1
00:00:41,990 --> 00:00:39,830
we are showing you a live look of

2
00:00:44,950 --> 00:00:42,000
spacex's falcon 9 rocket and cargo

3
00:00:47,110 --> 00:00:44,960
dragon here at pad 39a at kennedy space

4
00:00:49,350 --> 00:00:47,120
center yesterday's launch was scrubbed

5
00:00:51,430 --> 00:00:49,360
because of weather but things are

6
00:00:53,270 --> 00:00:51,440
looking a lot better out there today the

7
00:00:55,750 --> 00:00:53,280
launch team got a weather update about

8
00:00:58,389 --> 00:00:55,760
45 minutes ago and we are currently

9
00:01:01,590 --> 00:00:58,399
taking a look at their 80 percent go

10
00:01:04,390 --> 00:01:01,600
up from 40 percent yesterday and fueling

11
00:01:05,429 --> 00:01:04,400
began a couple of minutes ago at 2 39

12
00:01:06,789 --> 00:01:05,439
a.m

13
00:01:08,550 --> 00:01:06,799

good morning everyone and thank you for

14
00:01:10,390 --> 00:01:08,560
joining us i'm megan cruz with nasa

15
00:01:12,870 --> 00:01:10,400
communications we will be live with

16
00:01:14,870 --> 00:01:12,880
spacex at the top of the hour but first

17
00:01:19,830 --> 00:01:14,880
here's a preview of some of the science

18
00:01:24,070 --> 00:01:21,510
first let's chat with some girl scouts

19
00:01:26,230 --> 00:01:24,080
who are sending brine shrimp and ants to

20
00:01:27,749 --> 00:01:26,240
space evie and marie thank you so much

21
00:01:29,429 --> 00:01:27,759
for joining us so we're sending brian

22
00:01:32,630 --> 00:01:29,439
shrimp or sending ants and we're sending

23
00:01:34,710 --> 00:01:32,640
plants correct and 11 11 girls inspired

24
00:01:37,270 --> 00:01:34,720
these experiments yes so there are a

25
00:01:39,510 --> 00:01:37,280
total of three projects going into the

26
00:01:42,710 --> 00:01:39,520
space from the making space for girls

27
00:01:44,469 --> 00:01:42,720
program we have ants going up it was a

28
00:01:46,710 --> 00:01:44,479
younger girl who was really just wanting

29
00:01:48,230 --> 00:01:46,720
to see how they move how they act if

30
00:01:49,429 --> 00:01:48,240
they act differently

31
00:01:51,990 --> 00:01:49,439
we have

32
00:01:54,950 --> 00:01:52,000
tomatoes and lemongrass and peppers

33
00:01:56,630 --> 00:01:54,960
going up in our plants section and then

34
00:01:58,230 --> 00:01:56,640
of course we have the brine shrimp going

35
00:01:59,910 --> 00:01:58,240
up eva you're the one who's sending

36
00:02:01,910 --> 00:01:59,920
brine shrimp into space and i can see

37
00:02:03,190 --> 00:02:01,920
that you brought some with you yep why

38
00:02:04,310 --> 00:02:03,200

brine shrimp

39
00:02:06,310 --> 00:02:04,320
because

40
00:02:09,190 --> 00:02:06,320
well we wanted to send actual shrimp but

41
00:02:11,589 --> 00:02:09,200
they're kind of big and we have size

42
00:02:14,229 --> 00:02:11,599
constraints so these are the brand

43
00:02:16,949 --> 00:02:14,239
shrimp there is one big one but the rest

44
00:02:19,670 --> 00:02:16,959
of them are tiny so we're seeing if we

45
00:02:21,190 --> 00:02:19,680
can grow them on the space station how

46
00:02:23,670 --> 00:02:21,200
cool is it that you get to send up a

47
00:02:25,350 --> 00:02:23,680
science experiment to space alongside

48
00:02:27,670 --> 00:02:25,360
all of these other distinguished

49
00:02:29,589 --> 00:02:27,680
researchers around the world very very

50
00:02:31,589 --> 00:02:29,599
cool this is totally an amazing

51
00:02:33,990 --> 00:02:31,599
opportunity for kids around the world to

52
00:02:36,070 --> 00:02:34,000
see and say hey maybe i could i could

53
00:02:38,550 --> 00:02:36,080
send science up to the space station

54
00:02:40,309 --> 00:02:38,560
this opportunity is great because of the

55
00:02:42,070 --> 00:02:40,319
research and the girls who are getting

56
00:02:44,630 --> 00:02:42,080
to send it up but it's really a message

57
00:02:47,910 --> 00:02:44,640
for all girls out there that you can do

58
00:02:51,270 --> 00:02:47,920
space and that you can

59
00:02:54,869 --> 00:02:51,280
go and pursue a career in space and

60
00:02:56,550 --> 00:02:54,879
space exploration and the amazing

61
00:02:59,350 --> 00:02:56,560
work that goes into it and it really

62
00:03:02,949 --> 00:02:59,360
grows their creative sides and inspires

63
00:03:04,630 --> 00:03:02,959

them to further into space and science

64
00:03:06,710 --> 00:03:04,640
and guys we can literally see launch pad

65
00:03:08,949 --> 00:03:06,720
39a from where we're standing here

66
00:03:10,790 --> 00:03:08,959
that's where this spacex rocket is going

67
00:03:12,309 --> 00:03:10,800
to lift off from with your experiment

68
00:03:14,149 --> 00:03:12,319
how do you feel about that

69
00:03:15,589 --> 00:03:14,159
very very excited

70
00:03:17,830 --> 00:03:15,599
i've always loved to do science

71
00:03:19,670 --> 00:03:17,840
experiments and knowing that i inspired

72
00:03:20,949 --> 00:03:19,680
something that might help people is

73
00:03:23,030 --> 00:03:20,959
really really cool

74
00:03:25,589 --> 00:03:23,040
awesome guys thank you so much thank you

75
00:03:29,350 --> 00:03:27,509
the next person i want you to meet is dr

76
00:03:31,430 --> 00:03:29,360
nicola ditrani he's working with

77
00:03:34,550 --> 00:03:31,440
researchers at the houston methodist

78
00:03:37,990 --> 00:03:34,560
research institute to test an implant

79
00:03:39,670 --> 00:03:38,000
that can remotely deliver medicine thank

80
00:03:40,789 --> 00:03:39,680
you for joining me today nicola for

81
00:03:42,710 --> 00:03:40,799
those who don't know we're here at

82
00:03:44,630 --> 00:03:42,720
kennedy's space station processing

83
00:03:47,990 --> 00:03:44,640
facility do you mind telling people why

84
00:03:49,910 --> 00:03:48,000
you're here i'm preparing um the last

85
00:03:51,190 --> 00:03:49,920
step of assembling on an implantable

86
00:03:53,190 --> 00:03:51,200
device that we're going to shift to

87
00:03:54,470 --> 00:03:53,200
international space station and this is

88
00:03:56,309 --> 00:03:54,480

an implantable device that have been

89
00:03:58,229 --> 00:03:56,319
developed for the last year with my

90
00:03:59,990 --> 00:03:58,239
principal investigator alessandra tony

91
00:04:02,949 --> 00:04:00,000
at the houston methodist research

92
00:04:04,789 --> 00:04:02,959
institute it's a device for implant for

93
00:04:06,949 --> 00:04:04,799
drug delivery for sustained drug

94
00:04:08,070 --> 00:04:06,959
delivery that can be remotely controlled

95
00:04:10,949 --> 00:04:08,080
we're gonna

96
00:04:13,830 --> 00:04:10,959
send there 10 implants inside a faraday

97
00:04:16,229 --> 00:04:13,840
box which is

98
00:04:17,349 --> 00:04:16,239
box that has been developed by prosops

99
00:04:18,550 --> 00:04:17,359
and

100
00:04:20,150 --> 00:04:18,560
all of these devices are going to

101
00:04:22,150 --> 00:04:20,160
communicate with this computer and

102
00:04:24,790 --> 00:04:22,160
through an internet connection we're

103
00:04:26,950 --> 00:04:24,800
going to that same signal is going to go

104
00:04:28,710 --> 00:04:26,960
come back here on earth and from the

105
00:04:31,830 --> 00:04:28,720
houston facility we're going to be able

106
00:04:34,310 --> 00:04:31,840
to log on and see the status of each one

107
00:04:36,550 --> 00:04:34,320
of these devices how is it that that

108
00:04:38,710 --> 00:04:36,560
little device can do that can remotely

109
00:04:41,350 --> 00:04:38,720
deliver medicine to somebody the

110
00:04:43,670 --> 00:04:41,360
principle of working of this device is

111
00:04:46,070 --> 00:04:43,680
uh through a silicon nanophotic membrane

112
00:04:48,230 --> 00:04:46,080
which is this small piece that you see

113
00:04:50,390 --> 00:04:48,240

right here it's just six by six

114
00:04:53,510 --> 00:04:50,400
millimeter and it has hundreds of

115
00:04:56,070 --> 00:04:53,520
thousands of nano channels we use uh

116
00:04:58,550 --> 00:04:56,080
these silicon devices to finely tune how

117
00:05:00,150 --> 00:04:58,560
much drug diffuses through and it's

118
00:05:02,550 --> 00:05:00,160
delivered to the body

119
00:05:04,550 --> 00:05:02,560
so in connection to this membrane we

120
00:05:06,070 --> 00:05:04,560
have a mini computer on border device

121
00:05:08,550 --> 00:05:06,080
which is the same that you see here

122
00:05:11,749 --> 00:05:08,560
which is a printed circuit board and

123
00:05:13,670 --> 00:05:11,759
that has bluetooth capabilities so this

124
00:05:16,310 --> 00:05:13,680
uh mini computer is connected to the

125
00:05:18,629 --> 00:05:16,320
silicon membrane and so it can change

126
00:05:20,710 --> 00:05:18,639
how much drug is released wow and this

127
00:05:23,189 --> 00:05:20,720
research could help people here on earth

128
00:05:26,710 --> 00:05:23,199
right that is correct the goal of these

129
00:05:29,110 --> 00:05:26,720
devices is to actually treat and manage

130
00:05:31,909 --> 00:05:29,120
long-term chronic pathologies such as

131
00:05:33,830 --> 00:05:31,919
hypertension of rheumatoid arthritis wow

132
00:05:35,670 --> 00:05:33,840
and i think the size is so noteworthy

133
00:05:38,390 --> 00:05:35,680
too because right now the devices that

134
00:05:40,790 --> 00:05:38,400
do remotely deliver medicine are big

135
00:05:43,590 --> 00:05:40,800
right they're big devices yes similar

136
00:05:45,990 --> 00:05:43,600
devices that deliver drug for this kind

137
00:05:49,110 --> 00:05:46,000
of pathologies usually are peristaltic

138
00:05:51,670 --> 00:05:49,120

pump that are pretty big in size and the

139
00:05:53,830 --> 00:05:51,680
way we're able to shrink the device down

140
00:05:56,230 --> 00:05:53,840
to this size is because we don't use any

141
00:05:59,029 --> 00:05:56,240
mechanical components that are also

142
00:06:01,189 --> 00:05:59,039
prone to failure we everything we do is

143
00:06:03,029 --> 00:06:01,199
solid state like this membrane that we

144
00:06:04,550 --> 00:06:03,039
have right here is completely made of

145
00:06:06,469 --> 00:06:04,560
silicon all right nikola thank you so

146
00:06:09,029 --> 00:06:06,479
much thank you

147
00:06:11,350 --> 00:06:09,039
and finally i met with dr fabio paluso

148
00:06:14,150 --> 00:06:11,360
who's studying an interesting mixture

149
00:06:16,070 --> 00:06:14,160
that could protect our bones

150
00:06:17,990 --> 00:06:16,080
dr fabio palusa thank you so much for

151
00:06:19,510 --> 00:06:18,000
inviting us here and here for me dr

152
00:06:21,990 --> 00:06:19,520
felicia tell us about your experiment

153
00:06:24,309 --> 00:06:22,000
what is it that you're trying to study

154
00:06:26,469 --> 00:06:24,319
it's very simple this experiment is

155
00:06:29,189 --> 00:06:26,479
aimed at understanding whether the

156
00:06:30,550 --> 00:06:29,199
presence of a special metabolism excites

157
00:06:31,590 --> 00:06:30,560
from grapes

158
00:06:33,350 --> 00:06:31,600
may help

159
00:06:35,270 --> 00:06:33,360
bone cells to

160
00:06:37,749 --> 00:06:35,280
survive better when exposed to

161
00:06:40,469 --> 00:06:37,759
microgravity you know indeed that not

162
00:06:42,629 --> 00:06:40,479
only humans but also crew are exposed to

163
00:06:44,710 --> 00:06:42,639

many diseases and one of these is the

164
00:06:46,790 --> 00:06:44,720
osteoporosis when clear we are exposed

165
00:06:49,110 --> 00:06:46,800
to microrevenue for a long time their

166
00:06:51,350 --> 00:06:49,120
bone loses minerals yeah the mixture

167
00:06:52,950 --> 00:06:51,360
that you're studying is um metabolites

168
00:06:55,350 --> 00:06:52,960
from grapes

169
00:06:57,589 --> 00:06:55,360
and also collagen yes and also collagen

170
00:06:58,710 --> 00:06:57,599
there are two green lines

171
00:07:00,070 --> 00:06:58,720
that our

172
00:07:01,430 --> 00:07:00,080
colleagues from

173
00:07:03,909 --> 00:07:01,440
the department of biology are now

174
00:07:06,070 --> 00:07:03,919
preparing they are fixing the cells on

175
00:07:08,070 --> 00:07:06,080
these substrates there are two twin

176
00:07:10,469 --> 00:07:08,080
lines one with only with collagen which

177
00:07:11,830 --> 00:07:10,479
is a normal nutrient for cells and the

178
00:07:14,390 --> 00:07:11,840
other

179
00:07:17,749 --> 00:07:14,400
there is this special metabolism the

180
00:07:19,749 --> 00:07:17,759
extract of the grapes resveratrol name

181
00:07:22,309 --> 00:07:19,759
the chemical name

182
00:07:23,589 --> 00:07:22,319
that on ground has been tested

183
00:07:26,710 --> 00:07:23,599
successfully

184
00:07:28,230 --> 00:07:26,720
it helps bone cells to survive better so

185
00:07:30,469 --> 00:07:28,240
they have the cells the cells are going

186
00:07:32,950 --> 00:07:30,479
to go here this is going to go up to the

187
00:07:34,950 --> 00:07:32,960
space station again explain why this

188
00:07:36,629 --> 00:07:34,960

experiment has to happen on the

189
00:07:40,390 --> 00:07:36,639
international space station so the

190
00:07:42,950 --> 00:07:40,400
present the this experiment must be

191
00:07:44,629 --> 00:07:42,960
run in the absence of gravity on the

192
00:07:46,309 --> 00:07:44,639
international space station just to

193
00:07:49,110 --> 00:07:46,319
verify whether the presence of

194
00:07:51,270 --> 00:07:49,120
resveratrol may help the bone cells to

195
00:07:53,270 --> 00:07:51,280
survive for a long time okay perfect

196
00:07:54,469 --> 00:07:53,280
well dr paluso thank you so much and and

197
00:07:56,950 --> 00:07:54,479
i can't wait to see what you guys

198
00:08:00,390 --> 00:07:58,710
everything's just so interesting and

199
00:08:02,550 --> 00:08:00,400
that's actually just a fraction of the

200
00:08:03,909 --> 00:08:02,560
research going up there is plenty more

201
00:08:06,070 --> 00:08:03,919
experiments and technology

202
00:08:07,670 --> 00:08:06,080
demonstrations that you can read up on

203
00:08:09,830 --> 00:08:07,680
at nasa.gov

204
00:08:12,309 --> 00:08:09,840
commercial resupply again we'll be live

205
00:08:13,990 --> 00:08:12,319
with spacex starting soon at 3 am we

206
00:09:43,190 --> 00:08:14,000
leave you with shots of the rockets and

207
00:09:43,200 --> 00:11:24,810
so

208
00:11:24,820 --> 00:15:41,430
[Music]

209
00:15:49,990 --> 00:15:43,590
dragon doesn't count though

210
00:15:50,000 --> 00:16:00,710
dragon spacex go for watch

211
00:16:00,720 --> 00:16:14,470
[Music]

212
00:16:18,710 --> 00:16:16,470
and we are back showing you another live

213
00:16:21,590 --> 00:16:18,720

look of spacex's falcon 9 rocket and

214
00:16:23,590 --> 00:16:21,600
cargo dragon here at pad 39a at kennedy

215
00:16:25,590 --> 00:16:23,600
space center yesterday's launch was

216
00:16:27,990 --> 00:16:25,600
scrubbed because of weather we're going

217
00:16:29,670 --> 00:16:28,000
to try again in just about 14 minutes

218
00:16:31,910 --> 00:16:29,680
thank you for waking up with us again

219
00:16:33,910 --> 00:16:31,920
this sat sunday morning i don't know

220
00:16:35,749 --> 00:16:33,920
what day it is guys i'm megan cruz with

221
00:16:37,829 --> 00:16:35,759
nasa communications live from kennedy

222
00:16:40,710 --> 00:16:37,839
space center in florida today's launch

223
00:16:43,590 --> 00:16:40,720
at 3 14 a.m eastern time is spacex's

224
00:16:45,749 --> 00:16:43,600
23rd cargo resupply mission for nasa to

225
00:16:47,749 --> 00:16:45,759
the international space station we are

226
00:16:50,470 --> 00:16:47,759
again simulcasting this live show on

227
00:16:51,910 --> 00:16:50,480
nasa tv and on spacex's webcast let's

228
00:16:53,509 --> 00:16:51,920
bring in andy tran now live from

229
00:16:55,269 --> 00:16:53,519
spacex's headquarters in hawthorne

230
00:16:56,710 --> 00:16:55,279
california andy i know you're also

231
00:17:00,629 --> 00:16:56,720
hoping for some better weather today and

232
00:17:03,829 --> 00:17:02,230
yeah we are definitely continuing to

233
00:17:05,909 --> 00:17:03,839
keep an eye on the weather if it does

234
00:17:07,829 --> 00:17:05,919
cooperate this will be the third dragon

235
00:17:09,909 --> 00:17:07,839
flight to the space station this year

236
00:17:12,230 --> 00:17:09,919
and also the third cargo respite mission

237
00:17:13,750 --> 00:17:12,240
with our upgraded dragon following a

238
00:17:15,909 --> 00:17:13,760

successful launch this dragon will be

239
00:17:17,590 --> 00:17:15,919
joining the crew 2 vehicle endeavor

240
00:17:19,270 --> 00:17:17,600
currently on orbit and attached to the

241
00:17:20,949 --> 00:17:19,280
international space station for now

242
00:17:23,590 --> 00:17:20,959
let's take a closer look at the vehicles

243
00:17:25,990 --> 00:17:23,600
out on the pad on screen on screen right

244
00:17:28,390 --> 00:17:26,000
now is a view of dragon and that is a

245
00:17:30,630 --> 00:17:28,400
view of falcon 9 underneath it it is a

246
00:17:33,270 --> 00:17:30,640
reusable two-stage rocket designed and

247
00:17:35,110 --> 00:17:33,280
manufactured by spacex the bottom two

248
00:17:36,789 --> 00:17:35,120
thirds of the vehicle is the first stage

249
00:17:38,150 --> 00:17:36,799
its objective is to accelerate the

250
00:17:40,310 --> 00:17:38,160
vehicle through the earth's atmosphere

251
00:17:42,070 --> 00:17:40,320
to space and then separate from the rest

252
00:17:43,669 --> 00:17:42,080
of the rocket this is going to be the

253
00:17:45,430 --> 00:17:43,679
fourth flight for today's first stage

254
00:17:48,310 --> 00:17:45,440
which actually previously supported both

255
00:17:49,750 --> 00:17:48,320
the crew 1 and crew 2 missions for nasa

256
00:17:52,150 --> 00:17:49,760
we are going to be attempting to recover

257
00:17:53,350 --> 00:17:52,160
the first stage again with our brand new

258
00:17:55,590 --> 00:17:53,360
drone ship

259
00:17:57,270 --> 00:17:55,600
named a shortfall of gravitas there it

260
00:17:59,350 --> 00:17:57,280
is on screen

261
00:18:02,310 --> 00:17:59,360
above the first stage is the second

262
00:18:04,230 --> 00:18:02,320
stage it has a single merlin vacuum or

263
00:18:06,470 --> 00:18:04,240

mvac engine which ignites after the

264
00:18:08,310 --> 00:18:06,480
first stage it separates the second

265
00:18:10,549 --> 00:18:08,320
stage is what will carry dragon to its

266
00:18:12,230 --> 00:18:10,559
intended orbit allowing the spacecraft

267
00:18:14,870 --> 00:18:12,240
to eventually rendezvous with the

268
00:18:17,029 --> 00:18:14,880
international space station

269
00:18:18,950 --> 00:18:17,039
and uh as we saw previously dragon is

270
00:18:21,110 --> 00:18:18,960
the spacecraft sitting on top of the

271
00:18:22,710 --> 00:18:21,120
rocket to this day dragon remains the

272
00:18:24,310 --> 00:18:22,720
only spacecraft currently flying that's

273
00:18:26,789 --> 00:18:24,320
capable of transporting significant

274
00:18:28,230 --> 00:18:26,799
amounts of cargo to and from the earth

275
00:18:29,830 --> 00:18:28,240
so that's a little bit about our dragon

276
00:18:31,909 --> 00:18:29,840
and falcon 9 vehicles

277
00:18:33,510 --> 00:18:31,919
back to you megan

278
00:18:35,430 --> 00:18:33,520
thank you andy and now i want to bring

279
00:18:37,510 --> 00:18:35,440
in joshua santora also with nasa

280
00:18:39,669 --> 00:18:37,520
communications joshua can you walk us

281
00:18:41,990 --> 00:18:39,679
through yesterday's weather concerns and

282
00:18:43,350 --> 00:18:42,000
again just how much better it's looking

283
00:18:45,350 --> 00:18:43,360
today

284
00:18:47,350 --> 00:18:45,360
yeah megan as you said it is looking so

285
00:18:49,590 --> 00:18:47,360
much better today i appreciate that and

286
00:18:51,909 --> 00:18:49,600
so yesterday we had a lot of concerns

287
00:18:53,270 --> 00:18:51,919
happening really close to launch and as

288
00:18:55,430 --> 00:18:53,280

is the case with all weather concerns it

289
00:18:56,710 --> 00:18:55,440
just takes time to get past them and

290
00:18:58,310 --> 00:18:56,720
that's what we saw yesterday is we

291
00:19:00,150 --> 00:18:58,320
didn't have enough time

292
00:19:01,270 --> 00:19:00,160
and so we were concerned about things

293
00:19:03,270 --> 00:19:01,280
that either

294
00:19:04,630 --> 00:19:03,280
actual natural lightning or generating

295
00:19:06,549 --> 00:19:04,640
lightning as we flew through the

296
00:19:07,990 --> 00:19:06,559
atmosphere and so that really kind of

297
00:19:09,669 --> 00:19:08,000
forced us to wave off yesterday's

298
00:19:12,549 --> 00:19:09,679
attempt today things are looking

299
00:19:15,350 --> 00:19:12,559
phenomenal take a look here this is a

300
00:19:17,110 --> 00:19:15,360
only a 20 chance that we would have a a

301
00:19:19,190 --> 00:19:17,120
violation of our launch constraints

302
00:19:20,710 --> 00:19:19,200
which means we are 80 go on weather the

303
00:19:22,549 --> 00:19:20,720
only things we're watching are some

304
00:19:24,549 --> 00:19:22,559
clouds in the area and the potential for

305
00:19:26,230 --> 00:19:24,559
precipitation but by and large we're

306
00:19:28,150 --> 00:19:26,240
extremely optimistic now targeting

307
00:19:30,470 --> 00:19:28,160
launch in about 11 minutes from now uh

308
00:19:32,549 --> 00:19:30,480
that report coming from the space launch

309
00:19:33,909 --> 00:19:32,559
delta 45 folks with the space force

310
00:19:35,669 --> 00:19:33,919
appreciate launch weather officer brian

311
00:19:37,590 --> 00:19:35,679
sisik walking us through that and then

312
00:19:39,590 --> 00:19:37,600
the range taking care of public health

313
00:19:41,270 --> 00:19:39,600

and safety as well the land around the

314
00:19:42,870 --> 00:19:41,280
launch pad the water over which we fly

315
00:19:44,710 --> 00:19:42,880
the air we fly through and the space

316
00:19:46,230 --> 00:19:44,720
we're headed to doing the collision on

317
00:19:47,830 --> 00:19:46,240
launch avoidance assessments and those

318
00:19:50,390 --> 00:19:47,840
all look clear

319
00:19:54,390 --> 00:19:50,400
so we are on track for our liftoff on

320
00:19:56,150 --> 00:19:54,400
time at 3 14 49 a.m eastern time that

321
00:19:57,510 --> 00:19:56,160
timing is so precise because we have a

322
00:19:59,029 --> 00:19:57,520
single second in order to be able to

323
00:20:01,669 --> 00:19:59,039
rendezvous with the space station

324
00:20:04,070 --> 00:20:01,679
currently traveling at 17 500 miles an

325
00:20:06,549 --> 00:20:04,080
hour and we're set to to rendezvous and

326
00:20:08,390 --> 00:20:06,559
dock tomorrow morning monday at 11 a.m

327
00:20:11,270 --> 00:20:08,400
eastern time with our coverage beginning

328
00:20:13,669 --> 00:20:11,280
at about 9 30 a.m eastern time so megan

329
00:20:15,510 --> 00:20:13,679
uh technically really quiet weather

330
00:20:17,029 --> 00:20:15,520
looking really solid everything is go at

331
00:20:17,750 --> 00:20:17,039
this moment that's it for now back to

332
00:20:21,110 --> 00:20:17,760
you

333
00:20:22,789 --> 00:20:21,120
that all right t-minus 10 minutes to

334
00:20:24,390 --> 00:20:22,799
launch now how about we take a look at

335
00:20:29,990 --> 00:20:24,400
some of the science flying to station

336
00:20:35,029 --> 00:20:32,950
what do ants plants a remote implant in

337
00:20:36,710 --> 00:20:35,039
brine shrimp all have in common they're

338
00:20:38,230 --> 00:20:36,720

all part of investigations sponsored by

339
00:20:39,750 --> 00:20:38,240
the international space station u.s

340
00:20:42,149 --> 00:20:39,760
national laboratory launching on

341
00:20:44,870 --> 00:20:42,159
spacex's 23rd commercial resupply

342
00:20:46,230 --> 00:20:44,880
services mission

343
00:20:48,070 --> 00:20:46,240
moreover these projects will be

344
00:20:50,149 --> 00:20:48,080
supporting the validation of the faraday

345
00:20:52,470 --> 00:20:50,159
research facility a new commercial

346
00:20:53,830 --> 00:20:52,480
research facility operated by proxy ops

347
00:20:55,350 --> 00:20:53,840
that is flying on this mission and will

348
00:21:00,310 --> 00:20:55,360
provide additional avenues of

349
00:21:04,230 --> 00:21:02,390
specifically the girl scouts of citrus

350
00:21:05,830 --> 00:21:04,240
in conjunction with space kids global

351
00:21:07,909 --> 00:21:05,840
will launch three different student-led

352
00:21:09,830 --> 00:21:07,919
investigations all evaluating the

353
00:21:12,310 --> 00:21:09,840
characteristics of living organisms in

354
00:21:13,669 --> 00:21:12,320
low-earth orbit

355
00:21:15,990 --> 00:21:13,679
one experiment will examine

356
00:21:17,669 --> 00:21:16,000
microgravity's effects on ant behavior

357
00:21:19,750 --> 00:21:17,679
another we'll look at plant growth in

358
00:21:22,070 --> 00:21:19,760
space in the last we'll explore how

359
00:21:23,080 --> 00:21:22,080
brine shrimp move and behave in the low

360
00:21:24,630 --> 00:21:23,090
earth orbit environment

361
00:21:26,230 --> 00:21:24,640
[Music]

362
00:21:28,230 --> 00:21:26,240
a team of researchers from houston

363
00:21:29,510 --> 00:21:28,240

methodist research institute is also

364
00:21:31,430 --> 00:21:29,520
launching an investigation on this

365
00:21:33,750 --> 00:21:31,440
mission that will utilize the faraday

366
00:21:35,190 --> 00:21:33,760
research facility

367
00:21:37,590 --> 00:21:35,200
this team has a long and exciting

368
00:21:39,430 --> 00:21:37,600
history of space-based r d in areas

369
00:21:41,350 --> 00:21:39,440
ranging from nano fluidics to drug

370
00:21:45,350 --> 00:21:41,360
delivery technology development rodent

371
00:21:46,950 --> 00:21:45,360
research and advanced materials

372
00:21:48,630 --> 00:21:46,960
these research projects have led the

373
00:21:50,630 --> 00:21:48,640
team to its latest investigation that

374
00:21:52,870 --> 00:21:50,640
will aid in the development of a tunable

375
00:21:55,029 --> 00:21:52,880
drug delivery implant the implant can be

376
00:21:57,430 --> 00:21:55,039
remotely controlled to release specific

377
00:22:02,250 --> 00:21:57,440
amounts of drug providing individualized

378
00:22:06,470 --> 00:22:04,789
[Music]

379
00:22:08,630 --> 00:22:06,480
these are only a few of the iss national

380
00:22:10,870 --> 00:22:08,640
lab sponsor projects launching on spacex

381
00:22:12,549 --> 00:22:10,880
crs-23 research sponsored by the

382
00:22:14,390 --> 00:22:12,559
national lab aims to bring value to our

383
00:22:16,549 --> 00:22:14,400
nation and drive a robust market in

384
00:22:18,070 --> 00:22:16,559
low-earth orbit to learn more about all

385
00:22:19,669 --> 00:22:18,080
investigations sponsored by the iss

386
00:22:21,510 --> 00:22:19,679
national lab flying on this mission

387
00:22:23,360 --> 00:22:21,520
please visit our mission overview page

388
00:22:27,990 --> 00:22:23,370

at issnationallab.org

389
00:22:29,990 --> 00:22:28,000
[Music]

390
00:22:32,390 --> 00:22:30,000
all very interesting and really a wide

391
00:22:34,149 --> 00:22:32,400
variety of science researchers use the

392
00:22:36,870 --> 00:22:34,159
unique opportunity to study things in

393
00:22:39,510 --> 00:22:36,880
microgravity to hopefully uncover ways

394
00:22:41,830 --> 00:22:39,520
to improve human space flight or how we

395
00:22:43,830 --> 00:22:41,840
do things here on earth some of today's

396
00:22:45,909 --> 00:22:43,840
experiments were loaded onto dragon just

397
00:22:47,909 --> 00:22:45,919
right before yesterday's launch attempt

398
00:22:50,470 --> 00:22:47,919
you can see video there of what we call

399
00:22:53,029 --> 00:22:50,480
that late load each person is carefully

400
00:22:55,510 --> 00:22:53,039
handling the time sensitive experiments

401
00:22:57,750 --> 00:22:55,520
that needed to be packed into dragon as

402
00:22:59,510 --> 00:22:57,760
close to launch as possible

403
00:23:01,350 --> 00:22:59,520
but what happens to the science once it

404
00:23:03,830 --> 00:23:01,360
arrives at the space station let's take

405
00:23:05,510 --> 00:23:03,840
a look at a special tour we shot just

406
00:23:08,870 --> 00:23:05,520
for you guys with the astronauts on

407
00:23:12,310 --> 00:23:10,230
hello and welcome aboard the

408
00:23:14,310 --> 00:23:12,320
international space station i'm nasa

409
00:23:16,630 --> 00:23:14,320
astronaut megan macarthur along with my

410
00:23:19,270 --> 00:23:16,640
crew mate shane kimbrough we are getting

411
00:23:21,110 --> 00:23:19,280
ready for the spacex 23 cargo mission

412
00:23:23,190 --> 00:23:21,120
coming up soon and we're very excited

413
00:23:24,710 --> 00:23:23,200

it's going to be keeping us pretty busy

414
00:23:25,750 --> 00:23:24,720
hey megan let's go show them around the

415
00:23:27,190 --> 00:23:25,760
space station a little bit and we'll

416
00:23:28,870 --> 00:23:27,200
show you where some of these experiments

417
00:23:30,470 --> 00:23:28,880
are going to be done

418
00:23:31,909 --> 00:23:30,480
welcome to the european module called

419
00:23:34,230 --> 00:23:31,919
columbus this is where a lot of the

420
00:23:35,590 --> 00:23:34,240
spacex 23

421
00:23:37,990 --> 00:23:35,600
experiments are going to hang out one of

422
00:23:39,909 --> 00:23:38,000
those is called apex 8 which is going to

423
00:23:41,990 --> 00:23:39,919
study the response to stressors at the

424
00:23:43,830 --> 00:23:42,000
genetic level of plants now they're

425
00:23:45,430 --> 00:23:43,840
going to be really small plants in petri

426
00:23:46,950 --> 00:23:45,440
dishes that we're going to eventually

427
00:23:48,870 --> 00:23:46,960
put into this facility here that's

428
00:23:51,110 --> 00:23:48,880
called veggie it's a veggie plant growth

429
00:23:52,549 --> 00:23:51,120
facility on my last flight i got to grow

430
00:23:54,149 --> 00:23:52,559
lettuce in here and we got to actually

431
00:23:54,950 --> 00:23:54,159
harvest that and eat it so that's pretty

432
00:23:56,230 --> 00:23:54,960
cool

433
00:23:58,070 --> 00:23:56,240
one of the things we're trying to do is

434
00:23:59,990 --> 00:23:58,080
learn how to engineer plants to grow

435
00:24:01,669 --> 00:24:00,000
better in microgravity and what we learn

436
00:24:03,590 --> 00:24:01,679
from that will be able to help us in the

437
00:24:05,669 --> 00:24:03,600
future in space travel but also help

438
00:24:07,269 --> 00:24:05,679

people on earth grow things better this

439
00:24:08,630 --> 00:24:07,279
isn't the only facility we have on the

440
00:24:10,870 --> 00:24:08,640
international space station to grow

441
00:24:12,149 --> 00:24:10,880
things we have an advanced plant habitat

442
00:24:13,430 --> 00:24:12,159
and currently we're growing chili

443
00:24:16,310 --> 00:24:13,440
peppers in there which we hope to

444
00:24:18,470 --> 00:24:16,320
harvest towards the end of our mission

445
00:24:20,710 --> 00:24:18,480
so now we're in the u.s laboratory which

446
00:24:22,710 --> 00:24:20,720
is called destiny and this is one of our

447
00:24:24,710 --> 00:24:22,720
main areas for conducting science on the

448
00:24:25,990 --> 00:24:24,720
international space station one of the

449
00:24:28,230 --> 00:24:26,000
things that makes the international

450
00:24:29,990 --> 00:24:28,240
space station such a versatile research

451
00:24:31,990 --> 00:24:30,000
lab are the express racks there's a

452
00:24:33,830 --> 00:24:32,000
couple of them right here over my head

453
00:24:35,750 --> 00:24:33,840
and the cool thing about these is that

454
00:24:37,510 --> 00:24:35,760
it allows different researchers from

455
00:24:39,909 --> 00:24:37,520
around the world to send up their own

456
00:24:41,669 --> 00:24:39,919
payload and the express rack provides

457
00:24:43,830 --> 00:24:41,679
the power and data

458
00:24:45,669 --> 00:24:43,840
cooling whatever that particular payload

459
00:24:47,990 --> 00:24:45,679
needs one of the new facilities that

460
00:24:49,830 --> 00:24:48,000
will be coming up on spacex 23 cargo

461
00:24:51,990 --> 00:24:49,840
mission is called the faraday research

462
00:24:53,990 --> 00:24:52,000
facility and it's able to house four

463
00:24:56,390 --> 00:24:54,000

different experiments at once three of

464
00:24:58,549 --> 00:24:56,400
them will house small organisms the

465
00:25:00,789 --> 00:24:58,559
fourth experiment will be a medical

466
00:25:02,950 --> 00:25:00,799
experiment to look at remote-controlled

467
00:25:04,789 --> 00:25:02,960
delivery of medication so that would be

468
00:25:06,230 --> 00:25:04,799
an interesting technology demonstration

469
00:25:07,990 --> 00:25:06,240
as well and we'll be able to install

470
00:25:19,909 --> 00:25:08,000
that facility into one of our express

471
00:25:23,510 --> 00:25:21,590
and that was nasa astronauts megan

472
00:25:25,590 --> 00:25:23,520
mcarthur and shane kimbrough aboard the

473
00:25:26,950 --> 00:25:25,600
international space station and welcome

474
00:25:28,710 --> 00:25:26,960
to the international space station

475
00:25:30,950 --> 00:25:28,720
flight control room i am shanique

476
00:25:33,190 --> 00:25:30,960
lovreen live at the johnson space center

477
00:25:34,710 --> 00:25:33,200
here in houston texas

478
00:25:36,470 --> 00:25:34,720
the team of flight controllers in

479
00:25:38,870 --> 00:25:36,480
mission control houston today is being

480
00:25:40,230 --> 00:25:38,880
led by flight director rebecca wingfield

481
00:25:42,149 --> 00:25:40,240
teams here in mission control will

482
00:25:44,549 --> 00:25:42,159
really jump into action tonight into

483
00:25:45,830 --> 00:25:44,559
early monday morning as cargo dragon

484
00:25:46,870 --> 00:25:45,840
approaches the international space

485
00:25:48,870 --> 00:25:46,880
station

486
00:25:51,269 --> 00:25:48,880
there are currently seven crew members

487
00:25:53,430 --> 00:25:51,279
living and working aboard the station

488
00:25:55,830 --> 00:25:53,440

expedition 65 consists of nasa

489
00:25:57,190 --> 00:25:55,840
astronauts shane kimbrough megan

490
00:25:59,750 --> 00:25:57,200
mcarthur

491
00:26:02,630 --> 00:25:59,760
and mark vande ross cospo's cosmonauts

492
00:26:04,789 --> 00:26:02,640
piotr duprov and oleg nabiski aki

493
00:26:06,549 --> 00:26:04,799
hoshide of jaxa and tomah pesquet of the

494
00:26:08,070 --> 00:26:06,559
european space agency

495
00:26:09,269 --> 00:26:08,080
as crew dragon approaches the

496
00:26:11,750 --> 00:26:09,279
international space station in the

497
00:26:13,669 --> 00:26:11,760
morning hours on august 30th nasa

498
00:26:15,669 --> 00:26:13,679
astronaut shane kimbrough and megan

499
00:26:18,070 --> 00:26:15,679
macarthur will be monitoring the arrival

500
00:26:19,990 --> 00:26:18,080
from the station's cupula

501
00:26:21,590 --> 00:26:20,000
cargo dragon will remain attached to the

502
00:26:23,510 --> 00:26:21,600
international space station for about

503
00:26:25,430 --> 00:26:23,520
one month before being packed up with

504
00:26:27,590 --> 00:26:25,440
critical science and supplies and will

505
00:26:29,669 --> 00:26:27,600
splash down in the atlantic ocean or the

506
00:26:31,750 --> 00:26:29,679
gulf of mexico for that science to be

507
00:26:33,350 --> 00:26:31,760
analyzed back here on earth

508
00:26:34,870 --> 00:26:33,360
everything's still a go from here in

509
00:26:36,549 --> 00:26:34,880
mission control houston and we're

510
00:26:37,909 --> 00:26:36,559
looking forward to welcoming another

511
00:26:39,909 --> 00:26:37,919
vehicle to the international space

512
00:26:42,390 --> 00:26:39,919
station so for now we'll head back out

513
00:26:44,230 --> 00:26:42,400

to kennedy megan

514
00:26:45,990 --> 00:26:44,240
great shaniqua thanks let's get one last

515
00:26:47,190 --> 00:26:46,000
status update from andy and joshua

516
00:26:51,430 --> 00:26:47,200
before the final moments of the

517
00:26:55,909 --> 00:26:53,990
thanks megan uh we are about t minus

518
00:26:57,510 --> 00:26:55,919
three and a half minutes until liftoff

519
00:26:59,669 --> 00:26:57,520
the spacex team is working no

520
00:27:01,909 --> 00:26:59,679
significant issues uh right now we are

521
00:27:03,909 --> 00:27:01,919
expecting the strongback to be uh

522
00:27:06,070 --> 00:27:03,919
reclining away from the rocket to its

523
00:27:08,390 --> 00:27:06,080
pre-launch position about two degrees

524
00:27:10,070 --> 00:27:08,400
away from falcon 9 in order to prepare

525
00:27:11,590 --> 00:27:10,080
for liftoff

526
00:27:13,430 --> 00:27:11,600
that strongback is part of the

527
00:27:15,510 --> 00:27:13,440
transporter erector you can see on

528
00:27:17,669 --> 00:27:15,520
screen right now it's starting to

529
00:27:19,269 --> 00:27:17,679
recline away from falcon 9. the

530
00:27:21,350 --> 00:27:19,279
transport erector is that large truss

531
00:27:23,029 --> 00:27:21,360
structure next to falcon 9

532
00:27:25,190 --> 00:27:23,039
its job is again to retract away from

533
00:27:27,590 --> 00:27:25,200
the rocket and prepare for liftoff at

534
00:27:29,110 --> 00:27:27,600
this point rp1 fuel is completely loaded

535
00:27:31,110 --> 00:27:29,120
on the second stage and nearly

536
00:27:32,710 --> 00:27:31,120
completely loaded

537
00:27:34,230 --> 00:27:32,720
liquid oxygen loading is currently

538
00:27:35,430 --> 00:27:34,240

underway

539
00:27:36,950 --> 00:27:35,440
on

540
00:27:39,029 --> 00:27:36,960
both stages and will complete around the

541
00:27:40,870 --> 00:27:39,039
t-minus two minute mark in these last

542
00:27:42,470 --> 00:27:40,880
few minutes falcon 9 is performed is

543
00:27:44,630 --> 00:27:42,480
performing final health checks on his

544
00:27:46,470 --> 00:27:44,640
primary communications avionics and

545
00:27:48,470 --> 00:27:46,480
propulsion systems in preparation for

546
00:27:50,070 --> 00:27:48,480
flight

547
00:27:51,590 --> 00:27:50,080
dragon is undergoing vehicle health

548
00:27:53,430 --> 00:27:51,600
checks and we did hear the callout t

549
00:27:55,269 --> 00:27:53,440
minus five minutes for internal power

550
00:27:56,870 --> 00:27:55,279
switched to internal power meaning it's

551
00:27:59,029 --> 00:27:56,880
living on its own apart from ground

552
00:27:59,990 --> 00:27:59,039
support systems which is great uh we're

553
00:28:01,830 --> 00:28:00,000
also

554
00:28:03,350 --> 00:28:01,840
expecting right now the checkouts of the

555
00:28:05,430 --> 00:28:03,360
second stage thrust vector control

556
00:28:06,789 --> 00:28:05,440
actuators are underway this is what we

557
00:28:08,789 --> 00:28:06,799
affectionately refer to as the engine

558
00:28:10,070 --> 00:28:08,799
wiggle test uh not very technical but

559
00:28:11,990 --> 00:28:10,080
definitely kind of describes what we're

560
00:28:14,149 --> 00:28:12,000
talking about we're moving the nozzles

561
00:28:15,830 --> 00:28:14,159
of those engines on the engine on the on

562
00:28:18,389 --> 00:28:15,840
the second stage uh to ensure we have

563
00:28:20,310 --> 00:28:18,399

control for uh the uphill climbing and

564
00:28:21,750 --> 00:28:20,320
navigating that vehicle uh that's just

565
00:28:23,990 --> 00:28:21,760
part of making sure that the guidance

566
00:28:25,269 --> 00:28:24,000
hardware is go for flight spacex will do

567
00:28:27,029 --> 00:28:25,279
the exact same thing for all the first

568
00:28:28,230 --> 00:28:27,039
stage engines just a few seconds before

569
00:28:30,070 --> 00:28:28,240
ignition

570
00:28:31,510 --> 00:28:30,080
all this in preparation for our

571
00:28:33,350 --> 00:28:31,520
rendezvous with space station tomorrow

572
00:28:34,789 --> 00:28:33,360
morning uh and space station right now

573
00:28:37,190 --> 00:28:34,799
we're on uh we're on approach floor

574
00:28:39,430 --> 00:28:37,200
we're talking about explode complete

575
00:28:43,110 --> 00:28:39,440
is is just over the south edge of

576
00:28:45,269 --> 00:28:43,120
australia as we speak

577
00:28:47,750 --> 00:28:45,279
dragon is an auto idol and we just heard

578
00:28:49,669 --> 00:28:47,760
the call out that locks load has been

579
00:28:51,350 --> 00:28:49,679
completed that is uh that will wrap up

580
00:28:53,029 --> 00:28:51,360
propellant loading for the vehicle you

581
00:28:55,510 --> 00:28:53,039
can start to see some white clouds

582
00:28:57,510 --> 00:28:55,520
forming around falcon 9 and dragon that

583
00:28:59,110 --> 00:28:57,520
is normal and expected for us at this

584
00:29:02,149 --> 00:28:59,120
stage the countdown that is super chill

585
00:29:04,389 --> 00:29:02,159
liquid oxygen starting to condense as it

586
00:29:12,389 --> 00:29:04,399
reaches the warmer ambient air

587
00:29:15,029 --> 00:29:13,350
through the rest of the countdown we're

588
00:29:16,710 --> 00:29:15,039

going to hear a few call outs uh but by

589
00:29:20,070 --> 00:29:16,720
and large we'll just listen in here and

590
00:29:22,389 --> 00:29:20,080
uh walk through it as tr as uh

591
00:29:24,070 --> 00:29:22,399
excuse me as dragon uh finalizes its

592
00:29:27,990 --> 00:29:24,080
preparations and the team verifies we go

593
00:29:38,470 --> 00:29:30,870
falcon 9's in startup

594
00:29:41,990 --> 00:29:39,990
both stages are now pressurizing for

595
00:29:43,269 --> 00:29:42,000
launch uh range and weather should both

596
00:29:44,710 --> 00:29:43,279
be good

597
00:29:49,110 --> 00:29:44,720
crs 23

598
00:29:55,590 --> 00:29:49,990
that was the voice of the launch

599
00:29:55,600 --> 00:30:10,630
t-minus 30 seconds

600
00:30:10,640 --> 00:30:16,070
t-minus 15 seconds

601
00:30:18,070 --> 00:30:17,029
10

602
00:30:19,029 --> 00:30:18,080
9

603
00:30:19,909 --> 00:30:19,039
8

604
00:30:20,950 --> 00:30:19,919
7

605
00:30:21,909 --> 00:30:20,960
6

606
00:30:22,870 --> 00:30:21,919
five

607
00:30:23,909 --> 00:30:22,880
four

608
00:30:24,870 --> 00:30:23,919
three

609
00:30:25,750 --> 00:30:24,880
two

610
00:30:27,909 --> 00:30:25,760
one

611
00:30:29,590 --> 00:30:27,919
zero ignition

612
00:30:31,830 --> 00:30:29,600
and lift off

613
00:30:33,510 --> 00:30:31,840

cargo dragon takes flight continuing a

614
00:30:35,350 --> 00:30:33,520
busy year of deliveries to a crew of

615
00:30:41,990 --> 00:30:35,360
seven aboard the international space

616
00:30:42,000 --> 00:31:16,789
stage one chamber pressure is nominal

617
00:31:21,750 --> 00:31:20,149
we are 50 seconds into flight uh pokemon

618
00:31:25,430 --> 00:31:21,760
has cleared the tower and it's currently

619
00:31:27,509 --> 00:31:25,440
headed to space in about uh 15 seconds

620
00:31:29,190 --> 00:31:27,519
here we're coming up on max q this is

621
00:31:43,350 --> 00:31:29,200
where the vehicle will experience the

622
00:31:46,630 --> 00:31:45,269
and there was the callout for max q we

623
00:31:48,950 --> 00:31:46,640
actually throttled down the merlin

624
00:31:51,269 --> 00:31:48,960
engines in preparation for that event

625
00:31:53,750 --> 00:31:51,279
coming up are five more events in rapid

626
00:31:56,549 --> 00:31:53,760
succession main engine cutoff stage

627
00:31:58,549 --> 00:31:56,559
separation first stage flip second

628
00:32:00,870 --> 00:31:58,559
engine start one and then the boost back

629
00:32:03,830 --> 00:32:00,880
burn on the exercise

630
00:32:06,149 --> 00:32:03,840
main engine cutoff also known as miko is

631
00:32:08,230 --> 00:32:06,159
where all nine m1d engines on the falcon

632
00:32:10,630 --> 00:32:08,240
9 first stage will shut down this is

633
00:32:12,470 --> 00:32:10,640
followed by stage separation or the

634
00:32:15,269 --> 00:32:12,480
separation of the first and second

635
00:32:17,750 --> 00:32:15,279
stages from there the first stage will

636
00:32:21,190 --> 00:32:17,760
flip to prepare for

637
00:32:23,430 --> 00:32:21,200
re-entry and landing a few minutes later

638
00:32:25,430 --> 00:32:23,440

and the merlin vacuum engine on the

639
00:32:27,110 --> 00:32:25,440
second stage will ignite to boost dragon

640
00:32:29,190 --> 00:32:27,120
to low earth orbit and that's also known

641
00:32:30,870 --> 00:32:29,200
as ses1

642
00:32:32,230 --> 00:32:30,880
the first stage will then begin its

643
00:32:34,710 --> 00:32:32,240
boost back burn

644
00:32:40,950 --> 00:32:34,720
that is the first of three burns needed

645
00:32:44,549 --> 00:32:42,870
the first of that those five events main

646
00:32:57,590 --> 00:32:44,559
engine cutoff is coming up in about 10

647
00:32:57,600 --> 00:33:00,470
managing cut off

648
00:33:00,480 --> 00:33:04,190
age separation confirmed

649
00:33:04,200 --> 00:33:08,870
[Applause]

650
00:33:08,880 --> 00:33:19,830
impact ignition

651
00:33:19,840 --> 00:33:25,350
stage one boost back burn startup

652
00:33:29,190 --> 00:33:27,029
okay those were those five events a lot

653
00:33:31,190 --> 00:33:29,200
happening on screen main engine cutoff

654
00:33:33,269 --> 00:33:31,200
stage separation the first stage

655
00:33:34,870 --> 00:33:33,279
performed to flip uh second stage on the

656
00:33:37,669 --> 00:33:34,880
right hand side of the screen

657
00:33:39,029 --> 00:33:37,679
ignited its merlin vacuum engine and on

658
00:33:40,789 --> 00:33:39,039
the left hand side of the screen we're

659
00:33:43,190 --> 00:33:40,799
in the middle of that first stage boost

660
00:33:45,590 --> 00:33:43,200
back burn looks like we are getting some

661
00:33:46,789 --> 00:33:45,600
really cool views um

662
00:33:48,630 --> 00:33:46,799
stage 1

663
00:33:51,110 --> 00:33:48,640

shutdown controls being produced by the

664
00:33:53,350 --> 00:33:51,120
first stage

665
00:33:55,590 --> 00:33:53,360
and that was the call out for the

666
00:33:57,909 --> 00:33:55,600
successful completion of our first of

667
00:33:59,029 --> 00:33:57,919
three burns on the first stage

668
00:34:02,310 --> 00:33:59,039
so if you're just joining us you're

669
00:34:04,230 --> 00:34:02,320
watching a live webcast of the 23rd

670
00:34:05,669 --> 00:34:04,240
commercial resupply mission to the

671
00:34:08,470 --> 00:34:05,679
international space station for nasa

672
00:34:10,790 --> 00:34:08,480
this is spacex's 21st mission this year

673
00:34:12,950 --> 00:34:10,800
and um this is the cargo configuration

674
00:34:18,389 --> 00:34:12,960
of our dragon spacecraft acquisition of

675
00:34:21,270 --> 00:34:19,750
you might be interested to know in order

676
00:34:23,030 --> 00:34:21,280
to get into space the rocket has to do

677
00:34:25,430 --> 00:34:23,040
more than just go up it actually has to

678
00:34:27,109 --> 00:34:25,440
go sideways really really fast

679
00:34:28,950 --> 00:34:27,119
uh at liftoff gravity is pulling

680
00:34:31,109 --> 00:34:28,960
straight down the rocket and as we

681
00:34:33,430 --> 00:34:31,119
ascend we tilt the engines that turns

682
00:34:35,190 --> 00:34:33,440
the rockets horizontally now we're still

683
00:34:37,669 --> 00:34:35,200
going up but we're also heading

684
00:34:40,230 --> 00:34:37,679
horizontally away from the launch pad in

685
00:34:42,710 --> 00:34:40,240
what we call a gravity turn the rocket

686
00:34:45,990 --> 00:34:42,720
typically needs to go about 7.5

687
00:34:48,710 --> 00:34:46,000
kilometers per second or 17 500 miles

688
00:34:50,470 --> 00:34:48,720

per hour horizontally in order to avoid

689
00:34:57,829 --> 00:34:50,480
being pulled back down to earth and get

690
00:35:02,390 --> 00:34:59,829
on screen again is the view of the

691
00:35:04,630 --> 00:35:02,400
merlin vacuum engine on the second stage

692
00:35:10,069 --> 00:35:04,640
on the opposite end of that engine is

693
00:35:15,670 --> 00:35:13,109
next event for today's mission is the

694
00:35:18,230 --> 00:35:15,680
re-entry burn for the first stage that's

695
00:35:19,750 --> 00:35:18,240
the second of three burns this is where

696
00:35:21,670 --> 00:35:19,760
three of the merlin engines will

697
00:35:23,990 --> 00:35:21,680
reignite and this helps to slow down the

698
00:35:29,510 --> 00:35:24,000
stage as it re-enters the upper parts of

699
00:35:34,790 --> 00:35:32,790
and that the beginning of that burn is

700
00:35:39,589 --> 00:35:34,800
happening in under in just under a

701
00:35:42,950 --> 00:35:41,430
seems like we've lost the video footage

702
00:35:44,630 --> 00:35:42,960
of the first stage hopefully we can get

703
00:35:46,390 --> 00:35:44,640
it back

704
00:35:49,670 --> 00:35:46,400
in order to see that

705
00:35:53,349 --> 00:35:51,510
but on the bottom left hand side of the

706
00:35:55,190 --> 00:35:53,359
screen is

707
00:35:57,910 --> 00:35:55,200
a speedometer of sorts tracking the

708
00:35:58,710 --> 00:35:57,920
velocity of the first stage as we begin

709
00:36:04,310 --> 00:35:58,720
that

710
00:36:05,910 --> 00:36:04,320
slow down and uh definitely once we hit

711
00:36:07,990 --> 00:36:05,920
the upper

712
00:36:09,990 --> 00:36:08,000
the denser parts of the atmosphere uh

713
00:36:22,069 --> 00:36:10,000

we'll start to see uh

714
00:36:22,079 --> 00:36:28,870
stage one entry burn startup

715
00:36:33,990 --> 00:36:31,510
and there is the beginning of the entry

716
00:36:35,829 --> 00:36:34,000
burn three merlin engines have re-lit

717
00:36:44,470 --> 00:36:35,839
and are currently slowing down

718
00:36:48,710 --> 00:36:46,550
awesome that is the successful

719
00:36:50,790 --> 00:36:48,720
completion of the second burn

720
00:36:53,190 --> 00:36:50,800
we are about 60 seconds away from

721
00:36:56,150 --> 00:36:53,200
landing and the vehicle is traveling

722
00:36:58,069 --> 00:36:56,160
about 900 miles an hour

723
00:37:00,550 --> 00:36:58,079
this really puts into perspective the

724
00:37:02,870 --> 00:37:00,560
deceleration in the span of less than a

725
00:37:04,069 --> 00:37:02,880
minute we'll have uh reduce the speed

726
00:37:05,670 --> 00:37:04,079
from

727
00:37:14,550 --> 00:37:05,680
the speed of a jet all the way down to

728
00:37:17,990 --> 00:37:16,150
and again this is our

729
00:37:19,270 --> 00:37:18,000
brand new drone ship a shortfall of

730
00:37:21,270 --> 00:37:19,280
gravitas

731
00:37:24,069 --> 00:37:21,280
this can be the first time that we are

732
00:37:25,030 --> 00:37:24,079
making a landing attempt on it and it's

733
00:37:26,550 --> 00:37:25,040
currently

734
00:37:28,390 --> 00:37:26,560
perched out in the atlantic ocean

735
00:37:36,870 --> 00:37:28,400
waiting for that first stage booster to

736
00:37:36,880 --> 00:37:44,790
stage one landing burn startup

737
00:37:47,750 --> 00:37:46,069
a single

738
00:37:50,870 --> 00:37:47,760

engine the center engine engine number

739
00:38:00,710 --> 00:37:50,880
nine has relit

740
00:38:00,720 --> 00:38:17,829
stage one landing leg deploy

741
00:38:17,839 --> 00:38:22,950
stage one laning confirm

742
00:38:27,589 --> 00:38:25,510
uh and that is the 90th successful

743
00:38:30,230 --> 00:38:27,599
landing for an orbital class rocket and

744
00:38:32,069 --> 00:38:30,240
the very first for our new drone ship a

745
00:38:33,990 --> 00:38:32,079
shortfall of gravitas that is a

746
00:38:38,630 --> 00:38:34,000
beautiful thing to see and a great way

747
00:38:41,829 --> 00:38:40,710
next event coming up is for the second

748
00:38:45,109 --> 00:38:41,839
stage

749
00:38:47,510 --> 00:38:45,119
these the merlin vacuum engine will

750
00:38:51,270 --> 00:38:47,520
shut off his engine in an event called

751
00:38:53,109 --> 00:38:51,280
cutoff also known as sico

752
00:38:55,349 --> 00:38:53,119
and shortly after siko

753
00:38:57,270 --> 00:38:55,359
uh we'll be entering a coast phase and

754
00:39:07,430 --> 00:38:57,280
waiting for that confirmation of a good

755
00:39:07,440 --> 00:39:17,430
chico

756
00:39:21,829 --> 00:39:19,750
nominal orbit insertion and we did get

757
00:39:22,870 --> 00:39:21,839
confirmation

758
00:39:25,349 --> 00:39:22,880
of both

759
00:39:27,349 --> 00:39:25,359
siko second engine cutoff and a nominal

760
00:39:30,069 --> 00:39:27,359
orbital insertion

761
00:39:31,990 --> 00:39:30,079
now the second stage has one last major

762
00:39:35,270 --> 00:39:32,000
task and that is commanding separation

763
00:39:37,270 --> 00:39:35,280

of dragon a couple of minutes from now

764
00:39:39,510 --> 00:39:37,280
again this is the second flight for this

765
00:39:42,790 --> 00:39:39,520
particular dragon and the first reuse of

766
00:39:44,470 --> 00:39:42,800
our upgraded cargo vehicle

767
00:39:45,990 --> 00:39:44,480
we should have video of dragon

768
00:39:47,030 --> 00:39:46,000
separation from the top of the second

769
00:39:48,710 --> 00:39:47,040
stage

770
00:39:58,470 --> 00:39:48,720
it'll give us a nice view into dragon's

771
00:40:01,750 --> 00:40:00,230
and when this dragon makes its way to

772
00:40:04,230 --> 00:40:01,760
the international space station it will

773
00:40:06,069 --> 00:40:04,240
be joining the crew 2 vehicle endeavor

774
00:40:07,750 --> 00:40:06,079
currently on orbit and attached to the

775
00:40:09,589 --> 00:40:07,760
international space station it's going

776
00:40:10,790 --> 00:40:09,599
to be super cool to see two dragons

777
00:40:13,270 --> 00:40:10,800
docked to the international space

778
00:40:15,910 --> 00:40:13,280
station once again and again for cargo

779
00:40:18,790 --> 00:40:15,920
we will be delivering over 4 800 pounds

780
00:40:20,710 --> 00:40:18,800
of science research crew supplies and

781
00:40:22,390 --> 00:40:20,720
vehicle hardware to the oregon orbiting

782
00:40:24,870 --> 00:40:22,400
laboratory and its crew

783
00:40:26,309 --> 00:40:24,880
this includes the brine shrimps and ants

784
00:40:28,470 --> 00:40:26,319
that we had talked about earlier in the

785
00:40:30,390 --> 00:40:28,480
broadcast

786
00:40:31,990 --> 00:40:30,400
now the science and research being done

787
00:40:34,069 --> 00:40:32,000
in microgravity on the international

788
00:40:36,309 --> 00:40:34,079

space station has benefited our lives

789
00:40:38,309 --> 00:40:36,319
here on earth for decades what's really

790
00:40:40,230 --> 00:40:38,319
cool is that our new cargo dragon

791
00:40:42,550 --> 00:40:40,240
vehicle is also able to act

792
00:40:44,150 --> 00:40:42,560
laboratory in the advancement of this

793
00:40:47,190 --> 00:40:44,160
science and research we call this

794
00:40:49,270 --> 00:40:47,200
capability extend the lab it allows

795
00:40:51,109 --> 00:40:49,280
empowered payloads to remain on dragon

796
00:40:53,109 --> 00:40:51,119
for experimentation during the duration

797
00:40:55,109 --> 00:40:53,119
of the mission this is especially

798
00:40:57,430 --> 00:40:55,119
helpful when there is limited to no

799
00:40:59,190 --> 00:40:57,440
space on station for additional science

800
00:41:01,030 --> 00:40:59,200
and it also helps cut down the amount of

801
00:41:02,950 --> 00:41:01,040
time the crew has to move payloads in

802
00:41:05,670 --> 00:41:02,960
and out of dragon

803
00:41:07,510 --> 00:41:05,680
for crs 23 there are three extend the

804
00:41:09,430 --> 00:41:07,520
lab payloads launching with the mission

805
00:41:11,270 --> 00:41:09,440
and one stocked a fourth which is

806
00:41:13,109 --> 00:41:11,280
currently already attached which is

807
00:41:16,390 --> 00:41:13,119
currently already on the space station

808
00:41:18,950 --> 00:41:16,400
will be added to dragon

809
00:41:21,030 --> 00:41:18,960
so we are about a minute away from that

810
00:41:22,309 --> 00:41:21,040
separation from dragon from the second

811
00:41:24,790 --> 00:41:22,319
stage

812
00:41:26,950 --> 00:41:24,800
for now we are enjoying some views of

813
00:41:28,309 --> 00:41:26,960

the second stage merlin vacuum engine

814
00:41:31,510 --> 00:41:28,319
you can talk a little bit about the

815
00:41:34,309 --> 00:41:31,520
upgrades that have been made to dragon

816
00:41:37,109 --> 00:41:34,319
the first is solar rays typically after

817
00:41:39,589 --> 00:41:37,119
separation we wait for solar rays to

818
00:41:42,309 --> 00:41:39,599
unfurl from dragon this upgraded dragon

819
00:41:44,390 --> 00:41:42,319
has been redesigned and the solar rays

820
00:41:46,230 --> 00:41:44,400
has its panels built into the trunk

821
00:41:49,430 --> 00:41:46,240
section itself providing power during

822
00:41:52,630 --> 00:41:49,440
flight and while on board the station

823
00:41:54,710 --> 00:41:52,640
another upgrade is how we dock before we

824
00:41:56,870 --> 00:41:54,720
need a dragon to be berth which is where

825
00:41:58,790 --> 00:41:56,880
a robotic arm from the international

826
00:42:00,550 --> 00:41:58,800
space station reaches out and grabs

827
00:42:02,470 --> 00:42:00,560
dragon and will attach it to the

828
00:42:05,349 --> 00:42:02,480
international space station

829
00:42:07,430 --> 00:42:05,359
now dragon can autonomously dock

830
00:42:09,750 --> 00:42:07,440
using a centerline camera and lidar

831
00:42:12,309 --> 00:42:09,760
which is an acronym for light detection

832
00:42:14,309 --> 00:42:12,319
and ranging and so this autonomous

833
00:42:15,109 --> 00:42:14,319
docking sequence is what dragon will go

834
00:42:16,950 --> 00:42:15,119
through

835
00:42:19,190 --> 00:42:16,960
in the short future

836
00:42:20,630 --> 00:42:19,200
as it continues to make its way towards

837
00:42:25,829 --> 00:42:20,640
the international space station

838
00:42:30,390 --> 00:42:29,109

and that is a great view of dragon

839
00:42:39,510 --> 00:42:30,400
separating

840
00:42:45,109 --> 00:42:41,990
now the service section dracos will

841
00:42:46,790 --> 00:42:45,119
undergo some checkouts coming up is the

842
00:42:48,550 --> 00:42:46,800
beginning of the nosecone opening

843
00:42:51,109 --> 00:42:48,560
sequence i'm going to hand it over to

844
00:42:57,589 --> 00:42:51,119
shaniqua in houston to talk a little bit

845
00:43:01,750 --> 00:42:59,750
thanks andy everything is still going

846
00:43:03,829 --> 00:43:01,760
well back here in houston in mission

847
00:43:05,510 --> 00:43:03,839
control houston right after dragon

848
00:43:07,589 --> 00:43:05,520
separated and began a series of

849
00:43:09,190 --> 00:43:07,599
automatic checkouts including some small

850
00:43:11,430 --> 00:43:09,200
firings of the draco maneuvering

851
00:43:13,270 --> 00:43:11,440
thrusters the next milestone is the

852
00:43:14,950 --> 00:43:13,280
nosecone deploy

853
00:43:17,030 --> 00:43:14,960
the nosecone protects the docking

854
00:43:19,349 --> 00:43:17,040
hardware and rendezvous and tracking

855
00:43:22,230 --> 00:43:19,359
elements on top of dragon dragon during

856
00:43:24,550 --> 00:43:22,240
ascent the nose cone deployed uncovers

857
00:43:26,309 --> 00:43:24,560
the four ford bulkhead thrusters which

858
00:43:27,990 --> 00:43:26,319
dragon will use for its major burn

859
00:43:29,190 --> 00:43:28,000
maneuvers to catch up with the space

860
00:43:31,670 --> 00:43:29,200
station

861
00:43:33,510 --> 00:43:31,680
once open the nose cone will stay in

862
00:43:35,750 --> 00:43:33,520
that position until the very end of its

863
00:43:37,750 --> 00:43:35,760

mission closing prior to re-entry to

864
00:43:46,150 --> 00:43:37,760
provide some additional protection to

865
00:43:49,670 --> 00:43:47,829
and we currently are waiting for

866
00:45:07,829 --> 00:43:49,680
confirmation for that nose cone to be

867
00:45:10,950 --> 00:45:09,190
and if you're just joining us we're in

868
00:45:13,190 --> 00:45:10,960
mission control houston currently and

869
00:45:50,710 --> 00:45:13,200
we're waiting for the confirmation of

870
00:45:54,550 --> 00:45:52,390
and as we still wait we do have a

871
00:45:56,230 --> 00:45:54,560
special guest now joining me on the

872
00:45:58,150 --> 00:45:56,240
phone is manager of the international

873
00:46:01,190 --> 00:45:58,160
space station systems engineering and

874
00:46:02,630 --> 00:46:01,200
integration office jeff aaron

875
00:46:05,030 --> 00:46:02,640
jeff can you outline the major

876
00:46:06,710 --> 00:46:05,040
activities for the crew with crs 23 for

877
00:46:08,150 --> 00:46:06,720
us

878
00:46:09,990 --> 00:46:08,160
sure can

879
00:46:11,030 --> 00:46:10,000
in a word they're going to be extremely

880
00:46:12,710 --> 00:46:11,040
busy

881
00:46:14,870 --> 00:46:12,720
conducting research there's more than a

882
00:46:16,870 --> 00:46:14,880
metric ton of research arriving with

883
00:46:18,470 --> 00:46:16,880
spacex 23

884
00:46:20,309 --> 00:46:18,480
much of which needs to be removed in

885
00:46:22,069 --> 00:46:20,319
hours to days to start the science and

886
00:46:23,349 --> 00:46:22,079
research mission

887
00:46:25,109 --> 00:46:23,359
uh because most of which will be

888
00:46:27,510 --> 00:46:25,119

completed or most of which will be

889
00:46:30,470 --> 00:46:27,520
completed in the entire 30-day mission

890
00:46:32,069 --> 00:46:30,480
for while spacex is on orbit

891
00:46:33,510 --> 00:46:32,079
and then much of that science needs to

892
00:46:35,430 --> 00:46:33,520
return with the vehicle upon its

893
00:46:36,950 --> 00:46:35,440
departure

894
00:46:38,870 --> 00:46:36,960
so in addition to the research mission

895
00:46:40,950 --> 00:46:38,880
the crew will be conducting three evas

896
00:46:43,589 --> 00:46:40,960
over a 10-day period of time

897
00:46:45,349 --> 00:46:43,599
two evas on the russian segment where

898
00:46:47,589 --> 00:46:45,359
two new power cables will be installed

899
00:46:49,829 --> 00:46:47,599
to enable additional power transfer to

900
00:46:51,750 --> 00:46:49,839
the the new module the module that just

901
00:46:54,150 --> 00:46:51,760
arrived actually a month ago today the

902
00:46:56,390 --> 00:46:54,160
multi-purpose laboratory module

903
00:46:59,030 --> 00:46:56,400
and one eva on the u.s segment to

904
00:47:01,190 --> 00:46:59,040
install the third irosa mod kit which

905
00:47:05,109 --> 00:47:01,200
will enable the future solar ray upgrade

906
00:47:08,710 --> 00:47:07,030
thanks jeff and i know you mentioned a

907
00:47:10,390 --> 00:47:08,720
lot about the science and the hardware

908
00:47:12,790 --> 00:47:10,400
that's going up

909
00:47:14,630 --> 00:47:12,800
but how critical are these deliveries

910
00:47:16,150 --> 00:47:14,640
for the station and for the astronauts

911
00:47:17,910 --> 00:47:16,160
aboard

912
00:47:19,829 --> 00:47:17,920
yeah these commercial resupply missions

913
00:47:21,510 --> 00:47:19,839

are very very important to continue

914
00:47:23,109 --> 00:47:21,520
advancing science aboard the space

915
00:47:24,710 --> 00:47:23,119
station

916
00:47:26,549 --> 00:47:24,720
over three thousand experiments have

917
00:47:28,549 --> 00:47:26,559
been conducted during the nation's life

918
00:47:30,309 --> 00:47:28,559
during the station's lifetime

919
00:47:33,430 --> 00:47:30,319
which we're now approaching coming up on

920
00:47:35,510 --> 00:47:33,440
21 years of continuous human presence

921
00:47:37,589 --> 00:47:35,520
on this flight spacex is packed with

922
00:47:39,910 --> 00:47:37,599
more than two metric tons of supplies

923
00:47:41,190 --> 00:47:39,920
research technology demonstrations and

924
00:47:43,589 --> 00:47:41,200
hardware

925
00:47:45,910 --> 00:47:43,599
the crew will stay busy busy unpacking

926
00:47:47,430 --> 00:47:45,920
and conducting these research activities

927
00:47:49,190 --> 00:47:47,440
with the first several days being

928
00:47:51,430 --> 00:47:49,200
extremely critical for several

929
00:47:52,390 --> 00:47:51,440
experiments the faraday research

930
00:47:58,870 --> 00:47:52,400
facility

931
00:48:03,589 --> 00:48:01,910
and it you mentioned jeff as always it's

932
00:48:05,829 --> 00:48:03,599
a busy time aboard the international

933
00:48:08,150 --> 00:48:05,839
space station with cargo vehicles and

934
00:48:10,069 --> 00:48:08,160
crews coming and going you mentioned the

935
00:48:12,549 --> 00:48:10,079
two russian spacewalks that are quickly

936
00:48:14,309 --> 00:48:12,559
approaching us um how complex will the

937
00:48:17,109 --> 00:48:14,319
next few months be for the station

938
00:48:21,109 --> 00:48:17,119

program and the global partnerships

939
00:48:24,069 --> 00:48:21,119
yes it's always a complex time on on iss

940
00:48:26,630 --> 00:48:24,079
and spacex 23 as i think you pointed out

941
00:48:27,510 --> 00:48:26,640
earlier it you know it arrives tomorrow

942
00:48:28,549 --> 00:48:27,520
so

943
00:48:31,109 --> 00:48:28,559
um

944
00:48:33,510 --> 00:48:31,119
30 some hours wait what i'm trying to do

945
00:48:35,829 --> 00:48:33,520
real-time math here 28 to 30 hours later

946
00:48:37,990 --> 00:48:35,839
but 10 am central is when spacex will

947
00:48:40,069 --> 00:48:38,000
arrive

948
00:48:41,109 --> 00:48:40,079
following docking to the node 2 forward

949
00:48:42,710 --> 00:48:41,119
port

950
00:48:44,870 --> 00:48:42,720
oh by the way this is the first cargo

951
00:48:46,950 --> 00:48:44,880
vehicle that will be docking to

952
00:48:49,109 --> 00:48:46,960
to the forward port the hatch will be

953
00:48:50,549 --> 00:48:49,119
open about two hours later

954
00:48:52,870 --> 00:48:50,559
and then the crew still has several

955
00:48:54,710 --> 00:48:52,880
hours of unpacking to do to begin the

956
00:48:57,430 --> 00:48:54,720
research program

957
00:48:58,950 --> 00:48:57,440
um and and although the first eba isn't

958
00:49:00,630 --> 00:48:58,960
until friday

959
00:49:02,230 --> 00:49:00,640
uh of this week the crew has already

960
00:49:03,990 --> 00:49:02,240
begun preparing for each of these

961
00:49:04,710 --> 00:49:04,000
upcoming spacewalks

962
00:49:06,870 --> 00:49:04,720
with

963
00:49:09,510 --> 00:49:06,880

which includes suit preparations tool

964
00:49:11,349 --> 00:49:09,520
gathering and packing procedure reviews

965
00:49:13,589 --> 00:49:11,359
and personally a lot of cell study for

966
00:49:15,030 --> 00:49:13,599
the astronauts

967
00:49:17,349 --> 00:49:15,040
there will be two on the russian segment

968
00:49:19,910 --> 00:49:17,359
as you said and one in the u.s segment

969
00:49:21,990 --> 00:49:19,920
all over a 10-day period of time so it's

970
00:49:23,510 --> 00:49:22,000
very busy time

971
00:49:25,670 --> 00:49:23,520
but as i kind of said up front there

972
00:49:32,069 --> 00:49:25,680
it's it's kind of like that i'm every

973
00:49:37,270 --> 00:49:34,710
thanks jeff all right and thanks so much

974
00:49:38,549 --> 00:49:37,280
for joining us today back here in the

975
00:49:40,630 --> 00:49:38,559
international space station flight

976
00:49:42,390 --> 00:49:40,640
control room flight controllers are

977
00:49:44,630 --> 00:49:42,400
monitoring the systems on the station

978
00:49:45,829 --> 00:49:44,640
itself ahead of dragon's arrival monday

979
00:49:47,430 --> 00:49:45,839
morning

980
00:49:49,589 --> 00:49:47,440
once dragon crosses that approach

981
00:49:51,589 --> 00:49:49,599
ellipsoid which is the mythical sphere

982
00:49:53,270 --> 00:49:51,599
around the station flight controllers

983
00:49:55,349 --> 00:49:53,280
here in mission control houston will

984
00:49:57,430 --> 00:49:55,359
begin joint operations with the spacex

985
00:49:59,190 --> 00:49:57,440
teams in hawthorne california

986
00:50:01,030 --> 00:49:59,200
nasa astronauts shane kimbrough and

987
00:50:03,190 --> 00:50:01,040
megan macarthur will be monitoring the

988
00:50:06,069 --> 00:50:03,200

approach and arrival of dragon with a

989
00:50:08,870 --> 00:50:06,079
planned docking monday morning at 10 a.m

990
00:50:10,790 --> 00:50:08,880
central time 11 a.m eastern once cargo

991
00:50:12,470 --> 00:50:10,800
dragon is docked to the station

992
00:50:14,630 --> 00:50:12,480
macarthur and kimbrough will begin those

993
00:50:16,630 --> 00:50:14,640
hatch operations that jeff mentioned

994
00:50:18,309 --> 00:50:16,640
and between the international space

995
00:50:19,670 --> 00:50:18,319
station and cargo dragon the hatchets

996
00:50:21,430 --> 00:50:19,680
will be opened

997
00:50:23,030 --> 00:50:21,440
again everything's still on track on the

998
00:50:24,470 --> 00:50:23,040
international space station side so

999
00:50:26,549 --> 00:50:24,480
that'll do it for us here in mission

1000
00:50:27,910 --> 00:50:26,559
control houston now back over to kennedy

1001
00:50:29,510 --> 00:50:27,920
megan

1002
00:50:31,910 --> 00:50:29,520
thanks shaniqua that's going to wrap up

1003
00:50:33,829 --> 00:50:31,920
our launch coverage of spacex's 23rd

1004
00:50:35,910 --> 00:50:33,839
commercial resupply services mission

1005
00:50:38,390 --> 00:50:35,920
cargo dragon is on course to dock to the

1006
00:50:40,630 --> 00:50:38,400
international space station at about 11

1007
00:50:42,710 --> 00:50:40,640
a.m eastern time tomorrow we will have

1008
00:50:45,109 --> 00:50:42,720
live coverage of rendezvous and docking

1009
00:50:46,710 --> 00:50:45,119
beginning at 9 30. in the meantime you

1010
00:50:49,750 --> 00:50:46,720
can learn even more about this mission

1011
00:50:51,030 --> 00:50:49,760
on nasa.gov commercial resupply thank

1012
00:50:55,910 --> 00:50:51,040
you for joining us and we'll leave you

1013
00:50:55,920 --> 00:51:01,349

t-minus 15 seconds

1014
00:51:03,349 --> 00:51:02,309
10

1015
00:51:04,309 --> 00:51:03,359
9

1016
00:51:05,190 --> 00:51:04,319
8

1017
00:51:06,150 --> 00:51:05,200
7

1018
00:51:07,190 --> 00:51:06,160
6

1019
00:51:08,150 --> 00:51:07,200
5

1020
00:51:09,190 --> 00:51:08,160
four

1021
00:51:10,150 --> 00:51:09,200
three

1022
00:51:11,030 --> 00:51:10,160
two

1023
00:51:13,190 --> 00:51:11,040
one

1024
00:51:14,870 --> 00:51:13,200
zero ignition

1025
00:51:17,109 --> 00:51:14,880
and liftoff

1026
00:51:18,790 --> 00:51:17,119
cargo dragon takes flight continuing a

1027
00:51:20,630 --> 00:51:18,800
busy year of deliveries to a crew of

1028
00:51:27,270 --> 00:51:20,640
seven aboard the international space