1
00:00:16,070 --> 00:00:14,470
[Music]

2
00:00:17,510 --> 00:00:16,080
and you are looking live at a falcon 9

3
00:00:19,590 --> 00:00:17,520
rocket on the launch pad at the cape

4
00:00:21,910 --> 00:00:19,600
canaveral air force station in florida

5
00:00:23,670 --> 00:00:21,920
at 12 51 this afternoon the aerospace

6
00:00:25,750 --> 00:00:23,680
company spacex will launch a dragon

7
00:00:28,150 --> 00:00:25,760
cargo spacecraft on a nasa mission to

8
00:00:29,750 --> 00:00:28,160
resupply the international space station

9
00:00:31,589 --> 00:00:29,760
good afternoon and welcome everyone to

10
00:00:33,110 --> 00:00:31,599
nasa's kennedy space center for a live

11
00:00:35,350 --> 00:00:33,120
coverage of the launch of the 19th

12
00:00:38,150 --> 00:00:35,360
resupply mission for spacex i'm your

13
00:00:40,069 --> 00:00:38,160

host jennifer wolfinger we are about 20

14
00:00:41,830 --> 00:00:40,079
28 minutes away from the planned liftoff

15
00:00:44,389 --> 00:00:41,840
of a falcon 9 rocket from the coast of

16
00:00:45,830 --> 00:00:44,399
florida the mission to fly much needed

17
00:00:47,270 --> 00:00:45,840
astronaut supplies and research

18
00:00:48,709 --> 00:00:47,280
experiments up to the international

19
00:00:50,229 --> 00:00:48,719
space station

20
00:00:52,069 --> 00:00:50,239
and we have a team of correspondents

21
00:00:53,750 --> 00:00:52,079
across the country helping us cover all

22
00:00:55,110 --> 00:00:53,760
the angles of this launch

23
00:00:56,630 --> 00:00:55,120
we will head to the mission director

24
00:00:58,950 --> 00:00:56,640
center here on the space coast to get

25
00:01:00,310 --> 00:00:58,960
updates on the weather and the countdown

26
00:01:02,549 --> 00:01:00,320
and we'll head west to spacex

27
00:01:04,310 --> 00:01:02,559
headquarters in hawthorne california

28
00:01:06,230 --> 00:01:04,320
and check in at mission control houston

29
00:01:07,910 --> 00:01:06,240
at johnson space center

30
00:01:10,149 --> 00:01:07,920
but first here are some quick facts

31
00:01:11,670 --> 00:01:10,159
about today's launch

32
00:01:13,590 --> 00:01:11,680
spacex transport transported the falcon

33
00:01:14,870 --> 00:01:13,600
9 rocket out to the launch pad and

34
00:01:17,190 --> 00:01:14,880
lifted it to the vertical launch

35
00:01:18,550 --> 00:01:17,200
position for the 19th cargo resupply

36
00:01:19,830 --> 00:01:18,560
mission to the international space

37
00:01:21,590 --> 00:01:19,840
station

38
00:01:23,190 --> 00:01:21,600

this is the third flight for this dragon

39
00:01:25,429 --> 00:01:23,200
spacecraft and the first time this

40
00:01:27,910 --> 00:01:25,439
falcon booster has been flown

41
00:01:29,429 --> 00:01:27,920
dragon will deliver more than 5 700

42
00:01:31,109 --> 00:01:29,439
pounds of astronaut supplies and

43
00:01:33,270 --> 00:01:31,119
payloads for science research to the

44
00:01:35,429 --> 00:01:33,280
orbiting laboratory

45
00:01:37,030 --> 00:01:35,439
the launch window today is instantaneous

46
00:01:39,109 --> 00:01:37,040
which means spacex must launch at the

47
00:01:41,270 --> 00:01:39,119
exact second for the plan liftoff or try

48
00:01:42,630 --> 00:01:41,280
again another day

49
00:01:44,389 --> 00:01:42,640
the plan is to keep the dragon

50
00:01:48,069 --> 00:01:44,399
spacecraft docked to station for about a

51
00:01:49,510 --> 00:01:48,079
month before bringing it back to earth

52
00:01:51,109 --> 00:01:49,520
the dragon spacecraft will be filled

53
00:01:52,630 --> 00:01:51,119
with critical materials to directly

54
00:01:54,149 --> 00:01:52,640
support science and research that will

55
00:01:56,069 --> 00:01:54,159
take place on the international space

56
00:01:57,590 --> 00:01:56,079
station

57
00:01:59,510 --> 00:01:57,600
dragon will carry the confined

58
00:02:01,590 --> 00:01:59,520
combustion investigation which examines

59
00:02:03,190 --> 00:02:01,600
the behavior of flame as it spreads in

60
00:02:04,789 --> 00:02:03,200
differently shaped confined spaces in

61
00:02:06,469 --> 00:02:04,799
microgravity

62
00:02:08,150 --> 00:02:06,479
understanding how fire spreads and

63
00:02:09,749 --> 00:02:08,160

behaves in space is crucial for the

64
00:02:11,589 --> 00:02:09,759
safety of astronauts and for

65
00:02:13,350 --> 00:02:11,599
understanding and controlling fire here

66
00:02:15,270 --> 00:02:13,360
on earth

67
00:02:17,430 --> 00:02:15,280
another exciting payload is the hyper

68
00:02:19,670 --> 00:02:17,440
spectral imager suite which is a next

69
00:02:21,430 --> 00:02:19,680
generation hyperspectral earth imaging

70
00:02:22,790 --> 00:02:21,440
system developed by the japanese

71
00:02:24,949 --> 00:02:22,800
government

72
00:02:27,589 --> 00:02:24,959
it provides space-based observations for

73
00:02:29,990 --> 00:02:27,599
tasks such as resource exploration and

74
00:02:32,949 --> 00:02:30,000
applications in agriculture forestry and

75
00:02:35,030 --> 00:02:32,959
other environmental areas

76
00:02:37,350 --> 00:02:35,040
the mighty mice in space or rodent

77
00:02:38,710 --> 00:02:37,360
research 19 investigation will research

78
00:02:40,949 --> 00:02:38,720
features that influence muscle

79
00:02:43,110 --> 00:02:40,959
degradation to prevent skeletal muscle

80
00:02:44,790 --> 00:02:43,120
and bone loss during space flight and

81
00:02:45,990 --> 00:02:44,800
enhance recovery following return to

82
00:02:47,830 --> 00:02:46,000
earth

83
00:02:49,350 --> 00:02:47,840
this study could also support the

84
00:02:51,190 --> 00:02:49,360
development of therapies for a wide

85
00:02:53,670 --> 00:02:51,200
range of conditions that cause muscle

86
00:02:55,270 --> 00:02:53,680
and bone loss

87
00:02:57,350 --> 00:02:55,280
later in the show we'll be joined by a

88
00:02:58,949 --> 00:02:57,360

station national lab expert who will

89
00:03:01,110 --> 00:02:58,959
share more details about the exciting

90
00:03:03,190 --> 00:03:01,120
research taking place on station

91
00:03:04,550 --> 00:03:03,200
now let's bring in nasa's joshua santora

92
00:03:06,149 --> 00:03:04,560
who is in the mission director center

93
00:03:07,110 --> 00:03:06,159
just a few miles away from the launch

94
00:03:08,710 --> 00:03:07,120
pad

95
00:03:10,470 --> 00:03:08,720
hey joshua

96
00:03:11,750 --> 00:03:10,480
hey jennifer it's beginning to look a

97
00:03:13,350 --> 00:03:11,760
lot like christmas here on the space

98
00:03:15,030 --> 00:03:13,360
coast and for us that means partly

99
00:03:17,509 --> 00:03:15,040
cloudy skies

100
00:03:18,949 --> 00:03:17,519
and cool mornings and days so the

101
00:03:21,110 --> 00:03:18,959
weather outside is looking great that is

102
00:03:23,190 --> 00:03:21,120
a big point of concern yesterday

103
00:03:25,030 --> 00:03:23,200
at what would have been t minus zero the

104
00:03:26,149 --> 00:03:25,040
liftoff time we did have winds that

105
00:03:27,670 --> 00:03:26,159
would have violated the launch

106
00:03:28,869 --> 00:03:27,680
constraints so

107
00:03:30,789 --> 00:03:28,879
we're back here today the weather's

108
00:03:32,630 --> 00:03:30,799
looking great we have

109
00:03:33,830 --> 00:03:32,640
actually we've just got a recent update

110
00:03:35,670 --> 00:03:33,840
that the percent of violation is

111
00:03:37,589 --> 00:03:35,680
actually now down to 10 percent so the

112
00:03:40,070 --> 00:03:37,599
weather even improving for today we've

113
00:03:41,270 --> 00:03:40,080

got nice skies out there um those there

114
00:03:43,589 --> 00:03:41,280
are some clouds that are coming through

115
00:03:44,710 --> 00:03:43,599
the general area but ultimately we're

116
00:03:46,949 --> 00:03:44,720
hearing that those are not going to

117
00:03:48,630 --> 00:03:46,959
arrive until after our launch today so

118
00:03:51,670 --> 00:03:48,640
weather looks great that coming care of

119
00:03:54,229 --> 00:03:51,680
our launch weather officer mike

120
00:03:55,830 --> 00:03:54,239
mcelinin from the u.s air force 45th

121
00:03:57,509 --> 00:03:55,840
space wing weather squadron so we're

122
00:03:59,110 --> 00:03:57,519
keeping an eye on the technical side as

123
00:04:00,550 --> 00:03:59,120
well and it has been a really quiet

124
00:04:02,070 --> 00:04:00,560
morning for the countdown which is good

125
00:04:03,350 --> 00:04:02,080
news that means there are not a lot of

126
00:04:05,509 --> 00:04:03,360
issues

127
00:04:07,350 --> 00:04:05,519
hardly anything to speak of in fact so

128
00:04:09,429 --> 00:04:07,360
keep an eye on things progressing well

129
00:04:12,869 --> 00:04:09,439
again our instantaneous window is

130
00:04:14,550 --> 00:04:12,879
actually set for 12 29 and 24 seconds so

131
00:04:15,830 --> 00:04:14,560
that's the instant that we're looking to

132
00:04:17,830 --> 00:04:15,840
to launch today

133
00:04:19,670 --> 00:04:17,840
and this rocket actually is carrying the

134
00:04:21,189 --> 00:04:19,680
star of the show that the cargo dragon

135
00:04:22,310 --> 00:04:21,199
with those resources and research and

136
00:04:24,870 --> 00:04:22,320
supplies

137
00:04:27,030 --> 00:04:24,880
this cargo dragon was originally flown

138
00:04:29,430 --> 00:04:27,040

back in september of 2014 on the

139
00:04:31,189 --> 00:04:29,440
commercial resupply services 4 mission

140
00:04:32,870 --> 00:04:31,199
you can see here a beautiful night

141
00:04:35,030 --> 00:04:32,880
launch lighting up the sky

142
00:04:37,670 --> 00:04:35,040
and delivering research and

143
00:04:39,430 --> 00:04:37,680
cargo back in 2014 and then

144
00:04:42,469 --> 00:04:39,440
actually the first cargo dragon to be

145
00:04:44,870 --> 00:04:42,479
reused in june of 2017 it flew again on

146
00:04:46,870 --> 00:04:44,880
the crs 11 mission that's actually from

147
00:04:49,430 --> 00:04:46,880
launch complex 39a at the kennedy space

148
00:04:50,950 --> 00:04:49,440
center so a very exciting accomplishment

149
00:04:53,030 --> 00:04:50,960
for them and this another exciting

150
00:04:54,870 --> 00:04:53,040
accomplishment today with this cargo

151
00:04:56,790 --> 00:04:54,880
dragon flying for its third time this is

152
00:04:59,510 --> 00:04:56,800
the first time we've had a crs cargo

153
00:05:02,070 --> 00:04:59,520
dragon that is a third flown

154
00:05:03,029 --> 00:05:02,080
which is amazing i'm so excited to have

155
00:05:04,629 --> 00:05:03,039
that

156
00:05:07,189 --> 00:05:04,639
another groundbreaking achievement for

157
00:05:09,189 --> 00:05:07,199
the crs program and for just the life of

158
00:05:11,430 --> 00:05:09,199
the space station so

159
00:05:13,110 --> 00:05:11,440
jennifer we are underway with fueling um

160
00:05:15,830 --> 00:05:13,120
things progressing well again targeting

161
00:05:17,029 --> 00:05:15,840
that instantaneous window so for for us

162
00:05:18,469 --> 00:05:17,039
here now we're going to send it back

163
00:05:20,469 --> 00:05:18,479

over to you and we'll uh we'll touch

164
00:05:22,390 --> 00:05:20,479
back in a few minutes thanks joshua

165
00:05:24,550 --> 00:05:22,400
we'll check back with you a little later

166
00:05:26,469 --> 00:05:24,560
right now we are at t minus 24 minutes

167
00:05:28,390 --> 00:05:26,479
and counting let's check in with spacex

168
00:05:29,909 --> 00:05:28,400
headquarters in hawthorne california

169
00:05:31,909 --> 00:05:29,919
where the falcon 9 rocket and crew

170
00:05:33,510 --> 00:05:31,919
dragon were designed and built

171
00:05:35,590 --> 00:05:33,520
andy tran is joining us live from

172
00:05:36,870 --> 00:05:35,600
spacex's mission control center

173
00:05:40,150 --> 00:05:36,880
andy will you tell us a little bit about

174
00:05:44,469 --> 00:05:42,310
yeah absolutely thank you jennifer

175
00:05:46,710 --> 00:05:44,479
this mission marks spacex's 12th launch

176
00:05:48,150 --> 00:05:46,720
of 2019 and today we're going to be

177
00:05:50,550 --> 00:05:48,160
launching a flight proven dragon

178
00:05:52,230 --> 00:05:50,560
spacecraft as joshua mentioned this

179
00:05:55,029 --> 00:05:52,240
vehicle visited the international space

180
00:05:58,390 --> 00:05:55,039
station twice before both on crs 11 in

181
00:06:00,150 --> 00:05:58,400
june of 2017 and crs-4 back in september

182
00:06:01,990 --> 00:06:00,160
of 2014

183
00:06:04,070 --> 00:06:02,000
and while and while this dragon has

184
00:06:06,390 --> 00:06:04,080
flown before the booster we'll be flying

185
00:06:07,909 --> 00:06:06,400
today is actually brand new after stage

186
00:06:09,270 --> 00:06:07,919
separation we'll be landing the first

187
00:06:11,029 --> 00:06:09,280
stage on our drone trip out in the

188
00:06:13,110 --> 00:06:11,039

atlantic ocean so that it could be

189
00:06:14,870 --> 00:06:13,120
reflown on future missions

190
00:06:16,629 --> 00:06:14,880
now both falcon 9 and dragon were

191
00:06:18,150 --> 00:06:16,639
designed with re-flight in mind so the

192
00:06:19,590 --> 00:06:18,160
vehicle hardware is built to support

193
00:06:21,350 --> 00:06:19,600
multiple missions with minimal

194
00:06:22,950 --> 00:06:21,360
refurbishment in between

195
00:06:25,350 --> 00:06:22,960
our dragon spacecraft has been flying

196
00:06:27,350 --> 00:06:25,360
for nearly nine years now and today it's

197
00:06:29,189 --> 00:06:27,360
one of the few vehicles flying that that

198
00:06:31,110 --> 00:06:29,199
can deliver significant cargo to the

199
00:06:33,270 --> 00:06:31,120
international space station and the only

200
00:06:35,670 --> 00:06:33,280
one that can deliver significant cargo

201
00:06:38,550 --> 00:06:35,680
from it to provide a little historical

202
00:06:40,309 --> 00:06:38,560
background in 2010 spacex became the

203
00:06:42,309 --> 00:06:40,319
first private company to send a

204
00:06:43,350 --> 00:06:42,319
spacecraft into orbit and then return it

205
00:06:45,110 --> 00:06:43,360
to earth

206
00:06:46,950 --> 00:06:45,120
just two years later dragon became the

207
00:06:49,029 --> 00:06:46,960
first privately developed spacecraft to

208
00:06:51,430 --> 00:06:49,039
visit the space station

209
00:06:53,430 --> 00:06:51,440
since then spacex has made a total of 19

210
00:06:55,110 --> 00:06:53,440
trips to the international space station

211
00:06:57,189 --> 00:06:55,120
and we're under contract nasa for a

212
00:06:58,230 --> 00:06:57,199
total of 26 of these cargo resupply

213
00:07:00,070 --> 00:06:58,240

missions

214
00:07:01,909 --> 00:07:00,080
today's mission is to support the 20th

215
00:07:03,029 --> 00:07:01,919
trip to the international space station

216
00:07:04,710 --> 00:07:03,039
and we're looking forward to a

217
00:07:07,909 --> 00:07:04,720
successful launch day

218
00:07:10,070 --> 00:07:07,919
with that back to you jennifer

219
00:07:11,670 --> 00:07:10,080
thanks andy we are commemorating the

220
00:07:14,950 --> 00:07:11,680
20th year of the international space

221
00:07:16,950 --> 00:07:14,960
station october 31st 2020 marks two

222
00:07:19,909 --> 00:07:16,960
decades of continuous human presence in

223
00:07:21,670 --> 00:07:19,919
space and november 2nd 2020 marks 20

224
00:07:23,189 --> 00:07:21,680
years of continuous human presence in

225
00:07:24,629 --> 00:07:23,199
low earth orbit

226
00:07:26,390 --> 00:07:24,639
the space station one of the most

227
00:07:28,309 --> 00:07:26,400
ambitious international collaborations

228
00:07:31,110 --> 00:07:28,319
ever attempted is a convergence of

229
00:07:32,710 --> 00:07:31,120
science technology and human innovation

230
00:07:34,870 --> 00:07:32,720
it is one of the most crucial stepping

231
00:07:37,189 --> 00:07:34,880
stones for nasa's plan to land humans on

232
00:07:43,770 --> 00:07:37,199
the moon in 2024 through the artemis

233
00:07:43,780 --> 00:08:24,440
[Music]

234
00:08:24,450 --> 00:08:32,070
[Applause]

235
00:08:35,509 --> 00:08:33,670
liftoff of today's rocket from launch

236
00:08:38,149 --> 00:08:35,519
complex 40 is timed right down to the

237
00:08:39,670 --> 00:08:38,159
very second the reason for this spacex

238
00:08:40,870 --> 00:08:39,680

needs to get their cargo spacecraft

239
00:08:42,550 --> 00:08:40,880
lined up to rendezvous with the

240
00:08:43,990 --> 00:08:42,560
international space station

241
00:08:46,070 --> 00:08:44,000
for more on this let's check in with

242
00:08:49,590 --> 00:08:46,080
nasa's dan hewitt who is live at johnson

243
00:08:51,269 --> 00:08:49,600
space center in houston dan

244
00:08:53,030 --> 00:08:51,279
hey thanks jennifer and welcome

245
00:08:54,630 --> 00:08:53,040
everybody inside of mission control

246
00:08:56,710 --> 00:08:54,640
houston here at the johnson space center

247
00:08:58,310 --> 00:08:56,720
in houston you may be able to see right

248
00:09:00,070 --> 00:08:58,320
over my shoulder

249
00:09:01,990 --> 00:09:00,080
the holidays have arrived here in the

250
00:09:03,829 --> 00:09:02,000
control room where right now the orbit 2

251
00:09:05,990 --> 00:09:03,839
team is on console supporting the crew

252
00:09:07,509 --> 00:09:06,000
on board they are led today in the room

253
00:09:09,990 --> 00:09:07,519
right now by flight director allison

254
00:09:11,750 --> 00:09:10,000
bollinger who just about two hours ago

255
00:09:13,590 --> 00:09:11,760
pulled the teams and was able to report

256
00:09:15,750 --> 00:09:13,600
to the spacex mission director that the

257
00:09:18,230 --> 00:09:15,760
international space station is go for

258
00:09:19,990 --> 00:09:18,240
today's launch dragon ultimately bound

259
00:09:21,910 --> 00:09:20,000
for the international space station

260
00:09:24,550 --> 00:09:21,920
where right now the six-person crew of

261
00:09:27,350 --> 00:09:24,560
expedition 61 is going through a day

262
00:09:29,430 --> 00:09:27,360
preparing for this eventual arrival they

263
00:09:31,110 --> 00:09:29,440

are led by luca parmitano he's the tall

264
00:09:33,350 --> 00:09:31,120
gentleman right there in the middle he's

265
00:09:35,190 --> 00:09:33,360
an issa astronaut from italy going from

266
00:09:37,350 --> 00:09:35,200
left to right real quick nasa astronaut

267
00:09:40,070 --> 00:09:37,360
drew morgan russian cosmonaut alexander

268
00:09:42,790 --> 00:09:40,080
schwartzoff parmitano and then just next

269
00:09:44,550 --> 00:09:42,800
to him alex korpocha another rose cosmos

270
00:09:45,990 --> 00:09:44,560
cosmonaut and then rounding out the crew

271
00:09:49,430 --> 00:09:46,000
on the right there are nasa astronauts

272
00:09:51,509 --> 00:09:49,440
jess kamir and christina cook

273
00:09:53,750 --> 00:09:51,519
once dragon arrives with a launch today

274
00:09:56,310 --> 00:09:53,760
it's going to arrive on sunday and that

275
00:09:57,910 --> 00:09:56,320
will be up to luca and drew luca

276
00:10:00,470 --> 00:09:57,920
parmitano and drew morgan to actually

277
00:10:02,630 --> 00:10:00,480
use the station's 57-foot long robotic

278
00:10:04,870 --> 00:10:02,640
arm that canadarm2 to reach out and

279
00:10:07,190 --> 00:10:04,880
grapple dragon once it arrives it'll

280
00:10:08,710 --> 00:10:07,200
camp out about 30 feet or so away from

281
00:10:10,470 --> 00:10:08,720
the international space station and

282
00:10:12,630 --> 00:10:10,480
they'll use that arm to reach out and

283
00:10:14,550 --> 00:10:12,640
grab it right out of space then they'll

284
00:10:16,949 --> 00:10:14,560
turn over control down to the teams here

285
00:10:18,389 --> 00:10:16,959
on the ground to actually install dragon

286
00:10:20,389 --> 00:10:18,399
and we'll obviously be bringing you

287
00:10:22,389 --> 00:10:20,399
coverage of all that once it arrives

288
00:10:24,630 --> 00:10:22,399

that'll be happening on sunday with a

289
00:10:28,389 --> 00:10:24,640
launch today capture timed right around

290
00:10:30,710 --> 00:10:28,399
5 00 a.m central time 6 a.m eastern as

291
00:10:32,790 --> 00:10:30,720
you saw there's about 5 700 pounds of

292
00:10:34,310 --> 00:10:32,800
cargo coming up jennifer walked through

293
00:10:35,990 --> 00:10:34,320
some of the highlights of the research

294
00:10:38,150 --> 00:10:36,000
there's over one ton of science

295
00:10:40,150 --> 00:10:38,160
investigations on board and with these

296
00:10:42,310 --> 00:10:40,160
spacex missions they usually kick off a

297
00:10:44,710 --> 00:10:42,320
really fast and furious couple of weeks

298
00:10:46,310 --> 00:10:44,720
for the crew once the dragon arrives as

299
00:10:48,069 --> 00:10:46,320
there's a lot of what we call sortie

300
00:10:50,550 --> 00:10:48,079
science so science coming up that has to

301
00:10:52,710 --> 00:10:50,560
come back down with dragon in just 30

302
00:10:54,230 --> 00:10:52,720
days once it returns so the crew will be

303
00:10:55,670 --> 00:10:54,240
very busy they've just wrapped up a

304
00:10:57,509 --> 00:10:55,680
bunch of spacewalks now about to get

305
00:10:59,110 --> 00:10:57,519
into some really hardcore science over

306
00:11:01,350 --> 00:10:59,120
the next couple of weeks during this

307
00:11:02,870 --> 00:11:01,360
dragon mission but with that we are

308
00:11:04,230 --> 00:11:02,880
excited ready to see dragon launch

309
00:11:05,910 --> 00:11:04,240
everything's go on the international

310
00:11:07,430 --> 00:11:05,920
space station side so i'm going to send

311
00:11:08,710 --> 00:11:07,440
it back down to florida back over to you

312
00:11:11,509 --> 00:11:08,720
jennifer

313
00:11:13,350 --> 00:11:11,519

thanks dan crs 19 is packed with a

314
00:11:15,509 --> 00:11:13,360
variety of investigations sponsored by

315
00:11:25,570 --> 00:11:15,519
the u.s national laboratory here's a

316
00:13:06,389 --> 00:11:33,820
[Music]

317
00:13:08,470 --> 00:13:06,399
joining me now is patrick o'neill an

318
00:13:09,829 --> 00:13:08,480
expert on the u.s national lab thanks

319
00:13:11,670 --> 00:13:09,839
for being here patrick thank you for

320
00:13:13,190 --> 00:13:11,680
having me we saw some really cool

321
00:13:14,790 --> 00:13:13,200
science in that video can you tell us a

322
00:13:16,310 --> 00:13:14,800
little bit more about the investigations

323
00:13:17,910 --> 00:13:16,320
happening on the lab yeah i think that

324
00:13:19,190 --> 00:13:17,920
that video was a great encapsulation of

325
00:13:20,790 --> 00:13:19,200
some of the payloads that are going on

326
00:13:22,629 --> 00:13:20,800
this mission we have everything from

327
00:13:24,550 --> 00:13:22,639
rodents model organisms that are flying

328
00:13:25,829 --> 00:13:24,560
uh budweiser is sending more barley to

329
00:13:27,509 --> 00:13:25,839
the space station this will be their

330
00:13:29,269 --> 00:13:27,519
fourth separate investigation to the

331
00:13:30,949 --> 00:13:29,279
space station and then on top of that

332
00:13:32,870 --> 00:13:30,959
we're also looking at fire confined

333
00:13:34,710 --> 00:13:32,880
spaces so i think the video kind of

334
00:13:36,150 --> 00:13:34,720
touched on some of those elements but

335
00:13:38,150 --> 00:13:36,160
there's also cube satellites that are

336
00:13:40,310 --> 00:13:38,160
flying on this mission we also have an

337
00:13:41,829 --> 00:13:40,320
investigation that is sponsored by the

338
00:13:43,430 --> 00:13:41,839

national stem cell foundation that is

339
00:13:45,189 --> 00:13:43,440
looking at brain organoids that is

340
00:13:47,910 --> 00:13:45,199
focused on parkinson's disease as well

341
00:13:49,430 --> 00:13:47,920
as multiple sclerosis so we really have

342
00:13:50,710 --> 00:13:49,440
an awful lot of diversity that is on

343
00:13:52,790 --> 00:13:50,720
this mission and it really kind of

344
00:13:54,150 --> 00:13:52,800
encapsulates uh what's possible on the

345
00:13:56,069 --> 00:13:54,160
space station whether you're looking at

346
00:13:58,310 --> 00:13:56,079
life physical material sciences

347
00:14:00,790 --> 00:13:58,320
technology development it's all it's all

348
00:14:02,470 --> 00:14:00,800
represented right here on this mission

349
00:14:03,750 --> 00:14:02,480
all that sounds really amazing which may

350
00:14:05,590 --> 00:14:03,760
make it hard for you to answer this

351
00:14:07,590 --> 00:14:05,600
question what do you consider to be some

352
00:14:09,750 --> 00:14:07,600
of the highlights of the year well i

353
00:14:11,350 --> 00:14:09,760
think that this year in general has just

354
00:14:12,870 --> 00:14:11,360
been a banner year for the space station

355
00:14:15,350 --> 00:14:12,880
in its entirety whether that be from a

356
00:14:16,629 --> 00:14:15,360
national lab perspective or from nasa

357
00:14:18,710 --> 00:14:16,639
speaking on behalf of the national

358
00:14:20,629 --> 00:14:18,720
laboratory this has truly been uh you

359
00:14:22,230 --> 00:14:20,639
know the the banner year of research to

360
00:14:23,910 --> 00:14:22,240
date we've sent more payloads to the

361
00:14:26,389 --> 00:14:23,920
space station than we ever have before

362
00:14:28,389 --> 00:14:26,399
we've uh had astronauts working on uh

363
00:14:29,990 --> 00:14:28,399

research on the station station more

364
00:14:31,590 --> 00:14:30,000
than they ever had before and i think

365
00:14:32,949 --> 00:14:31,600
that all sets the foundation for what

366
00:14:35,110 --> 00:14:32,959
we're going to be seeing down the road

367
00:14:37,269 --> 00:14:35,120
it really demonstrates this enhanced

368
00:14:39,750 --> 00:14:37,279
desire for researchers to leverage this

369
00:14:41,750 --> 00:14:39,760
unique orbiting laboratory right we we

370
00:14:43,829 --> 00:14:41,760
accomplish so much this year what do you

371
00:14:44,710 --> 00:14:43,839
see for 2020 well i would like to say

372
00:14:46,310 --> 00:14:44,720
that you're going to see more of the

373
00:14:47,829 --> 00:14:46,320
same but just that you're going to see

374
00:14:49,110 --> 00:14:47,839
more of it you know i think that the

375
00:14:51,750 --> 00:14:49,120
idea is that we're going to be sending

376
00:14:53,670 --> 00:14:51,760
more payloads that uh have recognizable

377
00:14:55,269 --> 00:14:53,680
companies and brands that are interested

378
00:14:57,670 --> 00:14:55,279
in using the space station to enhance

379
00:14:59,110 --> 00:14:57,680
products therapies uh to improve life on

380
00:15:00,949 --> 00:14:59,120
earth and then we're also going to be

381
00:15:03,030 --> 00:15:00,959
seeing a variety of partners like the

382
00:15:05,189 --> 00:15:03,040
nih and the nsf's of the world who are

383
00:15:07,189 --> 00:15:05,199
looking to fund investigations that can

384
00:15:09,189 --> 00:15:07,199
bring fundamental and applied knowledge

385
00:15:11,670 --> 00:15:09,199
uh from space-based activity and

386
00:15:12,870 --> 00:15:11,680
bringing it back home here on earth i

387
00:15:14,069 --> 00:15:12,880
can't think of a better way to start a

388
00:15:15,750 --> 00:15:14,079

new decade

389
00:15:17,509 --> 00:15:15,760
thank you again for being here with us

390
00:15:18,790 --> 00:15:17,519
thank you so much and go dragon we're

391
00:15:20,310 --> 00:15:18,800
trying

392
00:15:21,910 --> 00:15:20,320
measuring the weight of objects in a

393
00:15:23,829 --> 00:15:21,920
microgravity environment can be

394
00:15:25,829 --> 00:15:23,839
complicated here's a look at how

395
00:15:32,790 --> 00:15:25,839
astronauts measure items on station a

396
00:15:38,389 --> 00:15:35,910
at home many people can and do weigh the

397
00:15:40,949 --> 00:15:38,399
food they eat it's as easy as putting it

398
00:15:41,749 --> 00:15:40,959
on a scale

399
00:15:44,710 --> 00:15:41,759
but

400
00:15:46,550 --> 00:15:44,720
scales don't work without gravity so how

401
00:15:48,389 --> 00:15:46,560
do astronauts measure the weight of

402
00:15:50,389 --> 00:15:48,399
small items in a microgravity

403
00:15:51,509 --> 00:15:50,399
environment like the international space

404
00:15:54,550 --> 00:15:51,519
station

405
00:15:55,910 --> 00:15:54,560
they measure mass instead what's the

406
00:15:58,310 --> 00:15:55,920
difference

407
00:16:00,230 --> 00:15:58,320
mass is the measure of how much matter

408
00:16:01,990 --> 00:16:00,240
something contains

409
00:16:04,470 --> 00:16:02,000
weight on the other hand is the

410
00:16:07,350 --> 00:16:04,480
measurement of the pull of gravity on an

411
00:16:09,189 --> 00:16:07,360
object we can actually know how much our

412
00:16:11,509 --> 00:16:09,199
plants are weighing that the astronauts

413
00:16:13,670 --> 00:16:11,519

will consume so they use the newton's

414
00:16:15,749 --> 00:16:13,680
second law of motion which has forced

415
00:16:18,870 --> 00:16:15,759
mass and acceleration under the same

416
00:16:20,829 --> 00:16:18,880
amount of force an object with more mass

417
00:16:22,389 --> 00:16:20,839
will accelerate

418
00:16:25,910 --> 00:16:22,399
less

419
00:16:28,389 --> 00:16:25,920
so to apply this in space astronauts use

420
00:16:31,269 --> 00:16:28,399
the mass measurement device

421
00:16:34,310 --> 00:16:31,279
mmd which launched to the space station

422
00:16:36,710 --> 00:16:34,320
in 2017. they then put these plant

423
00:16:38,389 --> 00:16:36,720
samples inside a little ziploc bag and

424
00:16:41,030 --> 00:16:38,399
then the mass measurement device goes

425
00:16:43,350 --> 00:16:41,040
back and forth a few times the mmd

426
00:16:44,389 --> 00:16:43,360
applies a known acceleration to the

427
00:16:47,189 --> 00:16:44,399
sample

428
00:16:49,110 --> 00:16:47,199
and measures the resulting force

429
00:16:52,389 --> 00:16:49,120
allowing the system to determine its

430
00:16:56,710 --> 00:16:52,399
mass it can measure between 1 and 100

431
00:16:57,910 --> 00:16:56,720
grams and has an accuracy of 0.1 grams

432
00:16:59,910 --> 00:16:57,920
it's wonderful it's really really

433
00:17:02,150 --> 00:16:59,920
accurate so it's a great new tool that

434
00:17:03,829 --> 00:17:02,160
we have

435
00:17:06,309 --> 00:17:03,839
there are multiple mass measurement

436
00:17:08,309 --> 00:17:06,319
devices on the space station

437
00:17:10,230 --> 00:17:08,319
they measure everything from astronauts

438
00:17:12,150 --> 00:17:10,240

who are monitoring their health to

439
00:17:15,029 --> 00:17:12,160
freshly harvested produce from the

440
00:17:17,429 --> 00:17:15,039
station's veggie growth chamber

441
00:17:18,870 --> 00:17:17,439
so when microgravity makes it impossible

442
00:17:24,309 --> 00:17:18,880
to tip the scales

443
00:17:27,829 --> 00:17:26,230
we are now about 12 minutes away from

444
00:17:29,350 --> 00:17:27,839
launch let's head back over to the

445
00:17:31,990 --> 00:17:29,360
mission director center to get an update

446
00:17:33,669 --> 00:17:32,000
from nasa's joshua santora hey joshua

447
00:17:35,029 --> 00:17:33,679
how are things looking

448
00:17:37,669 --> 00:17:35,039
hey jennifer things are looking really

449
00:17:38,950 --> 00:17:37,679
great one of my favorite things is

450
00:17:40,230 --> 00:17:38,960
rocket launches and so we get to

451
00:17:42,310 --> 00:17:40,240
experience that today because we do not

452
00:17:43,350 --> 00:17:42,320
have a winter wonderland out there so

453
00:17:45,270 --> 00:17:43,360
again the weather is looking really

454
00:17:47,350 --> 00:17:45,280
positive things progressing well

455
00:17:48,310 --> 00:17:47,360
there you see that beautiful rocket on

456
00:17:50,070 --> 00:17:48,320
the pad

457
00:17:52,070 --> 00:17:50,080
this shot special thanks to our drone

458
00:17:53,750 --> 00:17:52,080
team out there they're flying out to uav

459
00:17:56,230 --> 00:17:53,760
taking this shot for us so should be

460
00:17:57,590 --> 00:17:56,240
beautiful views all around of the launch

461
00:18:00,789 --> 00:17:57,600
today again we're targeting that

462
00:18:03,270 --> 00:18:00,799
instantaneous window at 12 29 and 24

463
00:18:05,590 --> 00:18:03,280

seconds eastern time so we're at about

464
00:18:06,789 --> 00:18:05,600
11 and a half minutes and counting so

465
00:18:09,430 --> 00:18:06,799
things progressing well you see the

466
00:18:11,190 --> 00:18:09,440
rocket there with the gaseous oxygen

467
00:18:13,270 --> 00:18:11,200
venting off the side that's completely

468
00:18:15,270 --> 00:18:13,280
normal and expected that's part of using

469
00:18:17,110 --> 00:18:15,280
crutch and fuel we have liquid oxygen

470
00:18:18,710 --> 00:18:17,120
and so when you're loading that you're

471
00:18:19,909 --> 00:18:18,720
going to have boil off and so ultimately

472
00:18:21,510 --> 00:18:19,919
you want to vent that out of the rocket

473
00:18:22,710 --> 00:18:21,520
and that's what you see there

474
00:18:25,190 --> 00:18:22,720
no harm there because it's just more

475
00:18:26,950 --> 00:18:25,200
oxygen into the atmosphere

476
00:18:28,630 --> 00:18:26,960
today the the goal here is to get the

477
00:18:30,950 --> 00:18:28,640
dragon into orbit to be on its way to

478
00:18:33,029 --> 00:18:30,960
the space station and so uh we want to

479
00:18:34,870 --> 00:18:33,039
touch on that dragon in particular it's

480
00:18:37,270 --> 00:18:34,880
its capacity you saw some of those great

481
00:18:39,190 --> 00:18:37,280
stats from dan as far as the amount of

482
00:18:42,150 --> 00:18:39,200
things that are going up the the weight

483
00:18:46,230 --> 00:18:42,160
there but volume wise the dragon can

484
00:18:49,190 --> 00:18:46,240
carry about 25 cubic meters of things

485
00:18:51,830 --> 00:18:49,200
research materials supplies resources

486
00:18:53,830 --> 00:18:51,840
and so it's about 11 cubic meters in the

487
00:18:55,669 --> 00:18:53,840
capsule itself and 14 in the trunk the

488
00:18:57,110 --> 00:18:55,679

trunk there is the cylindrical portion

489
00:18:58,470 --> 00:18:57,120
where you see the actual dragon logo

490
00:19:00,549 --> 00:18:58,480
there on the side of the rock on the

491
00:19:02,870 --> 00:19:00,559
spacecraft excuse me

492
00:19:04,950 --> 00:19:02,880
so just for comparison sake um 25 cubic

493
00:19:07,430 --> 00:19:04,960
meters how big is that so if you have a

494
00:19:09,029 --> 00:19:07,440
minivan a six or seven passenger minivan

495
00:19:10,470 --> 00:19:09,039
generally speaking those typically hold

496
00:19:12,070 --> 00:19:10,480
about four to four and a quarter cubic

497
00:19:13,830 --> 00:19:12,080
meters so if you take six of those

498
00:19:15,590 --> 00:19:13,840
minivans together and the storage

499
00:19:17,669 --> 00:19:15,600
capacity in those six minivans that's

500
00:19:21,029 --> 00:19:17,679
roughly the same kind of capacity you

501
00:19:24,150 --> 00:19:21,039
have for the dragon a very very uh well

502
00:19:26,230 --> 00:19:24,160
efficiently used space in there to kind

503
00:19:28,070 --> 00:19:26,240
of pack that well even up until a couple

504
00:19:29,990 --> 00:19:28,080
days ago late into tuesday they were

505
00:19:31,510 --> 00:19:30,000
actually doing their late loads there

506
00:19:33,350 --> 00:19:31,520
are certain

507
00:19:35,430 --> 00:19:33,360
portions of the supplies that they want

508
00:19:37,110 --> 00:19:35,440
to have away from our laboratory for as

509
00:19:39,029 --> 00:19:37,120
little time as possible and so there's

510
00:19:40,470 --> 00:19:39,039
about 700 pounds that they loaded up on

511
00:19:42,150 --> 00:19:40,480
tuesday

512
00:19:43,990 --> 00:19:42,160
that combined with the other 5000 that

513
00:19:47,430 --> 00:19:44,000

was already on there so you've got a

514
00:19:49,190 --> 00:19:47,440
little over 5700 pounds of cargo again

515
00:19:51,110 --> 00:19:49,200
spending about four weeks at station and

516
00:19:52,549 --> 00:19:51,120
then it will be returning back to

517
00:19:55,990 --> 00:19:52,559
hopefully be reused at some point in the

518
00:19:59,270 --> 00:19:57,270
that dragon is being carried by that

519
00:20:01,590 --> 00:19:59,280
falcon rocket you see there it is a

520
00:20:04,149 --> 00:20:01,600
two-stage rocket about 230 feet tall 12

521
00:20:05,990 --> 00:20:04,159
feet in diameter and the nine merlin

522
00:20:07,990 --> 00:20:06,000
engines will produce about 1.7 million

523
00:20:09,669 --> 00:20:08,000
pounds of thrust and lift off so that

524
00:20:10,950 --> 00:20:09,679
first stage like we heard from andy is

525
00:20:12,789 --> 00:20:10,960
going to be they're going to attempt to

526
00:20:14,149 --> 00:20:12,799
land on their drone ship about 185

527
00:20:16,310 --> 00:20:14,159
nautical miles off the coast of

528
00:20:17,830 --> 00:20:16,320
jacksonville again that's a secondary

529
00:20:19,669 --> 00:20:17,840
objective and spacex is always good

530
00:20:21,750 --> 00:20:19,679
about declaring that but getting cargo

531
00:20:24,310 --> 00:20:21,760
dragon to its correct orbit is primary

532
00:20:26,310 --> 00:20:24,320
and the falcon recovery is a big bonus

533
00:20:28,390 --> 00:20:26,320
for them so that second stage does have

534
00:20:30,390 --> 00:20:28,400
its own merlin 1d vacuum engine and it

535
00:20:32,630 --> 00:20:30,400
will produce about 210 000 pounds of

536
00:20:33,750 --> 00:20:32,640
thrust that's obviously in the vacuum of

537
00:20:34,789 --> 00:20:33,760
space

538
00:20:36,070 --> 00:20:34,799

and so

539
00:20:37,750 --> 00:20:36,080
we'll be looking for that performance as

540
00:20:39,029 --> 00:20:37,760
well obviously this is a multi-stage

541
00:20:51,190 --> 00:20:39,039
rocket so there's a lot of performance

542
00:20:54,470 --> 00:20:53,270
um we are again looking great there you

543
00:20:56,070 --> 00:20:54,480
see some blue skies you see a little bit

544
00:20:58,230 --> 00:20:56,080
of partly cloudy in the background but

545
00:21:00,789 --> 00:20:58,240
that's quite all right and the weather

546
00:21:02,149 --> 00:21:00,799
here forecast again uh we've updated

547
00:21:03,750 --> 00:21:02,159
that graphic for you we've got some

548
00:21:05,350 --> 00:21:03,760
winds again you kind of see the gaseous

549
00:21:06,710 --> 00:21:05,360
oxygen moving off the rocket again

550
00:21:08,230 --> 00:21:06,720
that's just a result of the winds

551
00:21:09,669 --> 00:21:08,240
temperatures again it's a it's a really

552
00:21:10,870 --> 00:21:09,679
nice morning here on the on the space

553
00:21:12,230 --> 00:21:10,880
coast

554
00:21:13,669 --> 00:21:12,240
the potential for clouds to be in the

555
00:21:16,070 --> 00:21:13,679
way is is the main thing we were looking

556
00:21:17,029 --> 00:21:16,080
at but as you see less than 10 chance

557
00:21:19,029 --> 00:21:17,039
that that's going to be a problem this

558
00:21:20,149 --> 00:21:19,039
morning so weather looking great

559
00:21:21,590 --> 00:21:20,159
technically we're looking great we

560
00:21:23,110 --> 00:21:21,600
should start to hear some

561
00:21:24,470 --> 00:21:23,120
more calls coming up in the next few

562
00:21:25,669 --> 00:21:24,480
minutes

563
00:21:28,390 --> 00:21:25,679

concerning the preparedness of the

564
00:21:29,430 --> 00:21:28,400
rocket in the spacecraft

565
00:21:30,470 --> 00:21:29,440
ultimately that's kind of what's

566
00:21:33,430 --> 00:21:30,480
happening in these last few minutes

567
00:21:35,990 --> 00:21:33,440
spacex does a late fuel they like to

568
00:21:37,750 --> 00:21:36,000
fuel as late as possible to allow the

569
00:21:39,430 --> 00:21:37,760
their cryogenics to be as cold as

570
00:21:41,190 --> 00:21:39,440
possible so they can pack as much in

571
00:21:43,430 --> 00:21:41,200
there as densely as possible so that

572
00:21:44,710 --> 00:21:43,440
that does allow them to

573
00:21:45,830 --> 00:21:44,720
be able to have more performance because

574
00:21:46,710 --> 00:21:45,840
if you if you can pack more fuel in

575
00:21:51,350 --> 00:21:46,720
there you have more performance

576
00:21:55,029 --> 00:21:52,470
we're playing catch up to the space

577
00:21:56,070 --> 00:21:55,039
station like we've been saying all all

578
00:21:58,390 --> 00:21:56,080
morning again we're about seven and a

579
00:22:00,070 --> 00:21:58,400
half minutes away from liftoff and right

580
00:22:02,310 --> 00:22:00,080
now the space station is flying over the

581
00:22:03,669 --> 00:22:02,320
southern pacific ocean headed up on a

582
00:22:05,909 --> 00:22:03,679
path that will take it over central

583
00:22:07,909 --> 00:22:05,919
america and then actually across the

584
00:22:09,909 --> 00:22:07,919
eastern portion of the united states and

585
00:22:11,590 --> 00:22:09,919
we'll rendezvous again as dan said

586
00:22:13,510 --> 00:22:11,600
sunday morning is the plan for for

587
00:22:14,870 --> 00:22:13,520
birthing so exciting stuff there the

588
00:22:17,190 --> 00:22:14,880

space station again thinking about kind

589
00:22:19,909 --> 00:22:17,200
of the capacity and ability think about

590
00:22:21,830 --> 00:22:19,919
the the volume of a six bedroom house so

591
00:22:23,270 --> 00:22:21,840
if you're if you have a six bedroom home

592
00:22:24,630 --> 00:22:23,280
that's roughly the amount of space that

593
00:22:26,710 --> 00:22:24,640
the astronauts have they have the added

594
00:22:27,750 --> 00:22:26,720
benefit of being in microgravity so they

595
00:22:29,430 --> 00:22:27,760
can use

596
00:22:31,510 --> 00:22:29,440
the walls and the ceiling freely because

597
00:22:33,669 --> 00:22:31,520
they don't have that that feeling of

598
00:22:35,590 --> 00:22:33,679
gravity all the time so maybe even feels

599
00:22:37,510 --> 00:22:35,600
bigger than a six-bedroom house

600
00:22:40,230 --> 00:22:37,520
that's roughly 33 000 cubic feet if

601
00:22:41,990 --> 00:22:40,240
you're interested in the numbers

602
00:22:44,789 --> 00:22:42,000
the space station program involves more

603
00:22:47,750 --> 00:22:44,799
than 10 000 people in space agencies and

604
00:22:49,110 --> 00:22:47,760
37 us states and 16 countries so a

605
00:22:50,390 --> 00:22:49,120
massive effort again as we've been

606
00:22:52,630 --> 00:22:50,400
saying a very exciting year for us

607
00:22:54,149 --> 00:22:52,640
celebrating the 20th year of our

608
00:22:55,510 --> 00:22:54,159
sustained human presence in space so if

609
00:22:58,070 --> 00:22:55,520
you're 18 years or younger some of you

610
00:22:59,909 --> 00:22:58,080
19 there has never been a time

611
00:23:01,590 --> 00:22:59,919
when we didn't have humans living and

612
00:23:06,230 --> 00:23:01,600
working in space so again we're

613
00:23:09,270 --> 00:23:07,510

looking ahead to some of the activities

614
00:23:11,430 --> 00:23:09,280
things we're going to hear um we'll

615
00:23:12,950 --> 00:23:11,440
start to hear about things like engine

616
00:23:15,110 --> 00:23:12,960
engines being chilled and prepared to

617
00:23:16,789 --> 00:23:15,120
handle cryogenic fuels that's obviously

618
00:23:20,070 --> 00:23:16,799
a big part of the process you don't want

619
00:23:22,310 --> 00:23:20,080
to run cryogenic temperatures through

620
00:23:23,750 --> 00:23:22,320
atmospheric temperature engines and

621
00:23:25,510 --> 00:23:23,760
engine bells that can cause some

622
00:23:27,190 --> 00:23:25,520
problems

623
00:23:29,110 --> 00:23:27,200
we'll also be hearing about the closing

624
00:23:31,270 --> 00:23:29,120
out of fueling um and then changing

625
00:23:32,950 --> 00:23:31,280
things towards internal power as they

626
00:23:46,470 --> 00:23:32,960
check out all their systems for for

627
00:23:49,190 --> 00:23:48,070
just to recap a little bit some some

628
00:23:51,269 --> 00:23:49,200
highlights we heard during our

629
00:23:53,190 --> 00:23:51,279
pre-launch briefing a couple days ago

630
00:23:55,350 --> 00:23:53,200
there's about 38 investigations that are

631
00:23:57,190 --> 00:23:55,360
going to be going up on this mission um

632
00:23:58,310 --> 00:23:57,200
23 new ones and continuing the rest of

633
00:24:00,310 --> 00:23:58,320
them and then they'll actually be

634
00:24:02,470 --> 00:24:00,320
returning home about 48

635
00:24:03,990 --> 00:24:02,480
research projects so

636
00:24:05,350 --> 00:24:04,000
it's never just about what's going up

637
00:24:06,390 --> 00:24:05,360
it's also about what's coming down

638
00:24:08,470 --> 00:24:06,400

because that benefit of getting to

639
00:24:10,470 --> 00:24:08,480
evaluate things here on gr on the ground

640
00:24:17,350 --> 00:24:10,480
after they've been in space is a huge

641
00:24:22,390 --> 00:24:19,990
over the course of our uh 20 years in

642
00:24:24,549 --> 00:24:22,400
space with sustained human presence

643
00:24:25,590 --> 00:24:24,559
we've had about 2 900 investigations

644
00:24:26,950 --> 00:24:25,600
from a hundred different country

645
00:24:28,549 --> 00:24:26,960
countries so when we say it's an

646
00:24:30,070 --> 00:24:28,559
international space station uh we're

647
00:24:33,909 --> 00:24:30,080
very serious about that

648
00:24:36,789 --> 00:24:35,029
so now we're getting into some really

649
00:24:38,470 --> 00:24:36,799
exciting things visually in just a few

650
00:24:41,029 --> 00:24:38,480
seconds you're going to see the clamp

651
00:24:42,710 --> 00:24:41,039
just beneath the trunk of the dragon it

652
00:24:45,430 --> 00:24:42,720
will the clamp will open and then the

653
00:24:46,870 --> 00:24:45,440
transporter erector or the strong back

654
00:24:48,549 --> 00:24:46,880
the tower that's next to that to the

655
00:24:50,870 --> 00:24:48,559
falcon will actually tilt back so if you

656
00:24:52,310 --> 00:24:50,880
look just beneath um where that dragon

657
00:24:54,470 --> 00:24:52,320
logo is in just a few seconds you should

658
00:24:56,390 --> 00:24:54,480
see that clamp begin to expand and that

659
00:24:58,549 --> 00:24:56,400
tower will will tip back slightly just a

660
00:25:12,950 --> 00:24:58,559
few degrees for now and it will tip back

661
00:25:12,960 --> 00:25:30,230
now you see the clamp opening

662
00:25:33,590 --> 00:25:31,350
and it won't move very far but you

663
00:25:35,830 --> 00:25:33,600

should see that tower next to the rocket

664
00:25:37,750 --> 00:25:35,840
tilt back just a few degrees

665
00:25:39,190 --> 00:25:37,760
a tower primarily is responsible for

666
00:25:41,430 --> 00:25:39,200
delivering

667
00:25:43,269 --> 00:25:41,440
power telemetry

668
00:25:44,710 --> 00:25:43,279
and fuel to the vehicle during this

669
00:26:08,950 --> 00:25:44,720
process there that's a great shot of

670
00:26:11,590 --> 00:26:10,470
so after we do have liftoff this morning

671
00:26:13,510 --> 00:26:11,600
you'll hear range avionics and

672
00:26:15,350 --> 00:26:13,520
propulsion um

673
00:26:17,350 --> 00:26:15,360
engineers all making their own calls as

674
00:26:19,190 --> 00:26:17,360
we as we kind of track with this rocket

675
00:26:20,789 --> 00:26:19,200
uphill

676
00:26:22,390 --> 00:26:20,799
the first stage's job is really to

677
00:26:23,750 --> 00:26:22,400
primarily get us out of the atmosphere

678
00:26:29,750 --> 00:26:23,760
and the second stage is to deliver the

679
00:26:43,220 --> 00:26:31,110
closed out

680
00:26:43,230 --> 00:27:01,750
[Applause]

681
00:27:01,760 --> 00:27:28,149
uh

682
00:27:28,159 --> 00:27:32,830
ch2 losses closed

683
00:27:36,389 --> 00:27:35,430
out we heard that first stage locks call

684
00:27:37,669 --> 00:27:36,399
just a minute ago and that was the

685
00:27:39,350 --> 00:27:37,679
second stage locks close out call as

686
00:27:40,389 --> 00:27:39,360
well we should be hearing from the range

687
00:27:42,230 --> 00:27:40,399
as well declaring we're good to go

688
00:27:44,230 --> 00:27:42,240

they're in charge of public safety again

689
00:27:45,830 --> 00:27:44,240
the physical area as well as the path of

690
00:27:47,669 --> 00:27:45,840
the rocket so looking for

691
00:27:49,510 --> 00:27:47,679
potential for collisions upon launch

692
00:27:50,789 --> 00:27:49,520
we're cleared those today no concerns

693
00:27:52,230 --> 00:27:50,799
there so

694
00:27:56,710 --> 00:27:52,240
everything is looking like we are go for

695
00:27:56,720 --> 00:28:24,310
gas closeouts are starting

696
00:28:27,990 --> 00:28:25,750
oh she got our final go for launch here

697
00:28:40,470 --> 00:28:28,000
from the launch director

698
00:28:40,480 --> 00:28:43,350
go for launch

699
00:28:43,360 --> 00:28:47,830
there we have the call for gopher launch

700
00:28:51,110 --> 00:28:49,510
you also may see water beginning to

701
00:28:52,710 --> 00:28:51,120
flood the launch pad about 18 seconds to

702
00:28:55,269 --> 00:28:52,720
go it's very normal that's part of the

703
00:29:10,470 --> 00:28:55,279
sound suppression system all part of the

704
00:29:10,480 --> 00:29:14,160
about 15

705
00:29:14,170 --> 00:29:19,350
[Applause]

706
00:29:21,430 --> 00:29:20,389
six

707
00:29:22,389 --> 00:29:21,440
five

708
00:29:23,350 --> 00:29:22,399
four

709
00:29:24,310 --> 00:29:23,360
three

710
00:29:25,110 --> 00:29:24,320
two

711
00:29:26,789 --> 00:29:25,120
one

712
00:29:29,830 --> 00:29:26,799
zero

713
00:29:31,990 --> 00:29:29,840

engines ignition liftoff of the falcon 9

714
00:29:33,830 --> 00:29:32,000
and cargo dragon transporting critical

715
00:29:38,500 --> 00:29:33,840
research to enable living and working in

716
00:29:38,510 --> 00:30:29,269
[Music]

717
00:30:29,279 --> 00:30:36,390
vehicle supersonic

718
00:30:36,400 --> 00:30:40,070
[Music]

719
00:30:42,710 --> 00:30:42,070
vehicle has reached maximum aerodynamic

720
00:30:48,630 --> 00:30:42,720
pressure

721
00:30:50,389 --> 00:30:48,640
[Music]

722
00:30:52,870 --> 00:30:50,399
a couple big calls there again all

723
00:30:54,870 --> 00:30:52,880
normal all nominal and progressing as

724
00:30:57,269 --> 00:30:54,880
expected flying through the densest part

725
00:30:59,600 --> 00:30:57,279
of the atmosphere

726
00:31:05,509 --> 00:30:59,610
recovery aos

727
00:31:05,519 --> 00:31:10,630
that back engine chill

728
00:31:43,590 --> 00:31:12,070
it's a call for chilling this the second

729
00:31:43,600 --> 00:32:02,070
you know

730
00:32:02,080 --> 00:32:12,870
niko

731
00:32:12,880 --> 00:32:25,590
impact

732
00:32:28,710 --> 00:32:27,430
very significant calls there successful

733
00:32:30,470 --> 00:32:28,720
separation of the first stage from the

734
00:32:32,630 --> 00:32:30,480
second stage a second stage there you

735
00:32:34,389 --> 00:32:32,640
see on screen with the red-hot engine

736
00:32:36,470 --> 00:32:34,399
that is now

737
00:32:38,549 --> 00:32:36,480
active and taking dragon towards its

738
00:32:40,549 --> 00:32:38,559

correct orbit and we saw the boost back

739
00:32:41,590 --> 00:32:40,559
burn begin and hear that call as well so

740
00:32:42,789 --> 00:32:41,600
the falcon is headed towards the

741
00:32:51,350 --> 00:32:42,799
drumship there again off the coast of

742
00:32:55,430 --> 00:32:52,950
stage while on bootstrap burner shut

743
00:32:57,990 --> 00:32:56,710
right now you're seeing the camera kind

744
00:33:00,630 --> 00:32:58,000
of flipping and essentially you're

745
00:33:02,310 --> 00:33:00,640
seeing uh two camera views one off oh

746
00:33:04,870 --> 00:33:02,320
you actually just see the nose cone flew

747
00:33:07,029 --> 00:33:04,880
past there that's a nominal jettison of

748
00:33:08,549 --> 00:33:07,039
the nose cone

749
00:33:10,549 --> 00:33:08,559
there that's a

750
00:33:12,870 --> 00:33:10,559
it's a shot from the first stage there's

751
00:33:15,509 --> 00:33:12,880
the hypersonic grid fins expanding to

752
00:33:17,430 --> 00:33:15,519
help control uh

753
00:33:18,630 --> 00:33:17,440
to help steer essentially

754
00:33:28,470 --> 00:33:18,640
this rocket towards the drumstick

755
00:33:32,630 --> 00:33:30,230
so again on that second stage engine

756
00:33:44,549 --> 00:33:32,640
you're seeing two camera views one on

757
00:33:47,909 --> 00:33:46,149
it's a great side by side again the

758
00:33:49,669 --> 00:33:47,919
primary objective today is to get cargo

759
00:33:51,430 --> 00:33:49,679
dragon to its correct orbit and the

760
00:33:53,509 --> 00:33:51,440
secondary objective is to recover that

761
00:33:55,669 --> 00:33:53,519
falcon booster landing on of course i

762
00:34:06,789 --> 00:33:55,679
still love you about 185 nautical miles

763
00:34:10,149 --> 00:34:08,069

the camera on the left i believe is

764
00:34:12,310 --> 00:34:10,159
actually inside the top of the first

765
00:34:19,510 --> 00:34:12,320
stage so you're getting kind of a view a

766
00:34:24,149 --> 00:34:21,030
stage two continues on nominal

767
00:34:28,629 --> 00:34:26,069
again we use that term nominal that

768
00:34:30,950 --> 00:34:28,639
essentially just means that we're within

769
00:34:32,550 --> 00:34:30,960
the expected and appropriate range where

770
00:34:33,589 --> 00:34:32,560
we should be so that all that means is

771
00:34:55,510 --> 00:34:33,599
that everything is going according to

772
00:34:59,349 --> 00:34:57,430
all right so a lot of work done a lot

773
00:35:01,349 --> 00:34:59,359
more to go we are still not there yet we

774
00:35:03,430 --> 00:35:01,359
have to kind of progress through the

775
00:35:04,550 --> 00:35:03,440
spacecraft deploy solar array deploy and

776
00:35:06,069 --> 00:35:04,560
check out to make sure everything is in

777
00:35:08,550 --> 00:35:06,079
good order but that is going to do it

778
00:35:10,230 --> 00:35:08,560
for us for myself from here in hangar ae

779
00:35:11,750 --> 00:35:10,240
at the cape canaveral air force station

780
00:35:13,430 --> 00:35:11,760
mission director center so it's been a

781
00:35:14,550 --> 00:35:13,440
pleasure being with you today thanks so

782
00:35:16,470 --> 00:35:14,560
much and i'm going to send it over to

783
00:35:18,790 --> 00:35:16,480
andy in spacex's headquarters in

784
00:35:22,470 --> 00:35:18,800
hawthorne california excuse me hawthorne

785
00:35:26,630 --> 00:35:25,030
thanks joshua in order to land our drone

786
00:35:29,030 --> 00:35:26,640
ship in the atlantic ocean the first

787
00:35:31,510 --> 00:35:29,040
stage needs to execute a series of three

788
00:35:33,030 --> 00:35:31,520

burns the first is a boost back burn

789
00:35:35,510 --> 00:35:33,040
which is meant to slow the rocket down

790
00:35:38,069 --> 00:35:35,520
and reorient it reorient it for re-entry

791
00:35:40,230 --> 00:35:38,079
that just completed a few seconds ago

792
00:35:42,069 --> 00:35:40,240
next is the entry burn where falcon 9

793
00:35:43,990 --> 00:35:42,079
slows itself down before before hitting

794
00:35:45,910 --> 00:35:44,000
the dense parts of the atmosphere

795
00:35:47,510 --> 00:35:45,920
without the second burn relying solely

796
00:35:48,790 --> 00:35:47,520
on the atmosphere to slow down falcon 9

797
00:35:50,710 --> 00:35:48,800
would put unnecessary strain on the

798
00:35:54,630 --> 00:35:50,720
rocket we should hopefully we can see

799
00:35:58,870 --> 00:35:56,870
the third and final burn is the landing

800
00:36:00,069 --> 00:35:58,880
burn and there's the the shot of the

801
00:36:01,750 --> 00:36:00,079
entry burn

802
00:36:04,470 --> 00:36:01,760
the third and final burn is the landing

803
00:36:06,150 --> 00:36:04,480
burn which happens just before touchdown

804
00:36:08,230 --> 00:36:06,160
it provides the booster a soft descent

805
00:36:10,470 --> 00:36:08,240
to attempt landing and this is also when

806
00:36:12,470 --> 00:36:10,480
the four landing legs were deployed

807
00:36:14,550 --> 00:36:12,480
probably we're probably about a minute

808
00:36:15,990 --> 00:36:14,560
away from beginning that landing burn

809
00:36:22,550 --> 00:36:16,000
let's keep an eye on screen to see if we

810
00:36:27,190 --> 00:36:24,870
for this this final burn falcon 9 uses

811
00:36:33,349 --> 00:36:27,200
just a single merlin engine the center

812
00:36:36,710 --> 00:36:34,790
on the left-hand screen you see a shot

813
00:36:38,710 --> 00:36:36,720

of the second stage

814
00:36:40,710 --> 00:36:38,720
continuing its journey into orbit and on

815
00:36:42,550 --> 00:36:40,720
the right hand side it's a view from the

816
00:36:45,430 --> 00:36:42,560
top of the first stage

817
00:36:53,270 --> 00:36:45,440
those griffins are helping to guide

818
00:36:53,280 --> 00:36:58,630
stage one landing barn has started

819
00:37:02,150 --> 00:37:00,069
and we did get confirmation that the

820
00:37:03,750 --> 00:37:02,160
landing burn did just start that's a

821
00:37:04,870 --> 00:37:03,760
view from our drone ship in the atlantic

822
00:37:06,870 --> 00:37:04,880
ocean

823
00:37:11,910 --> 00:37:06,880
as we get closer watchful as landing

824
00:37:20,230 --> 00:37:13,430
acquisition of signal new hampshire

825
00:37:25,589 --> 00:37:22,390
looks like we may have lost

826
00:37:27,510 --> 00:37:25,599
the link of the footage

827
00:37:32,230 --> 00:37:27,520
we're listening in to see if age one has

828
00:37:36,790 --> 00:37:34,710
and touchdown of falcon 9 on our drone

829
00:37:39,349 --> 00:37:36,800
ship of course i still love you you can

830
00:37:41,270 --> 00:37:39,359
certainly hear the excitement uh here at

831
00:37:43,510 --> 00:37:41,280
spacex congratulations to the entire

832
00:37:45,670 --> 00:37:43,520
spacex team for another successful

833
00:37:49,670 --> 00:37:45,680
landing for those keeping track this is

834
00:37:51,750 --> 00:37:49,680
first stage recovery number 46.

835
00:37:53,510 --> 00:37:51,760
back to our primary mission the second

836
00:37:55,750 --> 00:37:53,520
stage is still continuing its journey

837
00:37:57,670 --> 00:37:55,760
into its desired orbit we should be here

838
00:37:59,330 --> 00:37:57,680

in college for second engine cutoff very

839
00:38:14,150 --> 00:37:59,340
shortly here

840
00:38:20,870 --> 00:38:19,109
and good second engine cut cut off

841
00:38:29,349 --> 00:38:20,880
now we're waiting for callouts of a good

842
00:38:33,750 --> 00:38:31,349
it sounds like we do indeed have a good

843
00:38:36,790 --> 00:38:33,760
orbit up next is deployment of the

844
00:38:38,310 --> 00:38:36,800
dragon from that second stage

845
00:38:40,069 --> 00:38:38,320
when dragon separates from the second

846
00:38:41,829 --> 00:38:40,079
stage we're gonna get a glimpse inside

847
00:38:43,510 --> 00:38:41,839
of dragon's trunk

848
00:38:45,670 --> 00:38:43,520
dragon carries two types of cargo

849
00:38:48,310 --> 00:38:45,680
pressurized cargo inside of the capsule

850
00:38:50,069 --> 00:38:48,320
and unpressurized cargo in its trunk

851
00:38:51,670 --> 00:38:50,079
on the outside of dragon's trunk are two

852
00:38:53,750 --> 00:38:51,680
protective faring for dragon solar

853
00:38:55,750 --> 00:38:53,760
arrays the rays produce more than five

854
00:38:57,910 --> 00:38:55,760
kilowatts of power and help recharge

855
00:39:01,670 --> 00:38:57,920
dragon on its mission

856
00:39:03,670 --> 00:39:01,680
at this point we are about

857
00:39:05,990 --> 00:39:03,680
20 seconds 10 or 20 seconds away from

858
00:39:13,430 --> 00:39:06,000
dragon separation so let's listen for

859
00:39:19,109 --> 00:39:16,310
and there it is successful deployment of

860
00:39:20,870 --> 00:39:19,119
the dragon spacecraft uh there is a view

861
00:39:23,589 --> 00:39:20,880
inside the unpressurized section of

862
00:39:25,109 --> 00:39:23,599
cargo of dragon's trunk with dragon

863
00:39:27,109 --> 00:39:25,119

deployed the next major milestone will

864
00:39:28,310 --> 00:39:27,119
be deployment of the solar rays as

865
00:39:30,069 --> 00:39:28,320
dragon makes its way to the

866
00:39:31,829 --> 00:39:30,079
international space station now let's

867
00:39:35,510 --> 00:39:31,839
pass it off to dan for coverage of the

868
00:39:39,670 --> 00:39:37,910
hey thank you very much andy great to

869
00:39:41,670 --> 00:39:39,680
see dragon in orbit really cool as

870
00:39:43,670 --> 00:39:41,680
always to see that first stage touch

871
00:39:45,510 --> 00:39:43,680
back down on the drone ship so as he

872
00:39:47,270 --> 00:39:45,520
mentioned dragon now flying free you're

873
00:39:48,950 --> 00:39:47,280
actually getting a really cool view

874
00:39:50,950 --> 00:39:48,960
inside the trunk of dragon where there's

875
00:39:52,630 --> 00:39:50,960
two external payloads these are payloads

876
00:39:54,790 --> 00:39:52,640
that are already exposed to the vacuum

877
00:39:56,710 --> 00:39:54,800
of space one of those the larger one is

878
00:39:58,310 --> 00:39:56,720
that hi-sui that's the hyperspectral

879
00:39:59,829 --> 00:39:58,320
imager from the japanese government

880
00:40:01,349 --> 00:39:59,839
that's going to be installed the other

881
00:40:03,430 --> 00:40:01,359
one's actually a spare battery we've

882
00:40:04,950 --> 00:40:03,440
been doing a bunch of battery upgrades

883
00:40:06,710 --> 00:40:04,960
on the international space station

884
00:40:09,670 --> 00:40:06,720
switching from older nickel hydrogen

885
00:40:11,270 --> 00:40:09,680
batteries to new lithium-ion ones

886
00:40:12,630 --> 00:40:11,280
and we are going to be standing by for a

887
00:40:14,710 --> 00:40:12,640
couple of minutes until we see those

888
00:40:17,349 --> 00:40:14,720

solar arrays deploy you'll see them

889
00:40:18,950 --> 00:40:17,359
unfurl from the sides of the dragon

890
00:40:21,430 --> 00:40:18,960
trunk it'll eventually give dragon a

891
00:40:22,470 --> 00:40:21,440
wingspan of about 50 feet a little more

892
00:40:24,390 --> 00:40:22,480
than that

893
00:40:25,829 --> 00:40:24,400
and this is actually one of the last few

894
00:40:28,630 --> 00:40:25,839
times you're going to see these solar

895
00:40:30,550 --> 00:40:28,640
array deploys on a dragon spacecraft

896
00:40:33,190 --> 00:40:30,560
as they are deploying

897
00:40:35,510 --> 00:40:33,200
uh there are some additional moving

898
00:40:37,190 --> 00:40:35,520
parts in them as compared to the new uh

899
00:40:39,190 --> 00:40:37,200
dragon design and the crew dragon where

900
00:40:41,510 --> 00:40:39,200
those solar cells are actually wrapped

901
00:40:43,750 --> 00:40:41,520
around the trunk itself that does cut

902
00:40:45,190 --> 00:40:43,760
down on a few moving parts some of the

903
00:40:47,190 --> 00:40:45,200
things that the engineers have to check

904
00:40:49,430 --> 00:40:47,200
out all the screws bolts

905
00:40:51,030 --> 00:40:49,440
and things like that and also the lock

906
00:40:52,950 --> 00:40:51,040
nuts just making sure everything that's

907
00:40:56,309 --> 00:40:52,960
in place will actually be integrated

908
00:40:58,069 --> 00:40:56,319
into the trunk itself for those future

909
00:41:00,069 --> 00:40:58,079
dragon missions and they're going to be

910
00:41:01,990 --> 00:41:00,079
switching over to that dragon type once

911
00:41:04,630 --> 00:41:02,000
they start their crs2 contract

912
00:41:09,190 --> 00:41:04,640
deliveries which is slated for

913
00:41:11,030 --> 00:41:09,200

crs crs21 so just two missions from now

914
00:41:12,630 --> 00:41:11,040
but again still standing by for solar

915
00:41:13,910 --> 00:41:12,640
array deploy we've been hearing some

916
00:41:15,270 --> 00:41:13,920
updates from the visiting vehicle

917
00:41:17,589 --> 00:41:15,280
officer here in mission control

918
00:41:20,230 --> 00:41:17,599
everything so far has looked great with

919
00:41:22,230 --> 00:41:20,240
this dragon so far everything nominal as

920
00:41:24,150 --> 00:41:22,240
joshua's explaining just meaning normal

921
00:41:25,670 --> 00:41:24,160
by the book on plan

922
00:41:26,870 --> 00:41:25,680
with the trajectory and everything so

923
00:41:28,390 --> 00:41:26,880
far this is actually a view of those

924
00:41:52,550 --> 00:41:28,400
solar race we'll start to see those

925
00:42:00,829 --> 00:41:54,710
we did get some audio confirmation that

926
00:42:05,109 --> 00:42:03,510
begun dragon's propulsive system is

927
00:42:18,309 --> 00:42:05,119
successfully primed and all thrusters

928
00:42:24,630 --> 00:42:20,470
and there we go now getting a view of

929
00:42:29,589 --> 00:42:27,190
again one on each side of dragon's trunk

930
00:42:31,190 --> 00:42:29,599
giving a wingspan of about 54 feet once

931
00:42:32,870 --> 00:42:31,200
fully deployed

932
00:42:34,870 --> 00:42:32,880
providing all the electrical power to

933
00:42:42,230 --> 00:42:34,880
dragon systems as it makes its chase

934
00:42:45,829 --> 00:42:43,750
and everything looking smooth we'll wait

935
00:42:54,710 --> 00:42:45,839
for some audio confirmation that the

936
00:42:54,720 --> 00:43:20,309
let's take a lot of signal new hampshire

937
00:43:24,470 --> 00:43:22,550
we are seeing on video both sets of

938
00:43:30,870 --> 00:43:24,480

solar arrays deployed we're again just

939
00:43:35,030 --> 00:43:33,430
and we just now heard it the solar

940
00:43:37,190 --> 00:43:35,040
arrays have been deployed successfully

941
00:43:40,309 --> 00:43:37,200
the propulsion system on dragon being

942
00:43:42,069 --> 00:43:40,319
primed for some initial firings again

943
00:43:44,550 --> 00:43:42,079
dragon's gonna be gradually raising its

944
00:43:46,550 --> 00:43:44,560
orbit over the next two days two and a

945
00:43:52,470 --> 00:43:46,560
half days until it arrives at the

946
00:45:35,589 --> 00:43:54,230
dragon solar arrays are successfully

947
00:45:39,750 --> 00:45:37,750
all right so again dragon in orbit great

948
00:45:41,270 --> 00:45:39,760
to see another spacecraft on its way to

949
00:45:43,349 --> 00:45:41,280
the international space station as

950
00:45:45,349 --> 00:45:43,359
always back here in mission control

951
00:45:47,030 --> 00:45:45,359
houston i'm now joined by kenny todd

952
00:45:48,950 --> 00:45:47,040
he's the space station operations

953
00:45:51,190 --> 00:45:48,960
integration manager kenny was a great

954
00:45:53,030 --> 00:45:51,200
launch today how's the team feeling with

955
00:45:54,790 --> 00:45:53,040
what they saw so far

956
00:45:55,990 --> 00:45:54,800
well it's uh it's always great when we

957
00:45:57,990 --> 00:45:56,000
can get a new vehicle on the way to

958
00:46:00,390 --> 00:45:58,000
space station so we're very excited i'm

959
00:46:01,510 --> 00:46:00,400
looking forward to uh getting getting

960
00:46:02,309 --> 00:46:01,520
the dragon on board here in a couple

961
00:46:03,670 --> 00:46:02,319
days

962
00:46:05,190 --> 00:46:03,680
and so what's it going to look like for

963
00:46:06,710 --> 00:46:05,200

the crew now the dragon's on its way

964
00:46:08,230 --> 00:46:06,720
what's the schedule kind of looking like

965
00:46:10,950 --> 00:46:08,240
for the crew with coming days coming

966
00:46:12,790 --> 00:46:10,960
weeks now for them sure this really this

967
00:46:15,349 --> 00:46:12,800
really does kind of lay our path forward

968
00:46:17,910 --> 00:46:15,359
here through through the end of december

969
00:46:19,990 --> 00:46:17,920
on into the first uh first week of of

970
00:46:21,750 --> 00:46:20,000
january now uh an incredible amount of

971
00:46:23,270 --> 00:46:21,760
science coming up on board over five

972
00:46:25,510 --> 00:46:23,280
thousand pounds of new hardware coming

973
00:46:26,710 --> 00:46:25,520
on board and so so the crew over the

974
00:46:28,150 --> 00:46:26,720
next couple of days will be getting

975
00:46:30,550 --> 00:46:28,160
ready they'll finish out their training

976
00:46:32,309 --> 00:46:30,560
for uh for the um for being able to do

977
00:46:33,990 --> 00:46:32,319
the capture and and the grapple and

978
00:46:35,750 --> 00:46:34,000
getting getting the dragon birth and

979
00:46:37,829 --> 00:46:35,760
then after that we'll we'll be opening

980
00:46:39,430 --> 00:46:37,839
the hatch shortly thereafter we've got

981
00:46:41,589 --> 00:46:39,440
some some science that we need to get

982
00:46:42,550 --> 00:46:41,599
across the hatch and get up and up and

983
00:46:43,910 --> 00:46:42,560
running

984
00:46:45,910 --> 00:46:43,920
so that's that's gonna be the first

985
00:46:47,190 --> 00:46:45,920
couple of days here when we get going

986
00:46:49,030 --> 00:46:47,200
and right now it's scheduled to get

987
00:46:51,190 --> 00:46:49,040
there on sunday correct

988
00:46:53,190 --> 00:46:51,200

correct we'll uh uh we have a typical

989
00:46:55,270 --> 00:46:53,200
time usually around five or so in the

990
00:46:57,109 --> 00:46:55,280
morning about the time we we do the

991
00:46:59,670 --> 00:46:57,119
capture operation that's a standard

992
00:47:01,990 --> 00:46:59,680
standard time for a dragon capture uh

993
00:47:04,230 --> 00:47:02,000
usually by mid morning we'll have it uh

994
00:47:05,910 --> 00:47:04,240
birth and depending on how things have

995
00:47:07,510 --> 00:47:05,920
gone during the during the day for the

996
00:47:09,030 --> 00:47:07,520
crew we'll either get the hatch open or

997
00:47:10,950 --> 00:47:09,040
we'll wait till the to the following day

998
00:47:13,030 --> 00:47:10,960
and start with a clean fresh day and get

999
00:47:14,470 --> 00:47:13,040
in and get going on the science all

1000
00:47:16,150 --> 00:47:14,480
right thank you kenny obviously this

1001
00:47:17,750 --> 00:47:16,160
team going to be very involved with the

1002
00:47:19,109 --> 00:47:17,760
spacex flight controllers out in

1003
00:47:21,109 --> 00:47:19,119
hawthorne over the next couple of days

1004
00:47:22,549 --> 00:47:21,119
as dragon makes its way there and we're

1005
00:47:24,390 --> 00:47:22,559
going to continue all this live coverage

1006
00:47:26,150 --> 00:47:24,400
once dragon does arrive so be sure to

1007
00:47:27,990 --> 00:47:26,160
wake up really early on sunday morning

1008
00:47:29,510 --> 00:47:28,000
and join us as we get ready to bring one

1009
00:47:31,190 --> 00:47:29,520
more vehicle to the international space

1010
00:47:32,950 --> 00:47:31,200
station with that though that'll do it

1011
00:47:34,790 --> 00:47:32,960
for us here from houston send it back

1012
00:47:36,829 --> 00:47:34,800
down to ksc maybe get you some more

1013
00:47:38,950 --> 00:47:36,839

launch replays back over to you

1014
00:47:41,510 --> 00:47:38,960
jennifer thanks dan

1015
00:47:42,870 --> 00:47:41,520
joining us now is spacex's andy tran

1016
00:47:46,150 --> 00:47:42,880
andy can you tell us a little bit about

1017
00:47:50,309 --> 00:47:48,790
yeah sure thing thanks jennifer we had a

1018
00:47:52,549 --> 00:47:50,319
beautiful launch off space launch

1019
00:47:53,990 --> 00:47:52,559
complex 40 today this was our 20th

1020
00:47:55,430 --> 00:47:54,000
mission to the space station and our

1021
00:47:57,990 --> 00:47:55,440
eighth launch with a flight proven

1022
00:47:59,750 --> 00:47:58,000
dragon i can confirm now that dragon is

1023
00:48:02,230 --> 00:47:59,760
in good orbit the solar arrays have

1024
00:48:04,390 --> 00:48:02,240
deployed on time and then the guidance

1025
00:48:06,630 --> 00:48:04,400
navigation control bay door should be

1026
00:48:07,829 --> 00:48:06,640
opening later today

1027
00:48:09,589 --> 00:48:07,839
dragon is on its way to the

1028
00:48:11,270 --> 00:48:09,599
international space station and on track

1029
00:48:14,069 --> 00:48:11,280
for capture on december 8th at

1030
00:48:16,470 --> 00:48:14,079
approximately 3 a.m pacific time or 11

1031
00:48:18,230 --> 00:48:16,480
a.m coordinated universal time

1032
00:48:19,670 --> 00:48:18,240
after birthing the astronauts aboard the

1033
00:48:22,470 --> 00:48:19,680
international space station will unload

1034
00:48:24,549 --> 00:48:22,480
about 5 700 pounds of crew supplies and

1035
00:48:26,150 --> 00:48:24,559
payloads dragon will then return to

1036
00:48:27,670 --> 00:48:26,160
earth after about a month at the

1037
00:48:29,270 --> 00:48:27,680
orbiting laboratory

1038
00:48:31,670 --> 00:48:29,280

all around it's been a successful

1039
00:48:33,670 --> 00:48:31,680
mission so far i want to take this time

1040
00:48:35,270 --> 00:48:33,680
to thank our friends at nasa the air

1041
00:48:37,270 --> 00:48:35,280
force the federal aviation

1042
00:48:39,030 --> 00:48:37,280
administration and all of our customers

1043
00:48:42,069 --> 00:48:39,040
for their support and hard work to

1044
00:48:43,670 --> 00:48:42,079
ensure today's launch was a success

1045
00:48:45,670 --> 00:48:43,680
back to you jennifer

1046
00:48:47,910 --> 00:48:45,680
thanks sandy and that's going to wrap up

1047
00:48:49,750 --> 00:48:47,920
our coverage for more information visit

1048
00:48:54,630 --> 00:48:49,760
nasa.gov

1049
00:48:56,230 --> 00:48:54,640
spacex i'm jennifer wolfinger and from

1050
00:48:57,910 --> 00:48:56,240
everyone here at nasa's kennedy space

1051
00:48:59,430 --> 00:48:57,920
center thank you for joining us for the

1052
00:49:01,910 --> 00:48:59,440
successful launch and landing of

1053
00:49:03,750 --> 00:49:01,920
spacex's falcon 9 rocket we leave you

1054
00:49:10,309 --> 00:49:03,760
now with another look at today's launch

1055
00:49:13,190 --> 00:49:11,270
10

1056
00:49:14,230 --> 00:49:13,200
9 9 8 8

1057
00:49:15,270 --> 00:49:14,240
7

1058
00:49:16,309 --> 00:49:15,280
6

1059
00:49:17,270 --> 00:49:16,319
five

1060
00:49:18,230 --> 00:49:17,280
four

1061
00:49:19,190 --> 00:49:18,240
three

1062
00:49:20,069 --> 00:49:19,200
two

1063
00:49:21,349 --> 00:49:20,079

one

1064
00:49:24,150 --> 00:49:21,359
zero

1065
00:49:26,549 --> 00:49:24,160
independence ignition liftoff of the

1066
00:49:28,069 --> 00:49:26,559
falcon 9 and cargo dragon transporting

1067
00:49:33,420 --> 00:49:28,079
critical research to enable living and

1068
00:50:24,150 --> 00:50:07,740
[Music]

1069
00:50:24,160 --> 00:50:48,990
vehicle supersonic