously when they meet

181
00:08:27,749 --> 00:08:25,360
each other so there's basically

182
00:08:31,029 --> 00:08:27,759
you know two different types of holding

183
00:08:34,469 --> 00:08:31,039
tanks for that those propellants um and

184
00:08:37,750 --> 00:08:34,479
then whenever dragon quickly flows those

185
00:08:40,389 --> 00:08:37,760
propellants into the combustion chamber

186
00:08:43,190 --> 00:08:40,399
of the draco engines

187
00:08:45,269 --> 00:08:43,200
because of their properties they boom

188
00:08:47,990 --> 00:08:45,279

fire as soon as they touch this is

189

00:08:50,870 --> 00:08:48,000

different than how we

190

00:08:52,630 --> 00:08:50,880

make fire on falcon 9 for example

191

00:08:55,990 --> 00:08:52,640

in that case

192

00:08:58,790 --> 00:08:56,000

with the liquid oxygen and the

193

00:09:01,670 --> 00:08:58,800

rocket-grade kerosene the rp-1

194

00:09:02,710 --> 00:09:01,680

those two propellants do not ignite when

195

00:09:04,389 --> 00:09:02,720

they touch

196

00:09:06,630 --> 00:09:04,399

you actually need an ignition source so

197

00:09:07,430 --> 00:09:06,640

for that we use t-tub

198

00:09:10,389 --> 00:09:07,440

but

199

00:09:13,269 --> 00:09:10,399

in space we don't want to you know use

200

00:09:15,750 --> 00:09:13,279

an ignition source um this version where

201
00:09:18,710 --> 00:09:15,760
we use what are called hypergolic fuels

202
00:09:22,070 --> 00:09:18,720
or excuse me hypergolic propellants um

203
00:09:24,389 --> 00:09:22,080
is safer for space and uh they and they

204
00:09:27,190 --> 00:09:24,399
it's much faster of a

205
00:09:30,070 --> 00:09:27,200
of a reaction and as you can see with

206
00:09:32,550 --> 00:09:30,080
these tiny bursts uh from various

207
00:09:35,190 --> 00:09:32,560
directions we need dragon to be to be

208
00:09:37,350 --> 00:09:35,200
quick we need those thrusters to um you

209
00:09:39,990 --> 00:09:37,360
know they're really more like impulses

210
00:09:41,590 --> 00:09:40,000
uh more so than you know just flat out

211
00:09:44,389 --> 00:09:41,600
burns

212
00:09:47,030 --> 00:09:44,399
yeah those those hyper goals come with

213
00:09:49,350 --> 00:09:47,040

the additional benefit of not requiring

214

00:09:51,269 --> 00:09:49,360

not requiring what's called cryogenic

215

00:09:54,150 --> 00:09:51,279

storage so

216

00:09:57,350 --> 00:09:54,160

as you see falcon 9 fuel we're using

217

00:10:00,790 --> 00:09:57,360

that ultra densified locks and to keep

218

00:10:02,790 --> 00:10:00,800

fuels super cold takes a lot of energy a

219

00:10:04,949 --> 00:10:02,800

lot of power

220

00:10:07,670 --> 00:10:04,959

and you can do that when you have an

221

00:10:09,910 --> 00:10:07,680

entire ground support system maintaining

222

00:10:12,949 --> 00:10:09,920

a cryogenic fuel inside a small space

223

00:10:14,710 --> 00:10:12,959

like a spacecraft not really feasible

224

00:10:17,350 --> 00:10:14,720

which is why you'll it's extremely

225

00:10:19,190 --> 00:10:17,360

common to see these hypergolic fuels

226

00:10:20,790 --> 00:10:19,200

used for onboard thrusters we use the

227

00:10:23,509 --> 00:10:20,800

exact same mix

228

00:10:27,030 --> 00:10:23,519

in the european service module for the

229

00:10:32,710 --> 00:10:30,550

and in fact almost the opposite of

230

00:10:35,509 --> 00:10:32,720

the falcon 9 fuels we actually have

231

00:10:38,550 --> 00:10:35,519

heaters that we have on the tanks

232

00:10:40,550 --> 00:10:38,560

um for those hyperbolic fuels just to as

233

00:10:42,150 --> 00:10:40,560

you can store them much closer to almost

234

00:10:45,110 --> 00:10:42,160

at room temperature

235

00:10:46,870 --> 00:10:45,120

which is one of their real real draws

236

00:10:48,310 --> 00:10:46,880

for use in addition to the simplicity

237

00:10:55,350 --> 00:10:48,320

that kate talked about where you don't

238

00:10:58,949 --> 00:10:57,030

so we're still swinging around we're

239

00:11:02,069 --> 00:10:58,959

just about 10 and a half minutes away

240

00:11:03,910 --> 00:11:02,079

from our uh our

241

00:11:06,790 --> 00:11:03,920

waypoint number one which will put

242

00:11:07,750 --> 00:11:06,800

dragon just 220 meters above the space

243

00:11:09,829 --> 00:11:07,760

station

244

00:11:12,230 --> 00:11:09,839

it'll still be outside of what's known

245

00:11:14,230 --> 00:11:12,240

as the keep out sphere that's our

246

00:11:16,470 --> 00:11:14,240

second imaginary shape around the space

247

00:11:17,590 --> 00:11:16,480

station that just helps to govern

248

00:11:19,590 --> 00:11:17,600

uh the

249

00:11:21,670 --> 00:11:19,600

really the rules for approaching

250

00:11:22,790 --> 00:11:21,680

spacecraft before you're in the keepout

251
00:11:24,790 --> 00:11:22,800
sphere

252
00:11:27,430 --> 00:11:24,800
you have to be

253
00:11:29,990 --> 00:11:27,440
on what's essentially a four orbit or

254
00:11:31,910 --> 00:11:30,000
about a six hour free safe trajectory

255
00:11:34,069 --> 00:11:31,920
where if we completely lost control of

256
00:11:35,030 --> 00:11:34,079
dragon it wouldn't move inside of that

257
00:11:38,069 --> 00:11:35,040
sphere

258
00:11:39,750 --> 00:11:38,079
uh which is about 200 meters in radius

259
00:11:41,269 --> 00:11:39,760
around the station and so what you're

260
00:11:42,389 --> 00:11:41,279
looking at this is the maneuver we're on

261
00:11:45,430 --> 00:11:42,399
right now we're a little more than

262
00:11:48,069 --> 00:11:45,440
halfway up that uh kind of half circle

263
00:11:49,829 --> 00:11:48,079

line that you see on the left as we've

264

00:11:52,230 --> 00:11:49,839

moved from waypoint zero and we're

265

00:11:53,990 --> 00:11:52,240

moving on up to waypoint one so we've

266

00:11:56,310 --> 00:11:54,000

already moved out directly in front

267

00:11:59,269 --> 00:11:56,320

we're now moving directly over the

268

00:12:04,069 --> 00:11:59,279

docking port on node 2 where dragon

269

00:12:10,550 --> 00:12:07,269

so the the joint the integrated teams

270

00:12:13,670 --> 00:12:10,560

here at mcc accent over in houston

271

00:12:14,949 --> 00:12:13,680

are doing joint polls

272

00:12:16,550 --> 00:12:14,959

it's one of

273

00:12:19,750 --> 00:12:16,560

everybody's favorite things in space

274

00:12:22,230 --> 00:12:19,760

flight is go no goes

275

00:12:24,389 --> 00:12:22,240

and so they do these joint polls and

276
00:12:26,470 --> 00:12:24,399
we're just constantly assessing not only

277
00:12:28,710 --> 00:12:26,480
making sure dragon's ready

278
00:12:30,310 --> 00:12:28,720
but all the systems on board station are

279
00:12:32,230 --> 00:12:30,320
ready we do

280
00:12:34,550 --> 00:12:32,240
a couple of

281
00:12:37,430 --> 00:12:34,560
configurations to the station

282
00:12:39,910 --> 00:12:37,440
to get ready for the docking we do

283
00:12:42,389 --> 00:12:39,920
what's called feathering just a special

284
00:12:44,790 --> 00:12:42,399
orientation of the solar arrays to help

285
00:12:47,590 --> 00:12:44,800
give them additional protection from any

286
00:12:48,710 --> 00:12:47,600
uh plumes or just those thruster firings

287
00:12:51,269 --> 00:12:48,720
those can

288
00:12:53,750 --> 00:12:51,279

leave a residue if you don't and that's

289

00:12:56,310 --> 00:12:53,760

any spacecraft that's flying and so we

290

00:12:58,949 --> 00:12:56,320

always orient the solar arrays

291

00:13:00,389 --> 00:12:58,959

we also are going to be changing up how

292

00:13:03,110 --> 00:13:00,399

we

293

00:13:05,030 --> 00:13:03,120

do the attitude control on station

294

00:13:07,030 --> 00:13:05,040

during this final approach typically

295

00:13:09,030 --> 00:13:07,040

we're using the large gyroscopes on the

296

00:13:10,470 --> 00:13:09,040

us section just for nominal attitude

297

00:13:12,949 --> 00:13:10,480

control

298

00:13:14,629 --> 00:13:12,959

and then when we get into the actual

299

00:13:17,190 --> 00:13:14,639

final approach and docking

300

00:13:20,069 --> 00:13:17,200

we hand over that control to the

301
00:13:21,590 --> 00:13:20,079
thrusters on the russian segment

302
00:13:23,430 --> 00:13:21,600
who can provide

303
00:13:25,269 --> 00:13:23,440
a much more kind of fine-tuned

304
00:13:41,430 --> 00:13:25,279
propulsive attitude control for that

305
00:13:41,440 --> 00:13:52,790
so

306
00:13:58,470 --> 00:13:54,470
and just checking in we're about seven

307
00:14:00,389 --> 00:13:58,480
minutes 40 seconds away from the arrival

308
00:14:10,949 --> 00:14:00,399
at waypoint one dragon

309
00:14:14,550 --> 00:14:13,269
at this point dragon using a couple of

310
00:14:16,550 --> 00:14:14,560
different

311
00:14:36,949 --> 00:14:16,560
navigational tools to

312
00:14:40,550 --> 00:14:39,030
and we're seven minutes away from

313
00:14:42,470 --> 00:14:40,560

waypoint one

314

00:14:44,550 --> 00:14:42,480

again as everything continues to look

315

00:14:46,150 --> 00:14:44,560

good on dragon freedom

316

00:14:47,910 --> 00:14:46,160

thrusters

317

00:14:49,670 --> 00:14:47,920

performing nominally we've got all the

318

00:14:51,269 --> 00:14:49,680

navigational tools that we need for

319

00:14:53,670 --> 00:14:51,279

final approach

320

00:14:57,030 --> 00:14:53,680

we'll be able to move in from waypoint

321

00:15:03,269 --> 00:14:57,040

one down to waypoint number two

322

00:15:07,430 --> 00:15:05,750

and then we will stop at waypoint 2

323

00:15:09,189 --> 00:15:07,440

and the teams will do

324

00:15:10,550 --> 00:15:09,199

just a final check-in

325

00:15:19,110 --> 00:15:10,560

and they'll give the go for final

326

00:15:22,310 --> 00:15:20,790

and then after

327

00:15:24,069 --> 00:15:22,320

final approach is complete again we'll

328

00:15:26,870 --> 00:15:24,079

be moving at a pretty slow pace we'll

329

00:15:29,189 --> 00:15:26,880

get that initial contact uh dragon using

330

00:15:31,350 --> 00:15:29,199

the soft capture system to interlock

331

00:15:33,110 --> 00:15:31,360

with the international docking adapter

332

00:15:34,150 --> 00:15:33,120

then that soft capturing will start to

333

00:15:35,749 --> 00:15:34,160

retract

334

00:15:37,189 --> 00:15:35,759

bring the spacecraft in and then we get

335

00:15:39,189 --> 00:15:37,199

ready for

336

00:15:41,590 --> 00:15:39,199

what's called the hard mate where we

337

00:15:43,509 --> 00:15:41,600

drive 12 hooks

338

00:15:45,350 --> 00:15:43,519

that will securely hold dragon to the

339

00:15:47,030 --> 00:15:45,360

docking port

340

00:15:48,230 --> 00:15:47,040

six of those hooks have actually already

341

00:15:50,150 --> 00:15:48,240

been used

342

00:15:52,629 --> 00:15:50,160

on this flight they hold down the

343

00:15:55,110 --> 00:15:52,639

docking or the nose cone during the

344

00:15:56,790 --> 00:15:55,120

ascent portion and then those are one of

345

00:15:58,230 --> 00:15:56,800

the first

346

00:15:59,749 --> 00:15:58,240

uh real

347

00:16:01,910 --> 00:15:59,759

checkouts or one of the first real

348

00:16:04,389 --> 00:16:01,920

operations after dragon separates from

349

00:16:05,749 --> 00:16:04,399

falcon 9 is to open those hooks and get

350

00:16:08,230 --> 00:16:05,759

the nose cone open

351
00:16:20,389 --> 00:16:08,240
revealing all of our navigation tools in

352
00:16:25,189 --> 00:16:22,870
oh as dragon we just started to move out

353
00:16:28,069 --> 00:16:25,199
of view there we got another view here

354
00:16:29,829 --> 00:16:28,079
we can see that it is slowly but surely

355
00:16:31,430 --> 00:16:29,839
making its approach to the international

356
00:16:34,550 --> 00:16:31,440
space station

357
00:16:36,069 --> 00:16:34,560
once again this is the crew 4 crew a

358
00:16:37,910 --> 00:16:36,079
long duration mission to the

359
00:16:40,870 --> 00:16:37,920
international space station

360
00:16:42,550 --> 00:16:40,880
they launched earlier today uh actually

361
00:16:47,590 --> 00:16:42,560
just this morning

362
00:16:49,509 --> 00:16:47,600
we had liftoff at 12 52 a.m pacific time

363
00:16:50,470 --> 00:16:49,519

and everything

364

00:16:53,269 --> 00:16:50,480

was

365

00:16:55,110 --> 00:16:53,279

super go for our conditions you know as

366

00:16:57,189 --> 00:16:55,120

we talked about before

367

00:16:59,269 --> 00:16:57,199

weather is always a determining factor

368

00:17:02,550 --> 00:16:59,279

and whether or not we get to go to space

369

00:17:04,309 --> 00:17:02,560

uh and while weather at the cape was

370

00:17:08,549 --> 00:17:04,319

a little challenging throughout the week

371

00:17:10,870 --> 00:17:08,559

um we were able to get the crew 4 crew

372

00:17:13,750 --> 00:17:10,880

out with you know really gorgeous

373

00:17:14,870 --> 00:17:13,760

conditions for a nighttime launch

374

00:17:16,710 --> 00:17:14,880

and

375

00:17:19,429 --> 00:17:16,720

everything has been going really well

376

00:17:22,390 --> 00:17:19,439

very smoothly the crew had a sleep

377

00:17:24,710 --> 00:17:22,400

period uh you know just a scheduled

378

00:17:27,429 --> 00:17:24,720

period where they had to go to sleep in

379

00:17:29,990 --> 00:17:27,439

preparation for docking activities which

380

00:17:32,789 --> 00:17:30,000

we are you know coming up to

381

00:17:35,830 --> 00:17:32,799

um they've had two meals at this point

382

00:17:38,230 --> 00:17:35,840

uh and as of right now they are buckled

383

00:17:39,830 --> 00:17:38,240

into their seats uh with their

384

00:17:42,710 --> 00:17:39,840

spacesuits on

385

00:17:44,870 --> 00:17:42,720

and uh they are monitoring the approach

386

00:17:46,470 --> 00:17:44,880

of dragon capsule to the international

387

00:17:48,549 --> 00:17:46,480

space station

388

00:17:50,230 --> 00:17:48,559

dragon is fully autonomous so it is

389

00:17:54,310 --> 00:17:50,240

flying itself right now

390

00:17:57,669 --> 00:17:54,320

the crew acts as a backup to

391

00:18:00,549 --> 00:17:57,679

the system essentially but uh dragon is

392

00:18:02,630 --> 00:18:00,559

doing all the calculations in real time

393

00:18:04,950 --> 00:18:02,640

taking all the data coming in from the

394

00:18:07,270 --> 00:18:04,960

station from mission control center here

395

00:18:08,870 --> 00:18:07,280

in hawthorne from mission control center

396

00:18:10,789 --> 00:18:08,880

in houston

397

00:18:12,470 --> 00:18:10,799

all of these inputs analyzing them in

398

00:18:14,470 --> 00:18:12,480

real time and making those course

399

00:18:16,230 --> 00:18:14,480

corrections which we just saw there

400

00:18:19,430 --> 00:18:16,240

that's what happens whenever we we see

401
00:18:22,549 --> 00:18:19,440
those draco thrusters firing and

402
00:18:24,789 --> 00:18:22,559
that's essentially just dragon

403
00:18:27,430 --> 00:18:24,799
steering itself uh to

404
00:18:33,510 --> 00:18:27,440
the next location that it has to go to

405
00:18:38,549 --> 00:18:34,950
and we should be just about three

406
00:18:43,669 --> 00:18:41,270
after that we'll just be about 220

407
00:18:45,590 --> 00:18:43,679
meters right now we're 250 meters away

408
00:18:47,350 --> 00:18:45,600
and so even as it's making this kind of

409
00:18:48,710 --> 00:18:47,360
swing up and around it's moved in a

410
00:18:50,789 --> 00:18:48,720
little bit closer

411
00:18:55,990 --> 00:18:50,799
that 400 meter range and we're down at

412
00:19:01,830 --> 00:18:58,630
then things do pick up after we get to

413
00:19:03,669 --> 00:19:01,840

waypoint one we we move in about 200

414

00:19:05,830 --> 00:19:03,679

more meters until we hit waypoint two

415

00:19:06,710 --> 00:19:05,840

stopping just about 20 meters 60 feet or

416

00:19:09,270 --> 00:19:06,720

so

417

00:19:19,430 --> 00:19:09,280

the docking port and then we wait for

418

00:19:25,110 --> 00:19:22,630

then after they get docked there's

419

00:19:28,310 --> 00:19:25,120

a flurry of activity that happens both

420

00:19:30,150 --> 00:19:28,320

inside dragon and on the station side uh

421

00:19:32,150 --> 00:19:30,160

on board dragon they'll get to go to dog

422

00:19:33,669 --> 00:19:32,160

for get out of their suits and they set

423

00:19:36,630 --> 00:19:33,679

them up to dry

424

00:19:38,950 --> 00:19:36,640

essentially uh attaching the fan base on

425

00:19:41,110 --> 00:19:38,960

the big loop approach one and soft

426
00:19:43,270 --> 00:19:41,120
capture ring extension will begin

427
00:19:55,909 --> 00:19:43,280
shortly dragon will continue approach to

428
00:20:00,310 --> 00:19:57,590
the core here in

429
00:20:02,710 --> 00:20:00,320
hawthorne jake vandal

430
00:20:04,390 --> 00:20:02,720
bendel

431
00:20:06,390 --> 00:20:04,400
giving the crew dragon freedom

432
00:20:07,909 --> 00:20:06,400
astronauts a heads up that

433
00:20:09,990 --> 00:20:07,919
we're gonna just proceed right past

434
00:20:11,990 --> 00:20:10,000
waypoint one which will hit in under a

435
00:20:14,789 --> 00:20:12,000
minute and a half from now and move

436
00:20:17,110 --> 00:20:14,799
directly in towards waypoint two

437
00:20:19,110 --> 00:20:17,120
and that soft capturing is gonna extend

438
00:20:20,710 --> 00:20:19,120

out from the docking mechanism on dragon

439

00:20:22,149 --> 00:20:20,720

that's what's going to make that initial

440

00:20:25,029 --> 00:20:22,159

contact

441

00:20:26,630 --> 00:20:25,039

it's essentially three large metal pedal

442

00:20:28,549 --> 00:20:26,640

like structures

443

00:20:30,870 --> 00:20:28,559

that are going to interlock with the

444

00:20:32,710 --> 00:20:30,880

international docking adapter and after

445

00:20:35,750 --> 00:20:32,720

they make that initial contact it'll

446

00:20:37,510 --> 00:20:35,760

retract bring dragon enclosed

447

00:20:40,230 --> 00:20:37,520

essentially

448

00:20:42,149 --> 00:20:40,240

right up until forming a perfect seal

449

00:20:44,789 --> 00:20:42,159

and then we can enable those hard

450

00:20:50,149 --> 00:20:44,799

capture rings 12 in total to securely

451
00:21:01,190 --> 00:20:52,310
45 seconds until

452
00:21:05,110 --> 00:21:02,950
and we'll get an updated time after we

453
00:21:24,650 --> 00:21:05,120
get through 8.1 but we should be just

454
00:21:24,660 --> 00:21:35,029
[Music]

455
00:21:40,630 --> 00:21:37,270
you can see lots of draco thruster

456
00:21:40,640 --> 00:21:46,549
and we're just about to weigh point one

457
00:21:51,029 --> 00:21:48,710
and we got confirmation so we're through

458
00:21:57,990 --> 00:21:51,039
waypoint one

459
00:22:02,870 --> 00:22:00,630
these are primarily the service section

460
00:22:05,590 --> 00:22:02,880
uh draco thrusters that are firing

461
00:22:07,110 --> 00:22:05,600
essentially meaning they are located on

462
00:22:09,909 --> 00:22:07,120
the sides of dragon

463
00:22:13,430 --> 00:22:09,919

as opposed to the forward draco

464

00:22:14,789 --> 00:22:13,440

thrusters which are located at the top

465

00:22:17,909 --> 00:22:14,799

of dragon

466

00:22:19,909 --> 00:22:17,919

under the nose cone and around the

467

00:22:23,430 --> 00:22:19,919

around the hatch

468

00:22:26,310 --> 00:22:23,440

uh now um you know with waypoint one

469

00:22:28,470 --> 00:22:26,320

complete uh initial contact station

470

00:22:38,549 --> 00:22:28,480

spacex on the big loop expect

471

00:22:38,559 --> 00:22:46,710

station copies

472

00:22:50,470 --> 00:22:48,549

all right so that initial contact

473

00:22:53,350 --> 00:22:50,480

between dragon and the international

474

00:22:54,950 --> 00:22:53,360

space station uh is expected in about 30

475

00:22:56,310 --> 00:22:54,960

minutes

476
00:22:59,190 --> 00:22:56,320
now before

477
00:23:01,590 --> 00:22:59,200
uh before reaching waypoint one mission

478
00:23:03,669 --> 00:23:01,600
op mission operators conducted a go no

479
00:23:10,549 --> 00:23:03,679
go stationed on the big loop station is

480
00:23:22,950 --> 00:23:12,710
all right we just heard uh tom marshburn

481
00:23:26,870 --> 00:23:24,950
all right good news there um so

482
00:23:29,350 --> 00:23:26,880
conducted a poll to allow dragon to

483
00:23:31,590 --> 00:23:29,360
begin that approach to waypoint two uh

484
00:23:34,950 --> 00:23:31,600
which is located inside that keep out

485
00:23:36,390 --> 00:23:34,960
sphere which is about 20 meters away

486
00:23:38,630 --> 00:23:36,400
from the space station so we keep

487
00:23:41,430 --> 00:23:38,640
talking about these invisible shapes

488
00:23:43,430 --> 00:23:41,440

they're all intended uh primarily for

489

00:23:45,510 --> 00:23:43,440

safety of the crew both on board dragon

490

00:23:47,590 --> 00:23:45,520

and onboard station

491

00:23:50,390 --> 00:23:47,600

yeah and we we do this with every

492

00:23:51,990 --> 00:23:50,400

vehicle crew and cargo

493

00:23:53,909 --> 00:23:52,000

where we just have these checkpoints

494

00:23:56,310 --> 00:23:53,919

built in and you you put it beautiful

495

00:23:58,870 --> 00:23:56,320

earlier it's very similar to a countdown

496

00:24:01,269 --> 00:23:58,880

for launch where we have these times we

497

00:24:02,870 --> 00:24:01,279

have these moments built in to make sure

498

00:24:04,470 --> 00:24:02,880

all the different teams are in sync

499

00:24:05,990 --> 00:24:04,480

because we're constantly

500

00:24:07,909 --> 00:24:06,000

not just making sure that everything's

501
00:24:10,149 --> 00:24:07,919
looking good on dragon but also that all

502
00:24:11,590 --> 00:24:10,159
the systems on board the space station

503
00:24:15,110 --> 00:24:11,600
are ready to go that's why we're in what

504
00:24:17,269 --> 00:24:15,120
we call these integrated operations and

505
00:24:19,750 --> 00:24:17,279
as i've said a couple of times

506
00:24:22,630 --> 00:24:19,760
we're gonna be doing it slow and steady

507
00:24:24,390 --> 00:24:22,640
at this point um right now we're just

508
00:24:26,950 --> 00:24:24,400
about

509
00:24:29,510 --> 00:24:26,960
170 meters away from the station we're

510
00:24:31,029 --> 00:24:29,520
gonna get to waypoint two and pause and

511
00:24:33,269 --> 00:24:31,039
then we're gonna wait for that final go

512
00:24:35,510 --> 00:24:33,279
no go the latest docking time we're

513
00:24:37,909 --> 00:24:35,520

looking at right now is about 18 minutes

514

00:24:39,510 --> 00:24:37,919

from now so it should be coming at

515

00:24:41,990 --> 00:24:39,520

around

516

00:24:43,909 --> 00:24:42,000

4 42 p.m

517

00:24:45,590 --> 00:24:43,919

pacific time we'll get an exact docking

518

00:24:47,510 --> 00:24:45,600

time when it happens

519

00:24:49,909 --> 00:24:47,520

but we are still moving ahead of

520

00:24:51,110 --> 00:24:49,919

schedule um we're still about 40 minutes

521

00:24:53,430 --> 00:24:51,120

ahead of when we thought we were gonna

522

00:24:55,510 --> 00:24:53,440

dock and this was already one of the

523

00:24:57,990 --> 00:24:55,520

fastest there if not the fastest docking

524

00:24:59,510 --> 00:24:58,000

we've done on the crew dragon so far

525

00:25:02,310 --> 00:24:59,520

we're just continuing to stay ahead of

526
00:25:04,310 --> 00:25:02,320
schedule yeah for sure uh now at that 20

527
00:25:07,110 --> 00:25:04,320
meter distance from the station's

528
00:25:09,669 --> 00:25:07,120
docking adapter dragon's approach will

529
00:25:11,669 --> 00:25:09,679
slow and it'll begin to align itself

530
00:25:12,950 --> 00:25:11,679
with the adapter to come in for the

531
00:25:15,590 --> 00:25:12,960
final approach

532
00:25:17,510 --> 00:25:15,600
yeah and we heard the soft capture ring

533
00:25:19,510 --> 00:25:17,520
is being extended so that's just moving

534
00:25:22,310 --> 00:25:19,520
out a little bit from that very top part

535
00:25:25,110 --> 00:25:22,320
of dragon underneath the nose cone and

536
00:25:27,590 --> 00:25:25,120
it'll make that initial soft capture

537
00:25:29,269 --> 00:25:27,600
essentially using those metal pedals

538
00:25:31,510 --> 00:25:29,279

to interlock with the international

539

00:25:34,230 --> 00:25:31,520

docking adapter and after that contact

540

00:25:35,830 --> 00:25:34,240

is bait the ring on dragon will retract

541

00:25:37,350 --> 00:25:35,840

bring dragon in a little bit closer and

542

00:25:38,870 --> 00:25:37,360

then we can start the hard capture

543

00:25:41,750 --> 00:25:38,880

sequence

544

00:25:44,710 --> 00:25:41,760

and so dragon soft capturing has a bunch

545

00:25:46,470 --> 00:25:44,720

of dampers in the rotary springs and

546

00:25:48,470 --> 00:25:46,480

that just lessens the force as it brings

547

00:25:50,630 --> 00:25:48,480

it in a little bit closer and we make

548

00:25:52,950 --> 00:25:50,640

that initial contact with the station

549

00:25:55,269 --> 00:25:52,960

and after that we can engage those hooks

550

00:25:57,029 --> 00:25:55,279

and have a hard mate

551
00:25:58,230 --> 00:25:57,039
and then get ready to go through hat

552
00:26:00,390 --> 00:25:58,240
shops

553
00:26:02,870 --> 00:26:00,400
whenever i'm

554
00:26:03,909 --> 00:26:02,880
explaining the process to

555
00:26:05,350 --> 00:26:03,919
to

556
00:26:07,590 --> 00:26:05,360
younger people

557
00:26:09,350 --> 00:26:07,600
i often like to reference the movie

558
00:26:11,350 --> 00:26:09,360
interstellar because there's a couple

559
00:26:12,789 --> 00:26:11,360
scenes in there where the spacecraft is

560
00:26:15,110 --> 00:26:12,799
docking to that space station and

561
00:26:17,669 --> 00:26:15,120
there's like this great visual of the

562
00:26:19,909 --> 00:26:17,679
hooks walking in uh and while the design

563
00:26:22,149 --> 00:26:19,919

is certainly different for uh this space

564

00:26:23,510 --> 00:26:22,159

station and for dragon that that is what

565

00:26:26,549 --> 00:26:23,520

we're talking about when we when we

566

00:26:29,190 --> 00:26:26,559

refer to as hooks really locking in uh

567

00:26:31,350 --> 00:26:29,200

to the dragon capsule for that for that

568

00:26:33,190 --> 00:26:31,360

uh hard capture

569

00:26:34,789 --> 00:26:33,200

all right so we're just about six and a

570

00:26:36,789 --> 00:26:34,799

half minutes away from our arrival at

571

00:26:39,590 --> 00:26:36,799

waypoint two so at this point dragons

572

00:26:41,590 --> 00:26:39,600

pointed straight at the docking port

573

00:26:43,269 --> 00:26:41,600

right now again this docking port is on

574

00:26:44,870 --> 00:26:43,279

the top part of the space station

575

00:26:46,310 --> 00:26:44,880

dragons looking straight down at the

576
00:26:49,190 --> 00:26:46,320
space station

577
00:26:51,669 --> 00:26:49,200
and when we if we are lucky enough to

578
00:26:53,990 --> 00:26:51,679
get a couple more views from dragon

579
00:26:56,710 --> 00:26:54,000
we'll be looking directly down at planet

580
00:26:58,470 --> 00:26:56,720
earth behind the station as well

581
00:27:00,390 --> 00:26:58,480
and it's going to continue to move into

582
00:27:01,830 --> 00:27:00,400
waypoint 2. we're going to pause just 20

583
00:27:04,549 --> 00:27:01,840
minutes away

584
00:27:06,549 --> 00:27:04,559
we expect that to happen in about a

585
00:27:09,190 --> 00:27:06,559
little under six minutes from now

586
00:27:11,990 --> 00:27:09,200
and then we get that final go no go for

587
00:27:15,190 --> 00:27:12,000
it today that final go no go for docking

588
00:27:17,269 --> 00:27:15,200

after which uh the uh team on the ground

589

00:27:19,269 --> 00:27:17,279

here in hawthorne sends a command

590

00:27:21,510 --> 00:27:19,279

and dragon begins its final approach

591

00:27:24,870 --> 00:27:21,520

yeah and we should note that while the

592

00:27:27,029 --> 00:27:24,880

other pause points were able to be

593

00:27:29,750 --> 00:27:27,039

skipped essentially that is one that is

594

00:27:33,110 --> 00:27:29,760

not skipped because of that go no go

595

00:27:35,590 --> 00:27:33,120

that final go no-go point um yeah so

596

00:27:37,590 --> 00:27:35,600

point two is up next uh and again that

597

00:27:38,870 --> 00:27:37,600

puts dragon only 20 meters away from the

598

00:27:41,190 --> 00:27:38,880

space station

599

00:27:44,230 --> 00:27:41,200

uh from there the spacecraft will focus

600

00:27:46,310 --> 00:27:44,240

on station houston on the big loop

601
00:27:48,789 --> 00:27:46,320
station crew dragon is transmitting

602
00:27:50,950 --> 00:27:48,799
docking camera video please confirm

603
00:27:59,590 --> 00:27:50,960
video and data updating in dragon

604
00:28:05,190 --> 00:28:01,590
basically just asking the crew can you

605
00:28:05,200 --> 00:28:08,310
dragon docking monster

606
00:28:08,320 --> 00:28:12,549
houston copies

607
00:28:17,110 --> 00:28:14,630
awesome so there's a shot there of

608
00:28:19,590 --> 00:28:17,120
mission control center here at hawthorne

609
00:28:21,590 --> 00:28:19,600
california on the left-hand side and

610
00:28:23,909 --> 00:28:21,600
then of course mission control center at

611
00:28:25,750 --> 00:28:23,919
johnson space center in houston on the

612
00:28:28,310 --> 00:28:25,760
right-hand side

613
00:28:31,350 --> 00:28:28,320

dragon spacex on the big loop we see the

614

00:28:39,029 --> 00:28:31,360

onboard for rgps no immediate concerns

615

00:28:44,070 --> 00:28:41,190

and so that call up right there so our

616

00:28:46,710 --> 00:28:44,080

gps is the relative gps system again

617

00:28:48,149 --> 00:28:46,720

that's one of several navigational tools

618

00:28:50,549 --> 00:28:48,159

dragon has

619

00:28:52,149 --> 00:28:50,559

basically gps sensors on dragon talking

620

00:28:54,950 --> 00:28:52,159

to those on station

621

00:28:56,950 --> 00:28:54,960

that's used for a lot of the

622

00:28:59,430 --> 00:28:56,960

approach when we're still quite a ways

623

00:29:01,590 --> 00:28:59,440

out still but as you just heard the crew

624

00:29:03,430 --> 00:29:01,600

told dragon eyes are those primary tools

625

00:29:06,710 --> 00:29:03,440

that we're using now spacex on the big

626
00:29:09,510 --> 00:29:06,720
loop c2v2 link reconfiguration and soft

627
00:29:12,470 --> 00:29:09,520
capture ring ring extension complete

628
00:29:20,310 --> 00:29:12,480
with the rgps1 failure we are still go

629
00:29:24,070 --> 00:29:22,389
and so again just that quick update to

630
00:29:25,990 --> 00:29:24,080
the crew still go for docking we're

631
00:29:28,310 --> 00:29:26,000
using the dragon eye there's two

632
00:29:30,310 --> 00:29:28,320
on-board dragon we're using one

633
00:29:33,029 --> 00:29:30,320
with another one for redundancy for that

634
00:29:35,110 --> 00:29:33,039
final approach dragon eye using lidar

635
00:29:36,950 --> 00:29:35,120
essentially bouncing lasers off of

636
00:29:38,789 --> 00:29:36,960
reflectors on the space station also

637
00:29:40,549 --> 00:29:38,799
using a thermal imager

638
00:29:42,950 --> 00:29:40,559

to get range range

639

00:29:45,750 --> 00:29:42,960

on the big loop ground teams have pulled

640

00:29:47,430 --> 00:29:45,760

go for approach two upon confirmation of

641

00:29:55,830 --> 00:29:47,440

crew readiness we will enable the

642

00:30:00,950 --> 00:29:57,830

and there's a good call so the teams

643

00:30:03,350 --> 00:30:00,960

down here on the ground have pulled the

644

00:30:05,029 --> 00:30:03,360

dragons healthy and in a good config

645

00:30:08,070 --> 00:30:05,039

station's healthy and a good config and

646

00:30:09,750 --> 00:30:08,080

so we'll pause when we get to 20 meters

647

00:30:11,909 --> 00:30:09,760

and then as soon as the crew on dragon

648

00:30:13,510 --> 00:30:11,919

tells us that they're ready team here in

649

00:30:15,510 --> 00:30:13,520

hawthorne will send the command and

650

00:30:18,470 --> 00:30:15,520

we'll be in with final approach

651
00:30:20,310 --> 00:30:18,480
yeah so just a good example there of

652
00:30:22,870 --> 00:30:20,320
really as you've mentioned before these

653
00:30:25,029 --> 00:30:22,880
are integrated operations right it is

654
00:30:27,510 --> 00:30:25,039
mission control there that you see on

655
00:30:29,750 --> 00:30:27,520
there on your screen located here uh

656
00:30:31,909 --> 00:30:29,760
just behind dan and i uh at spacex

657
00:30:35,029 --> 00:30:31,919
headquarters that mission control center

658
00:30:36,630 --> 00:30:35,039
from johnson space center um and you

659
00:30:38,310 --> 00:30:36,640
know the crew on board station and the

660
00:30:39,990 --> 00:30:38,320
crew on board dragon and as you just

661
00:30:42,389 --> 00:30:40,000
said you know just checking in with the

662
00:30:44,389 --> 00:30:42,399
the crew on dragon hey you ready to

663
00:30:45,990 --> 00:30:44,399

ready to do this um and get the the

664

00:30:48,070 --> 00:30:46,000

final go from them

665

00:30:50,389 --> 00:30:48,080

we also heard the crew on station is

666

00:30:51,990 --> 00:30:50,399

getting video from dragon and they have

667

00:30:53,669 --> 00:30:52,000

a number of displays

668

00:30:55,190 --> 00:30:53,679

that they're able to see that video with

669

00:30:56,870 --> 00:30:55,200

overlays making sure again they're

670

00:30:58,630 --> 00:30:56,880

inside the docking corridor and things

671

00:31:00,389 --> 00:30:58,640

like that if you followed the ax1

672

00:31:01,990 --> 00:31:00,399

docking that hung us up at waypoint 2

673

00:31:04,070 --> 00:31:02,000

for a little while as we had an issue on

674

00:31:05,830 --> 00:31:04,080

station getting that video routed not an

675

00:31:08,549 --> 00:31:05,840

issue at all today

676

00:31:11,590 --> 00:31:08,559

and with uh these missions

677

00:31:14,630 --> 00:31:11,600

um with a nasa crew on board dragon

678

00:31:16,710 --> 00:31:14,640

they're actually prime in the

679

00:31:19,720 --> 00:31:16,720

kind of in the command tree for that

680

00:31:19,730 --> 00:31:27,029

[Music]

681

00:31:30,789 --> 00:31:28,870

all right so commander chow lingard just

682

00:31:32,789 --> 00:31:30,799

reporting the crews close their visors

683

00:31:34,789 --> 00:31:32,799

they're locked in we're just about a

684

00:31:36,149 --> 00:31:34,799

minute and a half away from arrival at

685

00:31:39,269 --> 00:31:36,159

way point two

686

00:31:41,590 --> 00:31:39,279

yeah so essentially that means that

687

00:31:43,750 --> 00:31:41,600

dragon spacex on the big loop we copied

688

00:31:46,470 --> 00:31:43,760

your last visors down

689

00:31:48,710 --> 00:31:46,480

we just enabled the approach as a final

690

00:31:50,549 --> 00:31:48,720

reminder once dragon is inside the crew

691

00:31:59,190 --> 00:31:50,559

hands-off point retreat and breakout are

692

00:32:03,110 --> 00:32:01,029

station houston on the big loop dragon

693

00:32:06,310 --> 00:32:03,120

is continuing approach and is go for

694

00:32:08,470 --> 00:32:06,320

docking monitor for steps five and six

695

00:32:12,830 --> 00:32:08,480

in procedure one decimal 102 dragon

696

00:32:21,110 --> 00:32:15,110

monitoring copies we're monitoring in

697

00:32:24,470 --> 00:32:22,789

all right that crew hands-off point that

698

00:32:25,750 --> 00:32:24,480

we heard mentioned essentially means

699

00:32:28,470 --> 00:32:25,760

that um

700

00:32:31,750 --> 00:32:28,480

uh dragon is the one that has to

701
00:32:33,830 --> 00:32:31,760
initiate uh that docking abort the the

702
00:32:36,789 --> 00:32:33,840
crew is uh

703
00:32:38,870 --> 00:32:36,799
not the one to do that um again this is

704
00:32:40,630 --> 00:32:38,880
dragon just driving itself autonomously

705
00:32:42,549 --> 00:32:40,640
it's taking all the data coming in from

706
00:32:45,269 --> 00:32:42,559
station from houston

707
00:32:47,509 --> 00:32:45,279
from hawthorne and making those precise

708
00:32:49,590 --> 00:32:47,519
calculations as well as utilizing those

709
00:32:52,470 --> 00:32:49,600
dragon eyes that are on board

710
00:32:55,430 --> 00:32:52,480
that lidar which is just using lasers

711
00:32:57,990 --> 00:32:55,440
and uh and the thermal imaging really to

712
00:32:59,509 --> 00:32:58,000
to make that final approach um and that

713
00:33:01,269 --> 00:32:59,519

precise docking

714

00:33:04,310 --> 00:33:01,279

there you can see a view of mission

715

00:33:07,590 --> 00:33:04,320

control center here in hawthorne

716

00:33:09,590 --> 00:33:07,600

these uh you know right behind dan and i

717

00:33:10,389 --> 00:33:09,600

the crew we heard before their visors

718

00:33:12,310 --> 00:33:10,399

are down

719

00:33:14,870 --> 00:33:12,320

uh meaning that their their suits are

720

00:33:17,110 --> 00:33:14,880

now also

721

00:33:19,590 --> 00:33:17,120

their primary breathing device uh so the

722

00:33:23,029 --> 00:33:19,600

the spacesuit acts as an extension of

723

00:33:25,430 --> 00:33:23,039

the capsule itself uh the crews have

724

00:33:26,310 --> 00:33:25,440

their spacesuits on their visors down

725

00:33:28,389 --> 00:33:26,320

and

726

00:33:31,110 --> 00:33:28,399

in the locked position but they are

727

00:33:33,269 --> 00:33:31,120

plugged in using an umbilical to their

728

00:33:37,029 --> 00:33:33,279

seat which provides

729

00:33:39,190 --> 00:33:37,039

telemetry and communications and air so

730

00:33:40,230 --> 00:33:39,200

right now we are

731

00:33:43,350 --> 00:33:40,240

flowing

732

00:33:45,509 --> 00:33:43,360

nitrox which is nitrogen oxygen mixture

733

00:33:47,029 --> 00:33:45,519

uh through the suits and not only does

734

00:33:49,509 --> 00:33:47,039

it allow them to breathe but it also

735

00:33:50,710 --> 00:33:49,519

keeps them cool so it's a cool nitrox

736

00:33:52,870 --> 00:33:50,720

mixture

737

00:33:54,310 --> 00:33:52,880

and really ultimately just intended to

738

00:33:56,789 --> 00:33:54,320

keep them comfortable

739

00:33:58,950 --> 00:33:56,799

and obviously safe

740

00:34:01,909 --> 00:33:58,960

and so at this point we've moved past

741

00:34:04,230 --> 00:34:01,919

waypoint two and we heard a bunch of the

742

00:34:06,149 --> 00:34:04,240

comms up to that crew

743

00:34:08,470 --> 00:34:06,159

so we were given the final go for

744

00:34:11,750 --> 00:34:08,480

docking and so right now we should just

745

00:34:14,069 --> 00:34:11,760

be about four minutes away or so and

746

00:34:16,310 --> 00:34:14,079

we don't have video at the moment uh

747

00:34:18,310 --> 00:34:16,320

we're we're in kind of a period where

748

00:34:20,149 --> 00:34:18,320

we're waiting to reacquire contact with

749

00:34:22,470 --> 00:34:20,159

our tdrs our tracking data and relay

750

00:34:24,310 --> 00:34:22,480

satellites to get that live video back

751

00:34:26,389 --> 00:34:24,320

we should get it back within the next

752

00:34:29,030 --> 00:34:26,399

two minutes or so so we should have

753

00:34:31,109 --> 00:34:29,040

those views of docking

754

00:34:32,790 --> 00:34:31,119

we promise we're not just showing you us

755

00:34:35,349 --> 00:34:32,800

because we want to as soon as we get

756

00:34:36,950 --> 00:34:35,359

views of that dragon again for the final

757

00:34:39,349 --> 00:34:36,960

approach we'll be bringing it to you we

758

00:34:41,109 --> 00:34:39,359

should be just about three and a half

759

00:34:43,589 --> 00:34:41,119

minutes a little bit more

760

00:34:45,829 --> 00:34:43,599

from docking um as you heard we're going

761

00:34:48,470 --> 00:34:45,839

to hear a call out for crew hands off

762

00:34:50,069 --> 00:34:48,480

point they'll just call up chop and that

763

00:34:51,909 --> 00:34:50,079

as kate said that just

764

00:34:54,230 --> 00:34:51,919

telling the crew they are not to send

765

00:34:56,230 --> 00:34:54,240

any commands to abort at that point any

766

00:34:58,390 --> 00:34:56,240

abort commands will come automatically

767

00:35:00,630 --> 00:34:58,400

from dragon's flight computer

768

00:35:03,670 --> 00:35:00,640

um so we're in our final approach we're

769

00:35:06,870 --> 00:35:03,680

just about 15 meters away from the space

770

00:35:09,030 --> 00:35:06,880

station should be docking and just about

771

00:35:11,190 --> 00:35:09,040

three minutes from now so we've

772

00:35:12,550 --> 00:35:11,200

continued to get further and further

773

00:35:15,430 --> 00:35:12,560

ahead on our timeline i think we were

774

00:35:17,990 --> 00:35:15,440

looking at about a 5 15 pm pacific

775

00:35:20,870 --> 00:35:18,000

docking uh now we're we're looking to do

776

00:35:24,230 --> 00:35:20,880

that almost 45 minutes early yeah which

777

00:35:28,390 --> 00:35:24,240

is great um you know the crew lifted off

778

00:35:30,550 --> 00:35:28,400

from kennedy space center pad 39a at

779

00:35:33,430 --> 00:35:30,560

12 52 a.m this morning

780

00:35:35,670 --> 00:35:33,440

um and so it's been a pretty busy day

781

00:35:38,310 --> 00:35:35,680

for them uh as i've said before they did

782

00:35:40,790 --> 00:35:38,320

go through a sleep phase which um you

783

00:35:43,190 --> 00:35:40,800

know was eight hours where they had the

784

00:35:44,550 --> 00:35:43,200

ability or rather the time to sleep

785

00:35:47,349 --> 00:35:44,560

whether or not they were able to get to

786

00:35:49,270 --> 00:35:47,359

sleep i hope so um but there's about an

787

00:35:51,190 --> 00:35:49,280

hour before that crew sleep period

788

00:35:52,950 --> 00:35:51,200

called pre-sleep and then there's about

789

00:35:54,630 --> 00:35:52,960

an hour after the sleep period called

790

00:35:57,109 --> 00:35:54,640

post sleep

791

00:35:59,829 --> 00:35:57,119

and it's you know just an opportunity

792

00:36:01,829 --> 00:35:59,839

for them to wind down but then also wind

793

00:36:03,910 --> 00:36:01,839

back up in preparation for

794

00:36:07,349 --> 00:36:03,920

you know all the activities that we've

795

00:36:09,109 --> 00:36:07,359

had today and still have upcoming um as

796

00:36:12,710 --> 00:36:09,119

dan said we're just a couple minutes

797

00:36:18,150 --> 00:36:15,510

spacex copies 10 meters

798

00:36:20,630 --> 00:36:18,160

we are less than 10 meters away so just

799

00:36:21,510 --> 00:36:20,640

about two minutes from docking and so

800

00:36:23,030 --> 00:36:21,520

we'll

801
00:36:25,670 --> 00:36:23,040
might be right on the edge of getting

802
00:36:27,349 --> 00:36:25,680
that video signal back but uh the teams

803
00:36:29,190 --> 00:36:27,359
and we're still getting telemetry so

804
00:36:31,109 --> 00:36:29,200
we'll be able to know when that docking

805
00:36:33,030 --> 00:36:31,119
has occurred and hopefully we'll get our

806
00:36:35,589 --> 00:36:33,040
kind of our high data rate communication

807
00:36:37,349 --> 00:36:35,599
back soon and be able to bring that live

808
00:36:40,069 --> 00:36:37,359
video but they're they're closing in

809
00:36:42,069 --> 00:36:40,079
we're just eight meters away now about a

810
00:36:44,390 --> 00:36:42,079
minute and a half from docking

811
00:36:47,270 --> 00:36:44,400
we'll hear that call out for chop come

812
00:36:49,829 --> 00:36:47,280
about 20 to 30 seconds before that

813
00:36:52,150 --> 00:36:49,839

initial contact which again is that soft

814

00:36:53,349 --> 00:36:52,160
capture ring on dragon's docking

815

00:36:55,270 --> 00:36:53,359
mechanism

816

00:36:57,190 --> 00:36:55,280
interfacing with the international

817

00:36:59,349 --> 00:36:57,200
docking adapter onboard the space

818

00:37:01,829 --> 00:36:59,359
station we're driving in towards the

819

00:37:04,470 --> 00:37:01,839
zenith port the space facing port on

820

00:37:07,109 --> 00:37:04,480
node two and we've got just six meters

821

00:37:11,510 --> 00:37:09,349
again dragon is driving itself at this

822

00:37:13,670 --> 00:37:11,520
point in time so hopefully when we get

823

00:37:14,790 --> 00:37:13,680
our views back we'll be able to

824

00:37:17,270 --> 00:37:14,800
show you and there we just heard the

825

00:37:19,510 --> 00:37:17,280
question copies five meters five meters

826
00:37:22,470 --> 00:37:19,520
away from that soft

827
00:37:34,150 --> 00:37:22,480
uh that initial contact point

828
00:37:47,030 --> 00:37:36,630
all right

829
00:37:47,040 --> 00:37:52,470
two and a half meters away

830
00:37:52,480 --> 00:38:06,069
two meters

831
00:38:06,079 --> 00:38:25,510
one meter in closing

832
00:38:30,230 --> 00:38:28,069
and we heard confirmation dragon spacex

833
00:38:39,349 --> 00:38:30,240
on the big loop contact and soft capture

834
00:38:46,150 --> 00:38:41,750
and confirmation soft capture and

835
00:38:49,829 --> 00:38:46,160
docking confirmed that time 4 37 p.m

836
00:38:53,670 --> 00:38:49,839
pacific 11 37 gmt with the international

837
00:38:57,349 --> 00:38:53,680
space station flying 261 statute miles

838
00:39:00,470 --> 00:38:57,359

over the central pacific ocean

839

00:39:02,870 --> 00:39:00,480

and there we got it

840

00:39:04,950 --> 00:39:02,880

that's a gorgeous view

841

00:39:06,710 --> 00:39:04,960

now of course there are still a few

842

00:39:09,670 --> 00:39:06,720

steps that we have to complete before

843

00:39:11,589 --> 00:39:09,680

dragon is securely attached to station

844

00:39:14,630 --> 00:39:11,599

dragon spacex on the big loop soft

845

00:39:18,790 --> 00:39:14,640

capture ring retraction is in progress

846

00:39:20,550 --> 00:39:18,800

there's our first full view of dragon

847

00:39:23,750 --> 00:39:20,560

dragon freedom attached to the

848

00:39:27,190 --> 00:39:23,760

international space station

849

00:39:29,349 --> 00:39:27,200

up next we are going to

850

00:39:31,589 --> 00:39:29,359

begin the hard capture sequence that's

851
00:39:32,710 --> 00:39:31,599
essentially when we are engaging the

852
00:39:40,150 --> 00:39:32,720
hooks

853
00:39:44,710 --> 00:39:42,150
well unfortunately we did have that

854
00:39:46,630 --> 00:39:44,720
video cut out right at that moment of

855
00:39:49,670 --> 00:39:46,640
docking but it's great to see it

856
00:39:54,390 --> 00:39:49,680
attached now again that initial contact

857
00:39:58,069 --> 00:39:54,400
that docking time 4 37 p.m pacific 11 37

858
00:39:59,829 --> 00:39:58,079
gmt the dragon and station flying 261

859
00:40:02,069 --> 00:39:59,839
miles over the central part of the

860
00:40:03,910 --> 00:40:02,079
pacific ocean

861
00:40:06,630 --> 00:40:03,920
and we heard the the retraction of the

862
00:40:08,470 --> 00:40:06,640
docking ring is underway so

863
00:40:10,790 --> 00:40:08,480

slowly see dragon inch a little bit

864

00:40:13,030 --> 00:40:10,800

closer to the docking adapter and then

865

00:40:15,510 --> 00:40:13,040

we can kick off that hard capture

866

00:40:16,950 --> 00:40:15,520

sequence all told it'll take about 10

867

00:40:18,790 --> 00:40:16,960

minutes

868

00:40:21,190 --> 00:40:18,800

for everything to

869

00:40:23,430 --> 00:40:21,200

finish after we've

870

00:40:24,950 --> 00:40:23,440

excuse me completed that that initial

871

00:40:27,349 --> 00:40:24,960

soft capture

872

00:40:29,670 --> 00:40:27,359

i will get those 12

873

00:40:31,589 --> 00:40:29,680

docking hooks engaged

874

00:40:35,349 --> 00:40:31,599

basically doing them two

875

00:40:38,150 --> 00:40:35,359

two sets one set of six at a time

876
00:40:39,030 --> 00:40:38,160
after which we'll have a hard mate and

877
00:40:41,190 --> 00:40:39,040
then

878
00:40:43,829 --> 00:40:41,200
all of the post-docking configs can get

879
00:40:45,510 --> 00:40:43,839
put into work including umbilicals

880
00:40:46,710 --> 00:40:45,520
and then the crews starting to step

881
00:40:48,710 --> 00:40:46,720
through

882
00:40:50,790 --> 00:40:48,720
all of their post docking crew onboard

883
00:40:52,390 --> 00:40:50,800
dragon getting out of their suits uh the

884
00:40:57,750 --> 00:40:52,400
crew on board station getting ready to

885
00:41:00,790 --> 00:40:59,589
so with this view here we are able to

886
00:41:03,270 --> 00:41:00,800
see

887
00:41:05,670 --> 00:41:03,280
uh those draco thrusters that we saw in

888
00:41:09,910 --> 00:41:05,680

action quite a bit uh throughout the

889

00:41:12,150 --> 00:41:09,920

approach maneuvers uh those uh

890

00:41:12,950 --> 00:41:12,160

well the dragon capsule to me is upside

891

00:41:14,950 --> 00:41:12,960

down

892

00:41:16,950 --> 00:41:14,960

but for the orientation that it's in

893

00:41:20,230 --> 00:41:16,960

right there kind of in the center

894

00:41:23,670 --> 00:41:20,240

of the pressurized section that that

895

00:41:26,470 --> 00:41:23,680

shiny uh bright white area we see three

896

00:41:30,550 --> 00:41:26,480

ports that are kind of like ovals um

897

00:41:33,270 --> 00:41:30,560

there are four clusters with three ports

898

00:41:35,430 --> 00:41:33,280

all around the the base or the service

899

00:41:37,910 --> 00:41:35,440

structure of dragon and those are those

900

00:41:39,109 --> 00:41:37,920

service structured draco thrusters that

901
00:41:41,430 --> 00:41:39,119
we utilize

902
00:41:42,870 --> 00:41:41,440
for that precise maneuvering as the

903
00:41:49,750 --> 00:41:42,880
dragon approaches the international

904
00:41:54,790 --> 00:41:53,030
i believe you can also identify

905
00:41:56,309 --> 00:41:54,800
uh that green light that we were talking

906
00:41:58,550 --> 00:41:56,319
about so there's a green one and a red

907
00:42:00,870 --> 00:41:58,560
one indicating what side is port which

908
00:42:02,630 --> 00:42:00,880
side is starboard starboard start

909
00:42:03,670 --> 00:42:02,640
starboard don't ask me which one is

910
00:42:05,670 --> 00:42:03,680
which

911
00:42:08,790 --> 00:42:05,680
i don't like deep water so i'm not

912
00:42:11,030 --> 00:42:08,800
really ever to to be on a boat but um

913
00:42:20,710 --> 00:42:11,040

yeah the the green light there you can

914

00:42:24,870 --> 00:42:22,630

yeah thanks to a quick refresher ports

915

00:42:27,190 --> 00:42:24,880

the left side starboard's the right side

916

00:42:29,430 --> 00:42:27,200

dragon spacex on the big loop ring

917

00:42:38,470 --> 00:42:29,440

retraction complete docking sequence is

918

00:42:45,030 --> 00:42:41,510

okay so the soft capture ring has drawn

919

00:42:47,670 --> 00:42:45,040

in now before we start uh to

920

00:42:50,230 --> 00:42:47,680

engage those hooks we're gonna do

921

00:42:52,950 --> 00:42:50,240

another reconfig of the mcs that's the

922

00:42:55,910 --> 00:42:52,960

motion control system on board station

923

00:42:57,430 --> 00:42:55,920

during the approach and initial contact

924

00:42:59,109 --> 00:42:57,440

we're under

925

00:43:00,950 --> 00:42:59,119

all of our attitude controls being done

926
00:43:02,870 --> 00:43:00,960
by thrusters on the russian segment we

927
00:43:04,309 --> 00:43:02,880
do that with any approaching visiting

928
00:43:06,950 --> 00:43:04,319
vehicle

929
00:43:09,910 --> 00:43:06,960
now the docking has occurred we're going

930
00:43:12,870 --> 00:43:09,920
to hand over control back to the u.s

931
00:43:15,270 --> 00:43:12,880
gyroscopes which do our nominal or just

932
00:43:17,589 --> 00:43:15,280
our normal day-to-day attitude control

933
00:43:19,829 --> 00:43:17,599
and so that puts station in a much more

934
00:43:22,069 --> 00:43:19,839
kind of quiescent it won't be able to

935
00:43:23,829 --> 00:43:22,079
make any rapid adjustments

936
00:43:25,910 --> 00:43:23,839
which could interfere

937
00:43:28,230 --> 00:43:25,920
with the driving of those hooks so as

938
00:43:31,109 --> 00:43:28,240

soon as the station teams have confirmed

939

00:43:34,470 --> 00:43:31,119

that we've handed over attitude control

940

00:43:35,750 --> 00:43:34,480

uh over to the uh us system

941

00:43:44,390 --> 00:43:35,760

they'll be able to start driving in

942

00:43:48,950 --> 00:43:46,870

fun little fact

943

00:44:03,510 --> 00:43:48,960

station houston on the big loop mcs

944

00:44:06,870 --> 00:44:05,510

we were talking about the red light and

945

00:44:10,069 --> 00:44:06,880

the green light

946

00:44:12,630 --> 00:44:10,079

john innsbrucker just sent me an im and

947

00:44:15,589 --> 00:44:12,640

the you know he's a very wisdom-filled

948

00:44:17,829 --> 00:44:15,599

person uh he says port has four letters

949

00:44:28,790 --> 00:44:17,839

as does left and i will never forget

950

00:44:32,870 --> 00:44:30,710

once again we can see that dragon

951
00:44:34,829 --> 00:44:32,880
freedom has made initial contact there

952
00:44:42,870 --> 00:44:34,839
with the international space

953
00:44:47,430 --> 00:44:44,950
and again we've we've had confirmation

954
00:44:49,109 --> 00:44:47,440
that soft capturing is retracted again

955
00:44:50,390 --> 00:44:49,119
just standing by

956
00:44:51,270 --> 00:44:50,400
we heard

957
00:44:53,109 --> 00:44:51,280
that

958
00:44:55,589 --> 00:44:53,119
the mcs handover the motion control

959
00:44:56,550 --> 00:44:55,599
system on stations occurred and now it's

960
00:44:58,790 --> 00:44:56,560
going to be

961
00:45:00,390 --> 00:44:58,800
a time for the

962
00:45:02,870 --> 00:45:00,400
those hard capture rings to start

963
00:45:06,309 --> 00:45:02,880

engaging again there's 12 of them total

964

00:45:08,309 --> 00:45:06,319

the first six have started to drive

965

00:45:10,470 --> 00:45:08,319

uh they're they're done in two gangs of

966

00:45:12,069 --> 00:45:10,480

six each

967

00:45:13,829 --> 00:45:12,079

these are

968

00:45:15,109 --> 00:45:13,839

this is the second time in this dragon

969

00:45:17,430 --> 00:45:15,119

flight that we've done something with

970

00:45:19,910 --> 00:45:17,440

these hooks they six of these are

971

00:45:21,990 --> 00:45:19,920

engaged during the ascent the launch and

972

00:45:22,790 --> 00:45:22,000

ascent portion holding the nose cone in

973

00:45:24,470 --> 00:45:22,800

place

974

00:45:26,069 --> 00:45:24,480

which you can see is open and swung out

975

00:45:28,309 --> 00:45:26,079

to the right there of the the

976

00:45:29,829 --> 00:45:28,319

international docking adapter

977

00:45:32,309 --> 00:45:29,839

those

978

00:45:34,470 --> 00:45:32,319

drive open and release the nose cone

979

00:45:37,030 --> 00:45:34,480

shortly after dragon gets on orbit

980

00:45:38,550 --> 00:45:37,040

and now six of those driving

981

00:45:39,750 --> 00:45:38,560

to do our

982

00:45:42,230 --> 00:45:39,760

initial

983

00:45:44,309 --> 00:45:42,240

uh gang of hooks to start that hard mate

984

00:45:46,230 --> 00:45:44,319

process and then once they're in place

985

00:45:48,870 --> 00:45:46,240

the second six will drive and we'll have

986

00:45:56,230 --> 00:45:48,880

a hard mate um

987

00:45:59,510 --> 00:45:58,150

for those of you that might be wondering

988

00:46:02,870 --> 00:45:59,520

excuse me

989

00:46:03,750 --> 00:46:02,880

um what the half black and half white

990

00:46:06,069 --> 00:46:03,760

part

991

00:46:08,470 --> 00:46:06,079

of dragon is that is the unpressurized

992

00:46:11,030 --> 00:46:08,480

section known as the trunk

993

00:46:14,069 --> 00:46:11,040

uh the side that is black that's

994

00:46:15,270 --> 00:46:14,079

actually covered in solar panels so that

995

00:46:17,910 --> 00:46:15,280

is what

996

00:46:20,069 --> 00:46:17,920

the dragon capsule utilizes while on

997

00:46:21,750 --> 00:46:20,079

orbit and you know making its way to the

998

00:46:23,670 --> 00:46:21,760

space station essentially to provide

999

00:46:26,550 --> 00:46:23,680

power generate power

1000

00:46:28,790 --> 00:46:26,560

so we only have them on one side of the

1001
00:46:35,990 --> 00:46:28,800
trunk and the other side of the trunk

1002
00:46:38,470 --> 00:46:37,349
you can just

1003
00:46:40,710 --> 00:46:38,480
sorry i was just going to say you can

1004
00:46:42,710 --> 00:46:40,720
just barely make out the the heat shield

1005
00:46:44,870 --> 00:46:42,720
there at the bottom of the pressurized

1006
00:46:46,950 --> 00:46:44,880
section uh just above the unpressurized

1007
00:46:49,349 --> 00:46:46,960
section so

1008
00:46:54,150 --> 00:46:49,359
yeah and we just heard that the first

1009
00:46:54,160 --> 00:47:07,990
and so now the second are driving

1010
00:47:12,309 --> 00:47:10,150
once again this is the hard capture

1011
00:47:14,230 --> 00:47:12,319
which is basically the final capture of

1012
00:47:18,470 --> 00:47:14,240
the dragon spacecraft to the

1013
00:47:21,910 --> 00:47:20,069

so once that second set of hooks are

1014

00:47:23,750 --> 00:47:21,920

driving we'll get confirmation of a hard

1015

00:47:25,990 --> 00:47:23,760

mate and then

1016

00:47:28,069 --> 00:47:26,000

we we jump right into the hatch

1017

00:47:29,990 --> 00:47:28,079

operations and the the crew on board

1018

00:47:32,309 --> 00:47:30,000

dragon will get the go to get out of

1019

00:47:34,390 --> 00:47:32,319

their seats out of their suits and start

1020

00:47:36,870 --> 00:47:34,400

getting uh be free to move about the

1021

00:47:39,670 --> 00:47:36,880

cabin essentially and start getting

1022

00:47:41,990 --> 00:47:39,680

ready to to open up the hatches they'll

1023

00:47:44,230 --> 00:47:42,000

uh hook their suits up to fans to dry

1024

00:47:45,829 --> 00:47:44,240

them out before they get stowed

1025

00:47:47,910 --> 00:47:45,839

and then they'll have a couple of

1026

00:47:50,230 --> 00:47:47,920

different tasks to do

1027

00:47:52,549 --> 00:47:50,240

after we get the hatches open in dragon

1028

00:47:55,829 --> 00:47:52,559

to just get it ready for that docked

1029

00:47:59,589 --> 00:47:55,839

operations and a lot of it's focused on

1030

00:48:01,109 --> 00:47:59,599

the atmospheric control on board dragon

1031

00:48:03,589 --> 00:48:01,119

they're going to be removing what's

1032

00:48:06,549 --> 00:48:03,599

called a lyo canister a lithium

1033

00:48:09,190 --> 00:48:06,559

hydroxide canister that

1034

00:48:11,109 --> 00:48:09,200

is used to scrub co2 from the dragon

1035

00:48:13,270 --> 00:48:11,119

cabin during free flight they'll remove

1036

00:48:15,190 --> 00:48:13,280

that and seal it as we're going to be

1037

00:48:16,870 --> 00:48:15,200

essentially integrating dragon's cabin

1038

00:48:19,430 --> 00:48:16,880

with the rest of the space station and

1039

00:48:21,190 --> 00:48:19,440

so not only will dragon be able to use

1040

00:48:22,549 --> 00:48:21,200

station power station data and

1041

00:48:25,030 --> 00:48:22,559

communications

1042

00:48:27,030 --> 00:48:25,040

but will flow

1043

00:48:29,030 --> 00:48:27,040

air from the station stack

1044

00:48:30,950 --> 00:48:29,040

into dragon and integrate it with all of

1045

00:48:33,670 --> 00:48:30,960

its life support systems generating

1046

00:48:36,710 --> 00:48:33,680

oxygen scrubbing carbon dioxide while

1047

00:48:39,670 --> 00:48:36,720

it's intact while it's attached and

1048

00:48:42,150 --> 00:48:39,680

we are hearing that the second set of

1049

00:48:44,549 --> 00:48:42,160

hooks are closed and we'll stand by

1050

00:48:58,630 --> 00:48:44,559

dragon spacex on the big loop 12 good

1051
00:48:58,640 --> 00:49:12,230
half

1052
00:49:16,470 --> 00:49:14,549
on your screen there on your screen is

1053
00:49:18,710 --> 00:49:16,480
spacex core crew operations and

1054
00:49:32,710 --> 00:49:18,720
resources engineer

1055
00:49:37,990 --> 00:49:34,950
the core acts as the primary

1056
00:49:39,750 --> 00:49:38,000
communication point um from the mission

1057
00:49:45,270 --> 00:49:39,760
control center here in hawthorne to the

1058
00:49:49,750 --> 00:49:47,589
all right so now that dragon has

1059
00:49:51,750 --> 00:49:49,760
completed the docking sequence uh the

1060
00:49:53,670 --> 00:49:51,760
spacecraft must undergo a handful of

1061
00:49:55,910 --> 00:49:53,680
checks before we will be able to open

1062
00:49:57,589 --> 00:49:55,920
the hatch the crew on board dragon will

1063
00:49:59,510 --> 00:49:57,599

now get a chance to get out of their

1064

00:50:01,430 --> 00:49:59,520

suits before moving into hatch

1065

00:50:04,470 --> 00:50:01,440

operations that's right and things are

1066

00:50:05,430 --> 00:50:04,480

going to be picking up on station two

1067

00:50:10,069 --> 00:50:05,440

nasa

1068

00:50:11,510 --> 00:50:10,079

lead for all of the hatch operations on

1069

00:50:13,030 --> 00:50:11,520

the station side

1070

00:50:15,829 --> 00:50:13,040

first he's going to have to open up a

1071

00:50:17,270 --> 00:50:15,839

hatch to gain access to the uh the

1072

00:50:18,870 --> 00:50:17,280

pressurized mating adapter and the

1073

00:50:20,390 --> 00:50:18,880

docking adapter

1074

00:50:22,069 --> 00:50:20,400

and then he's going to start

1075

00:50:22,950 --> 00:50:22,079

pressurizing that vestibule that small

1076

00:50:24,549 --> 00:50:22,960

space

1077

00:50:26,950 --> 00:50:24,559

between the two so we've got

1078

00:50:29,030 --> 00:50:26,960

confirmation hard captures complete and

1079

00:50:31,589 --> 00:50:29,040

now we're ready to get into those hatch

1080

00:50:34,870 --> 00:50:31,599

operations uh one more time if you

1081

00:50:38,870 --> 00:50:34,880

missed it docking occurred at 4 37 and

1082

00:50:41,670 --> 00:50:38,880

49 seconds uh pacific time that's 11 37

1083

00:50:44,549 --> 00:50:41,680

and 49 seconds gmt while both vehicles

1084

00:50:47,750 --> 00:50:44,559

were flying 261 statute miles over the

1085

00:50:50,230 --> 00:50:47,760

central pacific now with dragon firmly

1086

00:50:51,910 --> 00:50:50,240

attached we're going to toss it over to

1087

00:50:53,829 --> 00:50:51,920

the international space station flight

1088

00:50:55,670 --> 00:50:53,839

control room in houston

1089

00:50:57,589 --> 00:50:55,680

for shaniqua vareen to take us through

1090

00:51:02,309 --> 00:50:57,599

the next steps as we get ready to open

1091

00:51:06,549 --> 00:51:04,069

thanks dan and thanks hawthorne for your

1092

00:51:08,870 --> 00:51:06,559

help today we had a very exciting moment

1093

00:51:11,910 --> 00:51:08,880

here in mission control houston as well

1094

00:51:14,790 --> 00:51:11,920

following dr dragon stocking at 6 37 pm

1095

00:51:16,069 --> 00:51:14,800

central time while flying 261 statute

1096

00:51:17,430 --> 00:51:16,079

miles over the central part of the

1097

00:51:19,270 --> 00:51:17,440

pacific ocean

1098

00:51:21,270 --> 00:51:19,280

it's great to see dragon docked the

1099

00:51:23,349 --> 00:51:21,280

energy in the room here is high there

1100

00:51:25,109 --> 00:51:23,359

was applause and smiles all around the

1101

00:51:26,630 --> 00:51:25,119
room

1102

00:51:28,790 --> 00:51:26,640
now that we're docked

1103

00:51:30,710 --> 00:51:28,800
like dan mentioned tom marshburn is

1104

00:51:33,270 --> 00:51:30,720
securing some hardware and then moving

1105

00:51:35,349 --> 00:51:33,280
right into hatch operations

1106

00:51:36,390 --> 00:51:35,359
first we'll get the large hatch at node

1107

00:51:37,990 --> 00:51:36,400
2 zenith

1108

00:51:40,230 --> 00:51:38,000
giving them access inside the

1109

00:52:48,230 --> 00:51:40,240
pressurized mating adapter then we'll

1110

00:52:53,910 --> 00:52:51,430
and that was core jake vindle in

1111

00:52:56,390 --> 00:52:53,920
mcc x spacex mission control in

1112

00:52:57,589 --> 00:52:56,400
hawthorne california giving the crew

1113

00:53:00,630 --> 00:52:57,599

good words

1114

00:53:02,150 --> 00:53:00,640

inside dragon freedom

1115

00:53:04,150 --> 00:53:02,160

again

1116

00:53:06,069 --> 00:53:04,160

now that they are dog tom marshburn

1117

00:53:07,750 --> 00:53:06,079

inside the station is securing some

1118

00:53:09,910 --> 00:53:07,760

hardware and then moving right into

1119

00:53:10,630 --> 00:53:09,920

hatch operations

1120

00:53:13,190 --> 00:53:10,640

first

1121

00:53:58,390 --> 00:53:13,200

spacex on dragon to ground no response

1122

00:54:02,309 --> 00:54:00,630

we're currently in between satellites

1123

00:54:04,230 --> 00:54:02,319

and you're now seeing a live view inside

1124

00:54:06,710 --> 00:54:04,240

the international space station flight

1125

00:54:09,349 --> 00:54:06,720

control room

1126
00:54:11,430 --> 00:54:09,359
once we have fusion spacex on dragon to

1127
00:54:14,069 --> 00:54:11,440
ground no response required for your

1128
00:54:40,789 --> 00:54:14,079
awareness we'll be clearing the rgps one

1129
00:54:44,069 --> 00:54:42,230
spacex

1130
00:54:51,109 --> 00:54:44,079
freedom on

1131
00:55:46,630 --> 00:54:53,750
freedom spacex on dragon to ground i had

1132
00:55:50,549 --> 00:55:49,109
if you're just joining us

1133
00:55:52,470 --> 00:55:50,559
we're

1134
00:55:54,950 --> 00:55:52,480
we have live coverage as

1135
00:55:56,230 --> 00:55:54,960
we just watched as crew dragon freedom

1136
00:55:59,109 --> 00:55:56,240
docked to the international space

1137
00:56:01,349 --> 00:55:59,119
station at 6 37 pm central time while

1138
00:56:07,510 --> 00:56:01,359

flying 261 statute miles over the

1139

00:56:12,150 --> 00:56:10,230

now that dragon is docked tom marshburn

1140

00:56:13,670 --> 00:56:12,160

as well as the rest of his crew is

1141

00:56:19,510 --> 00:56:13,680

securing some hardware and then moving

1142

00:56:22,870 --> 00:56:20,950

first he will open the large hatchet

1143

00:56:25,349 --> 00:56:22,880

node to zenith giving them access inside

1144

00:56:26,630 --> 00:56:25,359

the pressurized mating adapter

1145

00:56:28,870 --> 00:56:26,640

then we'll have to pressurize the

1146

00:56:30,390 --> 00:56:28,880

vestibule which that small space between

1147

00:56:34,390 --> 00:56:30,400

the hatches on dragon

1148

00:56:37,990 --> 00:56:36,150

this was previously exposed to vacuum

1149

00:56:39,589 --> 00:56:38,000

prior to docking and we will need to

1150

00:56:41,910 --> 00:56:39,599

fill it with air and make sure its

1151

00:56:44,150 --> 00:56:41,920

pressure is nearly equal with the

1152

00:56:45,910 --> 00:56:44,160

atmospheric pressures on dragon and the

1153

00:56:47,670 --> 00:56:45,920

station

1154

00:56:49,510 --> 00:56:47,680

marshburn will use a small valve on the

1155

00:56:51,670 --> 00:56:49,520

station's hatch to slowly introduce air

1156

00:56:53,270 --> 00:56:51,680

into the vestibule flight controllers

1157

00:56:55,030 --> 00:56:53,280

here in houston will monitor the

1158

00:56:56,710 --> 00:56:55,040

pressure and the temperature readings

1159

00:56:59,190 --> 00:56:56,720

inside and verify that everything is

1160

00:57:01,109 --> 00:56:59,200

leak-free before we get ready to open up

1161

00:57:02,950 --> 00:57:01,119

the hatches

1162

00:57:04,630 --> 00:57:02,960

we expect this to take about two hours

1163

00:57:09,190 --> 00:57:04,640

to get everything pressurized and

1164

00:57:13,750 --> 00:57:10,950

with dragon's hatch currently target to

1165

00:57:16,549 --> 00:57:13,760

open a little round a little bit after 8

1166

00:57:18,069 --> 00:57:16,559

pm central time

1167

00:57:20,549 --> 00:57:18,079

following hatch open the crew will

1168

00:57:22,549 --> 00:57:20,559

configure dragon for an unorbit ops and

1169

00:57:24,829 --> 00:57:22,559

get a safety briefing

1170

00:57:26,789 --> 00:57:24,839

a few hours after

1171

00:57:28,789 --> 00:57:26,799

that

1172

00:57:31,670 --> 00:57:28,799

russian cosmonauts will wake up to begin

1173

00:57:33,430 --> 00:57:31,680

their day which will include a spacewalk

1174

00:57:40,390 --> 00:57:33,440

they will also have welcoming remarks

1175

00:57:45,270 --> 00:57:42,950

dragon spacex on dragon to ground the

1176

00:57:47,030 --> 00:57:45,280

iss crew has begun festival

1177

00:57:52,309 --> 00:57:47,040

pressurization

1178

00:58:04,710 --> 00:57:52,319

4.400 section 4 for telemetry if you'd

1179

00:58:04,720 --> 01:03:28,309

and freedom copies doesn't work

1180

01:03:31,270 --> 01:03:29,750

you're currently seeing inside the

1181

01:03:35,829 --> 01:03:31,280

international space station as tom

1182

01:03:37,910 --> 01:03:35,839

marshburn and caleb barron are preparing

1183

01:03:39,750 --> 01:03:37,920

the area for the crew to

1184

01:03:41,589 --> 01:03:39,760

ingress the space station

1185

01:03:42,950 --> 01:03:41,599

they're currently removing baggage and

1186

01:03:44,789 --> 01:03:42,960

stowage area

1187

01:04:04,150 --> 01:03:44,799

out of the way so there's more room for

1188

01:04:08,950 --> 01:04:06,630

and clarification that was rashid shari

1189

01:04:10,630 --> 01:04:08,960

and caleb baron removing stowage to

1190

01:05:07,270 --> 01:04:10,640

prepare for the crew to float through

1191

01:05:12,470 --> 01:05:09,829

now docked tom marshburn current station

1192

01:05:14,789 --> 01:05:12,480

commander is now securing some hardware

1193

01:05:16,710 --> 01:05:14,799

and moving into the hatch operations

1194

01:05:20,710 --> 01:05:16,720

you saw other crew members just removing

1195

01:05:25,270 --> 01:05:22,950

preparing for it to get them accessed

1196

01:05:27,109 --> 01:05:25,280

inside the pressurized mating adapter

1197

01:05:29,750 --> 01:05:27,119

they'll then be able to pressurize the

1198

01:05:32,150 --> 01:05:29,760

vestibule that space between the hatches

1199

01:05:34,069 --> 01:05:32,160

on dragon and the space station

1200

01:05:44,230 --> 01:05:34,079

this was previously exposed to vacuum

1201
01:05:44,240 --> 01:06:25,510
freedom copies

1202
01:06:31,829 --> 01:06:27,510
with the earlier docking time we also

1203
01:06:38,150 --> 01:06:31,839
expect the hatch to open just as early

1204
01:06:41,589 --> 01:06:39,829
it takes about 2 hours to get everything

1205
01:06:43,670 --> 01:06:41,599
pressurized and checked out before we

1206
01:06:45,270 --> 01:06:43,680
open the hatches between dragon and the

1207
01:06:48,470 --> 01:06:45,280
station

1208
01:06:51,109 --> 01:06:49,910
there typically would be a welcome

1209
01:06:53,349 --> 01:06:51,119
ceremony

1210
01:06:57,029 --> 01:06:53,359
however the crew will be awaiting the

1211
01:06:58,870 --> 01:06:57,039
russian cosmonauts to awake and have

1212
01:07:02,470 --> 01:06:58,880
welcomed remarks with the rest of the

1213
01:07:07,109 --> 01:07:04,470

crew 4 will join them and make a

1214

01:07:09,589 --> 01:07:07,119

compliment of 11 astronauts doing

1215

01:07:18,230 --> 01:07:09,599

welcoming remarks that'll happen around

1216

01:07:22,069 --> 01:07:19,910

currently on station is crew 3

1217

01:07:25,349 --> 01:07:22,079

astronauts national astronauts kayla

1218

01:07:27,589 --> 01:07:25,359

baron rasha achary tom marshburn

1219

01:07:30,630 --> 01:07:27,599

issa or european space station

1220

01:07:32,789 --> 01:07:30,640

agency astronaut matthias maurer

1221

01:07:34,630 --> 01:07:32,799

also aboard is the spaceship also aboard

1222

01:07:37,829 --> 01:07:34,640

the space station as russian cosmonauts

1223

01:07:51,029 --> 01:07:37,839

sergey korsakoff oleg artemyev and

1224

01:07:54,309 --> 01:07:52,470

currently on your screen is nasa

1225

01:11:30,550 --> 01:07:54,319

astronaut caleb bearing

1226

01:11:35,590 --> 01:11:33,350

dragon is currently in repressed about

1227

01:11:37,430 --> 01:11:35,600

five more minutes on the leak checks and

1228

01:11:39,430 --> 01:11:37,440

about 45 minutes after that we are

1229

01:16:05,110 --> 01:11:39,440

looking for the hatch to open right

1230

01:16:09,270 --> 01:16:06,790

if you're just joining us

1231

01:16:11,030 --> 01:16:09,280

we have live mission coverage of nasa's

1232

01:16:12,310 --> 01:16:11,040

spacex crew 4 mission to the

1233

01:16:14,390 --> 01:16:12,320

international space station where

1234

01:16:19,590 --> 01:16:14,400

they'll stay for a six-month

1235

01:16:26,229 --> 01:16:21,510

dragon has officially docked to the

1236

01:16:29,350 --> 01:16:26,239

station around 6 37 pm central time

1237

01:16:32,070 --> 01:16:29,360

and we're now awaiting repress

1238

01:16:36,149 --> 01:16:33,590

repress and pressurization of the

1239

01:16:37,350 --> 01:16:36,159

vegetable between the space station and

1240

01:16:47,270 --> 01:16:37,360

the dragon

1241

01:16:50,310 --> 01:16:48,550

flight controllers here in mission

1242

01:16:51,910 --> 01:16:50,320

control houston are monitoring the

1243

01:16:54,310 --> 01:16:51,920

pressure and temperature readings inside

1244

01:16:56,630 --> 01:16:54,320

and verifying that nothing's leaking

1245

01:17:12,310 --> 01:16:56,640

before we ready we get ready to open up

1246

01:17:15,830 --> 01:17:14,070

we're expecting to take another 45

1247

01:17:17,030 --> 01:17:15,840

minutes to get everything pressurized

1248

01:17:20,310 --> 01:17:17,040

and checked out before we open the

1249

01:17:22,310 --> 01:17:20,320

hatches up for dragon and the station

1250

01:17:24,390 --> 01:17:22,320

currently targeted to open up around 8

1251

01:17:27,270 --> 01:17:24,400

pm central time

1252

01:17:29,350 --> 01:17:27,280

following hatch open we'll see the crew

1253

01:17:32,630 --> 01:17:29,360

4 crew along with the other seven

1254

01:17:53,189 --> 01:17:32,640

astronauts on board the station eagerly

1255

01:17:57,030 --> 01:17:54,950

post hatch open

1256

01:17:59,669 --> 01:17:57,040

that will end our coverage today but

1257

01:18:03,430 --> 01:17:59,679

we'll actually come back on air around 1

1258

01:18:05,910 --> 01:18:03,440

40 a.m central time to see the crew

1259

01:18:08,149 --> 01:18:05,920

welcome remarks where

1260

01:18:10,870 --> 01:18:08,159

crew 3 astronauts nasa astronauts kayla

1261

01:18:13,110 --> 01:18:10,880

baron rashachari tom marshburn issa

1262

01:18:16,070 --> 01:18:13,120

astronaut matthias maurer

1263

01:18:19,189 --> 01:18:16,080

and russian cosmonauts sergey korsakoff

1264

01:24:12,149 --> 01:18:19,199

oleg artemyev and denise montvev

1265

01:24:15,910 --> 01:24:14,310

you're currently seeing live views

1266

01:24:17,669 --> 01:24:15,920

inside the international space station

1267

01:24:20,229 --> 01:24:17,679

in the harmony module

1268

01:24:22,629 --> 01:24:20,239

where kayla baron in your bottom

1269

01:24:24,950 --> 01:24:22,639

left-hand corner

1270

01:24:27,669 --> 01:24:24,960

is beginning to do some preparations or

1271

01:24:30,870 --> 01:24:27,679

continue continuing preparations for the

1272

01:24:32,870 --> 01:24:30,880

arrival for crew 4

1273

01:24:36,629 --> 01:24:32,880

they docked at the international space

1274

01:24:39,590 --> 01:24:36,639

station at 6 37 pm central time

1275

01:24:45,030 --> 01:24:39,600

while flying 261 statute miles

1276

01:24:49,270 --> 01:24:46,550

we exp

1277

01:25:13,189 --> 01:24:49,280

dragon spacex on dragon to ground for

1278

01:25:17,750 --> 01:25:15,910

and spacex from freedom we've got four

1279

01:25:20,629 --> 01:25:17,760

of us out of the suits uh we are

1280

01:25:24,709 --> 01:25:20,639

continuing uh through the two procedures

1281

01:25:28,629 --> 01:25:26,709

and ford at 400

1282

01:25:32,470 --> 01:25:28,639

and uh you are welcome to come back on

1283

01:25:35,030 --> 01:25:34,070

okay cop y'all farmer thanks for the

1284

01:25:38,950 --> 01:25:35,040

update

1285

01:25:40,790 --> 01:25:38,960

indications of a good vestibule leak

1286

01:25:46,070 --> 01:25:40,800

check stand by for more and we'll bring

1287

01:25:48,709 --> 01:25:47,669

okay copy that and for your awareness

1288

01:25:52,870 --> 01:25:48,719

we're about

1289

01:25:52,880 --> 01:26:03,910

copy 12 minutes

1290

01:26:08,870 --> 01:26:06,870

you just heard calls from the core or

1291

01:26:11,669 --> 01:26:08,880

the crew operations resource engineer at

1292

01:26:13,030 --> 01:26:11,679

spacex into the crew dragon

1293

01:26:16,390 --> 01:26:13,040

freedom

1294

01:26:19,669 --> 01:26:18,390

a good vegetable check

1295

01:26:21,590 --> 01:26:19,679

and the crew reported back that they

1296

01:26:23,669 --> 01:26:21,600

have doffed their own their suits are

1297

01:26:25,910 --> 01:26:23,679

taken off their suits and they are

1298

01:26:27,990 --> 01:26:25,920

preparing for hatch open as well running

1299

01:26:53,990 --> 01:26:28,000

through some checks on their side

1300

01:26:58,550 --> 01:26:56,229

dragon spacex on dragon to ground

1301

01:27:05,270 --> 01:26:58,560

cameras are back on board we see

1302

01:28:27,590 --> 01:27:06,550

copy that

1303

01:28:31,910 --> 01:28:29,990

here back seeing live views inside crew

1304

01:28:34,709 --> 01:28:31,920

dragon freedom

1305

01:28:36,470 --> 01:28:34,719

you currently see a couple empty suits

1306

01:28:39,110 --> 01:28:36,480

still in the chairs as the crew are

1307

01:28:40,390 --> 01:28:39,120

continuing to do preparations to

1308

01:28:42,550 --> 01:28:40,400

open the hatch

1309

01:28:44,470 --> 01:28:42,560

and ingress the international space

1310

01:29:17,910 --> 01:28:44,480

station we're looking for that ingress

1311

01:29:17,920 --> 01:29:35,030

on the big loop

1312

01:29:35,040 --> 01:29:38,970

listening on the big

1313

01:29:38,980 --> 01:29:57,510

[Music]

1314

01:29:57,520 --> 01:30:20,229

copies

1315

01:30:24,790 --> 01:30:22,550

and that was capcom alex kanolinkos here

1316

01:30:26,870 --> 01:30:24,800

in mission control houston relaying to

1317

01:30:29,430 --> 01:30:26,880

the dragon crew aboard freedom that

1318

01:30:31,590 --> 01:30:29,440

they're calm to calm for station to

1319

01:30:33,510 --> 01:30:31,600

dragon will be down about five minutes

1320

01:30:35,510 --> 01:30:33,520

but they'd still have connection through

1321

01:32:42,709 --> 01:30:35,520

space to ground and dragon to ground to

1322

01:32:46,310 --> 01:32:45,590

nasa astronaut kayla baron running

1323

01:32:49,110 --> 01:32:46,320

through

1324

01:32:52,070 --> 01:32:49,120

her procedures and checklist on her ipad

1325

01:32:56,149 --> 01:32:54,229

velcro to her leg as she's running

1326

01:32:59,030 --> 01:32:56,159

through procedures to continue

1327

01:33:01,270 --> 01:32:59,040

preparations for crew 4's arrival in

1328

01:33:54,890 --> 01:33:01,280

ingress out of the dragon into the

1329

01:33:54,900 --> 01:33:58,070

[Music]

1330

01:34:16,709 --> 01:34:00,470

we are ready for vehicle to vehicle

1331

01:34:27,350 --> 01:34:18,550

and freedom on the egg loop is ready for

1332

01:34:35,350 --> 01:34:29,590

and freedoms ready for voice checks on

1333

01:34:41,830 --> 01:34:37,030

and houston freedom we have you loud and

1334

01:34:48,070 --> 01:34:43,510

and station freedom has you live and

1335

01:34:48,080 --> 01:36:26,149

houston copies good voice checks

1336

01:36:26,159 --> 01:36:31,669

spacex freedom for inventory

1337

01:36:42,470 --> 01:36:34,070

freedom spacex on dragon to ground ready

1338

01:36:42,480 --> 01:37:13,750

all right

1339

01:37:20,390 --> 01:37:16,709

okay jessica to read back two meals from

1340

01:37:23,189 --> 01:37:20,400

309 two meals from 301

1341

01:37:31,669 --> 01:37:23,199

five water bottles from 208 and the rest

1342

01:37:36,790 --> 01:37:34,709

that's a good read back

1343

01:37:39,030 --> 01:37:36,800

okay copy all thanks for the report i

1344

01:37:40,870 --> 01:37:39,040

want to clarify does that include the

1345

01:37:51,109 --> 01:37:40,880

morning meal inventory from a few hours

1346

01:37:56,790 --> 01:37:54,950

hey firm the meals in 309 and 301 were

1347

01:38:00,790 --> 01:37:56,800

our breakfast this morning and we

1348

01:38:21,030 --> 01:38:01,910

okay copy all thanks for the

1349

01:38:25,109 --> 01:38:22,709

we're currently in a brief handover

1350

01:38:26,790 --> 01:38:25,119

between satellites you currently see a

1351
01:38:28,870 --> 01:38:26,800
live view inside the international space

1352
01:38:30,709 --> 01:38:28,880
station flight control room

1353
01:40:56,390 --> 01:38:30,719
but we'll get views of dragon and inside

1354
01:41:12,870 --> 01:40:59,270
dragon spacex on dragon to ground for

1355
01:41:12,880 --> 01:41:20,149
and go for freedom

1356
01:41:26,790 --> 01:41:23,510
okay freedom uh we expect that the iss

1357
01:41:28,950 --> 01:41:26,800
side is close to ready for hatch open

1358
01:41:32,470 --> 01:41:28,960
we're hoping you can step into section

1359
01:41:34,709 --> 01:41:32,480
five of 4.400 for the waste system flush

1360
01:41:36,870 --> 01:41:34,719
and we will stand by for a report on

1361
01:41:53,669 --> 01:41:36,880
which water bottle you intend to use for

1362
01:41:59,109 --> 01:41:56,470
okay freedom copies the status

1363
01:42:01,189 --> 01:41:59,119

we have a water bottle set aside from

1364

01:42:02,709 --> 01:42:01,199

bag 208 that are already accounted they

1365

01:42:06,550 --> 01:42:02,719

were partially used before we're going

1366

01:42:07,750 --> 01:42:06,560

to use those for the waste flush

1367

01:42:31,750 --> 01:42:07,760

okay copy all thanks for the

1368

01:42:36,149 --> 01:42:33,990

for those of you just joining us crew

1369

01:42:39,109 --> 01:42:36,159

for nasa astronauts chill lindgren bob

1370

01:42:41,030 --> 01:42:39,119

hines and jessica watkins and european

1371

01:42:43,270 --> 01:42:41,040

space agency astronaut samantha chris

1372

01:42:46,070 --> 01:42:43,280

ferretti had a successful launch this

1373

01:42:48,629 --> 01:42:46,080

morning around 2 52 a.m central time

1374

01:42:51,669 --> 01:42:48,639

from launch complex 39a and nasa's

1375

01:42:54,870 --> 01:42:51,679

kennedy space center in florida

1376

01:42:56,070 --> 01:42:54,880

we saw crew 4 on dragon freedom

1377

01:43:02,550 --> 01:42:56,080

docked to the international space

1378

01:43:07,350 --> 01:43:04,229

we're looking for them to

1379

01:43:08,709 --> 01:43:07,360

open hatches to let the crew ingress in

1380

01:43:11,189 --> 01:43:08,719

just about

1381

01:43:13,109 --> 01:43:11,199

18 minutes from now

1382

01:43:15,189 --> 01:43:13,119

that's 8 pm central time we're looking

1383

01:43:17,270 --> 01:43:15,199

for the crew to be able to ingress to

1384

01:43:31,590 --> 01:43:17,280

open hatches and ingress into the

1385

01:43:35,750 --> 01:43:33,350

we're in a brief handover period

1386

01:43:37,109 --> 01:43:35,760

currently between satellites and we'll

1387

01:43:39,830 --> 01:43:37,119

have views of dragon and the

1388

01:43:41,830 --> 01:43:39,840

international space station back shortly

1389

01:43:43,350 --> 01:43:41,840

you are currently seeing a live view of

1390

01:43:47,350 --> 01:43:43,360

the international space station flight

1391

01:43:50,310 --> 01:43:47,360

control room here in houston texas

1392

01:43:53,270 --> 01:43:50,320

where flight controller flight director

1393

01:43:58,390 --> 01:43:53,280

adi boulos saw us through integrated

1394

01:44:03,990 --> 01:44:01,750

to his right you see alex kanelankos the

1395

01:44:06,470 --> 01:44:04,000

capcom or the capsule communicator who

1396

01:44:07,350 --> 01:44:06,480

you'll hear talking to the crew from the

1397

01:44:58,390 --> 01:44:07,360

ground

1398

01:45:02,229 --> 01:44:59,990

houston dragon

1399

01:45:03,010 --> 01:45:02,239

station we're ready for hatch

1400

01:45:13,510 --> 01:45:03,020

equalization

1401

01:45:13,520 --> 01:45:25,669

and dragon copies we're ready

1402

01:45:28,709 --> 01:45:27,109

stationed houston on the big loop we

1403

01:45:40,470 --> 01:45:28,719

need about three to four minutes to

1404

01:45:44,310 --> 01:45:42,390

and tom just clarification on that your

1405

01:45:55,270 --> 01:45:44,320

go to equalize it will take three to

1406

01:46:05,990 --> 01:45:56,870

after you go to equalize it'll take

1407

01:46:10,070 --> 01:46:07,990

and you're getting live views

1408

01:46:12,149 --> 01:46:10,080

of mission control houston where flight

1409

01:46:14,070 --> 01:46:12,159

controllers here are looking after the

1410

01:46:16,709 --> 01:46:14,080

international space station which

1411

01:46:26,950 --> 01:46:16,719

freedom dragon just docked to around 7

1412

01:46:30,629 --> 01:46:29,189

you just heard capcom here in mission

1413

01:46:33,669 --> 01:46:30,639

control houston

1414

01:46:35,990 --> 01:46:33,679

confirm with the crew that equalization

1415

01:46:39,750 --> 01:46:36,000

is ready to start between iss and

1416

01:46:42,550 --> 01:46:41,189

he also let the crew know that it would

1417

01:46:44,149 --> 01:46:42,560

take about three to four minutes for

1418

01:46:45,830 --> 01:46:44,159

that to

1419

01:46:48,310 --> 01:46:45,840

continue and verify that the hatch is

1420

01:47:12,709 --> 01:46:48,320

good to be open between the station and

1421

01:47:17,030 --> 01:47:14,550

earlier we did hear a call to the crew

1422

01:47:19,750 --> 01:47:17,040

saying that the iss side is close to

1423

01:47:22,070 --> 01:47:19,760

ready for hatch to open and that the

1424

01:47:31,510 --> 01:47:22,080

system flush was needed on the spacex

1425

01:47:35,750 --> 01:47:33,990

again the clock has started

1426
01:47:36,470 --> 01:47:35,760
from freedom to the international space

1427
01:47:38,149 --> 01:47:36,480
station

1428
01:47:40,149 --> 01:47:38,159
for equalization

1429
01:47:41,669 --> 01:47:40,159
it's in progress and we're looking for

1430
01:48:51,510 --> 01:47:41,679
three or four minutes before that is

1431
01:48:56,070 --> 01:48:53,669
again we are between satellites and

1432
01:48:58,790 --> 01:48:56,080
currently in a loss of signal which is

1433
01:49:01,270 --> 01:48:58,800
expected at this time and so we're

1434
01:49:03,030 --> 01:49:01,280
waiting on views to come return from

1435
01:49:04,629 --> 01:49:03,040
dragon and the international space

1436
01:49:07,430 --> 01:49:04,639
station

1437
01:49:19,350 --> 01:49:07,440
as we wait we are in the middle

1438
01:49:23,589 --> 01:49:21,270

and that's waiting on pressurization to

1439

01:50:37,510 --> 01:49:23,599

equalize between freedom and the space

1440

01:50:43,109 --> 01:50:38,950

again we're in the middle of

1441

01:50:47,510 --> 01:50:45,030

pressure between the freedom and the

1442

01:50:49,189 --> 01:50:47,520

space station

1443

01:50:55,270 --> 01:50:49,199

spacex ready to copy on dragging the

1444

01:50:59,350 --> 01:50:57,750

hey um could you please take the cameras

1445

01:51:03,109 --> 01:50:59,360

external we're going to be changing into

1446

01:51:16,390 --> 01:51:04,709

okay copy i'll chill we'll take the

1447

01:51:16,400 --> 01:52:40,390

freedom spacex cameras are external

1448

01:52:44,070 --> 01:52:41,990

station houston on space to ground three

1449

01:52:45,910 --> 01:52:44,080

no response required we see in the video

1450

01:52:47,910 --> 01:52:45,920

i'm just letting you know that we're

1451
01:52:49,589 --> 01:52:47,920
reconfiguring the potable water source

1452
01:52:55,270 --> 01:52:49,599
so you may hear some valve

1453
01:52:55,280 --> 01:53:05,669
copy thumbs up

1454
01:53:13,990 --> 01:53:07,990
and that was thumbs up from the crew as

1455
01:53:20,709 --> 01:53:17,030
and we have good equalization on the iss

1456
01:53:23,589 --> 01:53:20,719
and between dragon and iss

1457
01:53:25,750 --> 01:53:23,599
as soon as the space

1458
01:53:28,070 --> 01:53:25,760
craft

1459
01:53:28,950 --> 01:53:28,080
dragon freedom is ready

1460
01:53:31,030 --> 01:53:28,960
um

1461
01:53:34,310 --> 01:53:31,040
i'm told that we are ready to have hatch

1462
01:53:35,669 --> 01:53:34,320
open just here shortly

1463
01:53:50,390 --> 01:53:35,679

again we're looking for that it happened

1464

01:54:02,310 --> 01:53:52,950

dragon spacex on dragon to ground for

1465

01:54:02,320 --> 01:54:05,430

freedom freddy copy

1466

01:54:11,109 --> 01:54:07,990

all right freedom the iss is ready

1467

01:54:14,470 --> 01:54:11,119

ground teams are also ready for

1468

01:54:16,470 --> 01:54:14,480

dragon hatch opening on your uh on your

1469

01:54:19,350 --> 01:54:16,480

go

1470

01:54:22,629 --> 01:54:19,360

hatch

1471

01:54:30,070 --> 01:54:22,639

and then contact us per step 6.6 of

1472

01:54:36,950 --> 01:54:32,629

copy it's going to take us about 5-10

1473

01:54:36,960 --> 01:55:04,310

okay cup y'all

1474

01:55:08,550 --> 01:55:05,910

and you just heard from the crew

1475

01:55:09,830 --> 01:55:08,560

operations resource engineer or core at

1476
01:55:13,189 --> 01:55:09,840
spacex

1477
01:55:15,430 --> 01:55:13,199
telling crew dragon

1478
01:55:17,589 --> 01:55:15,440
the crew aboard dragon that they are

1479
01:55:18,390 --> 01:55:17,599
ready to open the hatch as soon as they

1480
01:55:20,070 --> 01:55:18,400
are

1481
01:55:21,910 --> 01:55:20,080
ready the crew did report they need

1482
01:55:24,790 --> 01:55:21,920
about five to ten more minutes before

1483
01:55:26,550 --> 01:55:24,800
they're ready to open

1484
01:55:29,669 --> 01:55:26,560
but that's great news to hear that we

1485
01:56:55,990 --> 01:55:29,679
are ready here shortly around 8 p.m

1486
01:56:59,669 --> 01:56:58,310
again preparations continuing on both

1487
01:57:02,070 --> 01:56:59,679
sides

1488
01:57:03,589 --> 01:57:02,080

station houston on space to ground three

1489

01:57:06,470 --> 01:57:03,599

for kayla

1490

01:57:08,830 --> 01:57:06,480

notice in your just above and to your

1491

01:57:12,790 --> 01:57:08,840

right there's a

1492

01:57:14,790 --> 01:57:12,800

cpa cable sticking out

1493

01:57:16,310 --> 01:57:14,800

if you can tuck that back in just so yes

1494

01:57:37,669 --> 01:57:16,320

that right there so it doesn't get

1495

01:57:41,910 --> 01:57:39,430

and you just heard capcom alex

1496

01:57:44,229 --> 01:57:41,920

kanelanko's given a few

1497

01:57:45,990 --> 01:57:44,239

uh checks left to the crew inside the

1498

01:58:35,030 --> 01:57:46,000

international space station to prepare

1499

01:58:39,830 --> 01:58:36,790

as you can see preparations are still

1500

01:58:41,910 --> 01:58:39,840

continuing between the iss and on crew

1501

01:58:43,669 --> 01:58:41,920

dragon freedom

1502

01:58:45,750 --> 01:58:43,679

the crew for astronauts are getting

1503

01:58:47,589 --> 01:58:45,760

things configured and will join the

1504

01:58:49,510 --> 01:58:47,599

seven-person crew on station bringing

1505

01:58:58,229 --> 01:58:49,520

the total crew members on station till

1506

01:59:03,189 --> 01:59:01,189

you currently see a view of all all four

1507

01:59:12,390 --> 01:59:03,199

crew 3 members

1508

01:59:16,790 --> 01:59:14,149

we will be back on air after hatch

1509

01:59:19,910 --> 01:59:16,800

opening around 1 40 a.m

1510

01:59:22,390 --> 01:59:19,920

and all seven excuse me all 11 crew

1511

02:02:54,310 --> 01:59:22,400

members will be awake

1512

02:02:57,669 --> 02:02:56,070

if you're just joining us you're looking

1513

02:03:01,030 --> 02:02:57,679

live inside the international space

1514

02:03:03,430 --> 02:03:01,040

station as the crew aboard prepare for

1515

02:03:04,950 --> 02:03:03,440

the ingress of crew 4

1516

02:03:06,790 --> 02:03:04,960

which docked to the international space

1517

02:03:09,830 --> 02:03:06,800

station zenith port on the harmony

1518

02:03:20,149 --> 02:03:09,840

module at 6 37 pm

1519

02:03:26,550 --> 02:03:22,950

pressurization equalization has happened

1520

02:03:28,709 --> 02:03:26,560

and we are waiting for the spacex crude

1521

02:03:31,510 --> 02:03:28,719

crew dragon freedom

1522

02:03:33,270 --> 02:03:31,520

crew members to open their hatch

1523

02:04:11,990 --> 02:03:33,280

and ingress the international space

1524

02:04:18,709 --> 02:04:15,990

with about a 15 or 16 hour rendezvous

1525

02:04:20,790 --> 02:04:18,719

to docking

1526

02:04:22,870 --> 02:04:20,800

this was one of the fastest if not the

1527

02:04:24,149 --> 02:04:22,880

fastest commercial crew

1528

02:08:05,270 --> 02:04:24,159

flights to the international space

1529

02:08:08,550 --> 02:08:06,709

if you're just joining us you're

1530

02:08:11,669 --> 02:08:08,560

watching the live broadcast for the crew

1531

02:08:14,629 --> 02:08:11,679

4 mission which had a successful launch

1532

02:08:18,470 --> 02:08:14,639

at 2 52 a.m central time and docked to

1533

02:08:19,990 --> 02:08:18,480

the space station at 6 37 pm central

1534

02:08:22,310 --> 02:08:20,000

today

1535

02:08:24,550 --> 02:08:22,320

now we're just waiting for the crew to

1536

02:08:26,229 --> 02:08:24,560

open the hatch in ingress or come aboard

1537

02:08:39,270 --> 02:08:26,239

the space station

1538

02:08:43,830 --> 02:08:41,189

the crew on board

1539

02:08:46,950 --> 02:08:43,840

station you see on the screen

1540

02:08:49,109 --> 02:08:46,960

is nasa astronaut kayla baron and rasha

1541

02:08:50,709 --> 02:08:49,119

chari

1542

02:09:44,950 --> 02:08:50,719

they're eagerly awaiting the crew for

1543

02:09:52,069 --> 02:09:47,030

this is uh freedom on

1544

02:10:03,109 --> 02:09:54,069

freedom spacex on the big loop go for

1545

02:10:03,119 --> 02:10:15,589

making copies

1546

02:10:49,589 --> 02:10:17,990

dragon spacex on the big loop hoping to

1547

02:10:54,149 --> 02:10:51,990

and you just heard a few checks from the

1548

02:10:57,830 --> 02:10:54,159

crew operations resource engineer or the

1549

02:10:59,430 --> 02:10:57,840

corps at spacex

1550

02:14:09,750 --> 02:10:59,440

great news with that go for hatch

1551
02:14:15,510 --> 02:14:13,189
and we do have a go for hatch open

1552
02:14:16,870 --> 02:14:15,520
but we are waiting on the crew inside

1553
02:14:18,709 --> 02:14:16,880
dragon to

1554
02:14:19,750 --> 02:14:18,719
finish some preparations and open the

1555
02:14:23,990 --> 02:14:19,760
hatch

1556
02:14:26,149 --> 02:14:24,000
take another few minutes for the crew to

1557
02:14:27,990 --> 02:14:26,159
ingress the space station and be welcome

1558
02:14:31,109 --> 02:14:28,000
to their new home for the next six

1559
02:14:36,709 --> 02:14:31,119
months as a part of the expedition 67

1560
02:14:41,270 --> 02:14:38,390
they will continue to walk through some

1561
02:14:42,550 --> 02:14:41,280
procedures as they ingress before

1562
02:14:48,069 --> 02:14:42,560
ingressing the international space

1563
02:14:51,510 --> 02:14:50,229

they are looking to install imv ducting

1564

02:14:53,189 --> 02:14:51,520

mixing the air of the space station

1565

02:14:55,910 --> 02:14:53,199

environment with the air inside the crew

1566

02:14:59,109 --> 02:14:55,920

dragon freedom they'll seal some of the

1567

02:15:01,350 --> 02:14:59,119

io or lithium hydroxide cartridges that

1568

02:15:03,430 --> 02:15:01,360

scrub carbon dioxide inside the dragon

1569

02:15:05,750 --> 02:15:03,440

capsule on the ride to the international

1570

02:15:10,149 --> 02:15:05,760

space station they'll check some vent

1571

02:15:14,790 --> 02:15:12,709

some vent wells as well so they may be

1572

02:15:58,470 --> 02:15:14,800

just a little bit more time until we

1573

02:16:04,550 --> 02:16:00,629

and dragon hatch is open and they are

1574

02:16:06,870 --> 02:16:04,560

welcoming the crew 4 astronauts on board

1575

02:16:08,229 --> 02:16:06,880

you see all smiles around as jessica

1576

02:16:11,189 --> 02:16:08,239

watkins

1577

02:16:12,470 --> 02:16:11,199

bob hines samantha christopher reddy of

1578

02:16:15,430 --> 02:16:12,480

ingressed

1579

02:16:16,950 --> 02:16:15,440

and are hugging all their current crew 3

1580

02:16:18,870 --> 02:16:16,960

crew members

1581

02:16:21,750 --> 02:16:18,880

and last one in we see

1582

02:16:23,270 --> 02:16:21,760

commander of dragon chill lindgren now

1583

02:17:00,950 --> 02:16:23,280

entering into

1584

02:17:05,669 --> 02:17:02,709

you're currently looking at all eight

1585

02:17:09,429 --> 02:17:05,679

crew members of crew three and four

1586

02:17:14,549 --> 02:17:09,439

together inside the harmony module

1587

02:17:18,629 --> 02:17:16,709

crew 3 and crew 4 will do what's called

1588

02:17:21,030 --> 02:17:18,639

a direct handover

1589

02:17:22,790 --> 02:17:21,040

for the next five days there'll be

1590

02:17:25,910 --> 02:17:22,800

two dragons docked to the international

1591

02:17:40,070 --> 02:17:28,629

crew 3 currently set to

1592

02:17:43,830 --> 02:17:42,070

station houston on space to ground three

1593

02:17:46,150 --> 02:17:43,840

no response required just letting you

1594

02:17:47,589 --> 02:17:46,160

know pwd is going to be down 10 to 15

1595

02:18:02,950 --> 02:17:47,599

minutes

1596

02:18:14,230 --> 02:18:04,469

and tell i'll owe you a beverage when

1597

02:18:24,870 --> 02:18:16,549

houston station iv duct installation is

1598

02:18:24,880 --> 02:19:53,610

houston cubbies

1599

02:20:38,790 --> 02:19:55,030

[Applause]

1600

02:20:43,590 --> 02:20:41,590

wow what an incredible morning it is so

1601
02:20:46,070 --> 02:20:43,600
great to see crew 4 astronauts finally

1602
02:20:48,309 --> 02:20:46,080
on board the international space station

1603
02:20:50,550 --> 02:20:48,319
after about a 15-hour flight

1604
02:20:52,469 --> 02:20:50,560
the crew is now aboard and ready to

1605
02:20:54,230 --> 02:20:52,479
continue their six-month rotational

1606
02:20:56,230 --> 02:20:54,240
mission aboard the international space

1607
02:20:58,790 --> 02:20:56,240
station they were welcomed by the

1608
02:21:03,910 --> 02:20:58,800
current space station crew members of

1609
02:21:08,469 --> 02:21:05,190
the full

1610
02:21:15,349 --> 02:21:08,479
complement now up to 11 human beings as

1611
02:21:19,750 --> 02:21:18,070
it's been an incredible 24 hours and

1612
02:21:21,349 --> 02:21:19,760
with crew board

1613
02:21:23,590 --> 02:21:21,359

crew 4 now aboard the international

1614

02:21:24,710 --> 02:21:23,600

space station that's it for us in

1615

02:21:27,030 --> 02:21:24,720

houston

1616

02:21:35,750 --> 02:21:27,040

welcome aboard crew 4. now let's turn it

1617

02:21:40,790 --> 02:21:37,429

thanks shaniqua

1618

02:21:44,469 --> 02:21:40,800

so great to see crew 4 on board

1619

02:21:46,230 --> 02:21:44,479

as she said it's been quite a 24 hours

1620

02:21:48,630 --> 02:21:46,240

you know we had everything kicked off

1621

02:21:52,790 --> 02:21:48,640

really with suit up that was actually

1622

02:21:55,110 --> 02:21:52,800

yesterday around 11 50 pm eastern time

1623

02:21:57,429 --> 02:21:55,120

and then later on a couple hours later

1624

02:22:00,070 --> 02:21:57,439

we saw the crew ingress into dragon

1625

02:22:02,150 --> 02:22:00,080

freedom uh that was around 1 17 a.m

1626
02:22:04,150 --> 02:22:02,160
eastern and then of course we had an

1627
02:22:07,910 --> 02:22:04,160
on-time liftoff from kennedy space

1628
02:22:08,790 --> 02:22:07,920
center pad 39a at 3 52 a.m eastern this

1629
02:22:10,790 --> 02:22:08,800
morning

1630
02:22:12,469 --> 02:22:10,800
that was followed by a stage one landing

1631
02:22:14,790 --> 02:22:12,479
on our drone ship

1632
02:22:16,790 --> 02:22:14,800
a successful dragon separation as well

1633
02:22:19,910 --> 02:22:16,800
as deployment of the nose cone which we

1634
02:22:21,750 --> 02:22:19,920
saw in action uh on our webcasts and

1635
02:22:24,389 --> 02:22:21,760
then if you join us earlier this

1636
02:22:26,070 --> 02:22:24,399
afternoon we saw the five major burns

1637
02:22:27,910 --> 02:22:26,080
that dragon performed

1638
02:22:30,469 --> 02:22:27,920

as it approached the international space

1639

02:22:33,270 --> 02:22:30,479

station we were able to confirm docking

1640

02:22:35,190 --> 02:22:33,280

at 7 37 pm eastern

1641

02:22:37,510 --> 02:22:35,200

and then we just saw ingress into

1642

02:22:40,309 --> 02:22:37,520

station just a couple minutes ago so

1643

02:22:42,230 --> 02:22:40,319

super exciting on behalf of spacex and

1644

02:22:44,630 --> 02:22:42,240

nasa i want to thank you for watching

1645

02:22:46,950 --> 02:22:44,640

today's webcast and for your interest in

1646

02:22:48,790 --> 02:22:46,960

this exciting fourth rotational mission

1647

02:22:50,230 --> 02:22:48,800

yeah and now that the crew is on board

1648

02:22:52,070 --> 02:22:50,240

they've got a couple of tasks to go

1649

02:22:53,670 --> 02:22:52,080

through shaniqua was talking about

1650

02:22:55,750 --> 02:22:53,680

they're going to be integrating dragon's

1651
02:22:57,910 --> 02:22:55,760
cabin with that on board the station you

1652
02:22:58,870 --> 02:22:57,920
know on the right uphill dragon has its

1653
02:23:00,469 --> 02:22:58,880
own

1654
02:23:02,550 --> 02:23:00,479
eclipse environmental control life

1655
02:23:05,030 --> 02:23:02,560
support system regulating

1656
02:23:06,230 --> 02:23:05,040
temperature humidity control scrubbing

1657
02:23:07,990 --> 02:23:06,240
co2

1658
02:23:09,750 --> 02:23:08,000
and that temperature by the way can be

1659
02:23:12,389 --> 02:23:09,760
actively controlled by the astronauts on

1660
02:23:14,870 --> 02:23:12,399
the displays or changed by the team here

1661
02:23:17,190 --> 02:23:14,880
in mission control hawthorne and so they

1662
02:23:18,870 --> 02:23:17,200
have to install that imv ducting we

1663
02:23:21,590 --> 02:23:18,880

heard that done the intramodular

1664

02:23:23,110 --> 02:23:21,600

ventilation integrate dragon's cabin

1665

02:23:24,790 --> 02:23:23,120

atmosphere with the rest of the station

1666

02:23:26,870 --> 02:23:24,800

now they're also installing some seals

1667

02:23:29,750 --> 02:23:26,880

around the hatchway around dragon

1668

02:23:31,990 --> 02:23:29,760

and a hatch cover as well and with them

1669

02:23:33,750 --> 02:23:32,000

arrived we're less than a week away now

1670

02:23:35,110 --> 02:23:33,760

from the return of crew three so pretty

1671

02:23:36,469 --> 02:23:35,120

much everything we just saw we're going

1672

02:23:38,550 --> 02:23:36,479

to see in reverse

1673

02:23:40,469 --> 02:23:38,560

as those four crew members get ready to

1674

02:23:42,790 --> 02:23:40,479

come home and end their long duration

1675

02:23:45,030 --> 02:23:42,800

stay on board station uh as you heard

1676

02:23:47,030 --> 02:23:45,040

right now we're targeting may 4th for

1677

02:23:49,670 --> 02:23:47,040

that return everything is going to

1678

02:23:51,750 --> 02:23:49,680

depend on weather so be sure to follow

1679

02:23:53,110 --> 02:23:51,760

nasa and spacex as we're going to be

1680

02:23:55,030 --> 02:23:53,120

bringing you live coverage of their

1681

02:23:57,590 --> 02:23:55,040

entire journey but then follow us on

1682

02:23:59,349 --> 02:23:57,600

social media for real-time updates as we

1683

02:24:01,910 --> 02:23:59,359

continue counting down to the end of the

1684

02:24:05,910 --> 02:24:01,920

crew 3 missions so thank you again for

1685

02:24:09,030 --> 02:24:05,920

watching go nasa go spacex go crew 4 and

1686

02:24:10,550 --> 02:24:09,040

pretty soon come home crew 3. with that

1687

02:24:17,650 --> 02:24:10,560

we'll wrap it up and we'll see you again