1
00:00:06,630 --> 00:00:01,500
foreign

2
00:00:17,480 --> 00:00:08,700
[Applause]

3
00:00:34,040 --> 00:00:27,450
[Music]

4
00:00:53,950 --> 00:00:34,050
[Applause]

5
00:00:53,960 --> 00:06:24,290
thank you

6
00:06:24,300 --> 00:06:34,270
[Music]

7
00:06:34,280 --> 00:06:45,230
Dragon SpaceX go for launch

8
00:06:59,809 --> 00:06:52,760
[Music]

9
00:07:05,689 --> 00:07:02,450
you are looking live at launch complex

10
00:07:07,850 --> 00:07:05,699
39a at Kennedy Space Center in less than

11
00:07:10,670 --> 00:07:07,860
half an hour this Falcon 9 rocket will

12
00:07:13,309 --> 00:07:10,680
lift off carrying the 27th Commercial

13
00:07:15,710 --> 00:07:13,319

resupply Services Mission from both NASA

14
00:07:17,150 --> 00:07:15,720
and SpaceX to the International Space

15
00:07:19,189 --> 00:07:17,160
Station

16
00:07:22,909 --> 00:07:19,199
good evening and welcome to live

17
00:07:25,490 --> 00:07:22,919
coverage of the crs-27 launch I'm NASA's

18
00:07:27,770 --> 00:07:25,500
Jasmine Hopkins feeling of the Falcon 9

19
00:07:30,110 --> 00:07:27,780
began about 10 minutes ago and we're

20
00:07:33,830 --> 00:07:30,120
counting down to an instantaneous launch

21
00:07:37,129 --> 00:07:33,840
at 8 30 p.m eastern time this Mission

22
00:07:39,770 --> 00:07:37,139
will deliver more than 6 000 pounds of

23
00:07:41,809 --> 00:07:39,780
science supplies and equipment to the

24
00:07:44,089 --> 00:07:41,819
space station and these resupply

25
00:07:45,890 --> 00:07:44,099
missions help NASA and our partners

26
00:07:48,350 --> 00:07:45,900
continue research that could better our

27
00:07:50,689 --> 00:07:48,360
life right here on Earth and help us as

28
00:07:52,730 --> 00:07:50,699
we explore deep space

29
00:07:54,650 --> 00:07:52,740
let's go now to SpaceX headquarters in

30
00:07:56,570 --> 00:07:54,660
Hawthorne California where Zachary

31
00:07:58,490 --> 00:07:56,580
Lupine is standing by to tell us more

32
00:08:02,809 --> 00:07:58,500
about the vehicle supporting today's

33
00:08:06,950 --> 00:08:05,150
thanks Jasmine hi everyone my name is

34
00:08:09,770 --> 00:08:06,960
Zachary Lupine and I'm an avionics

35
00:08:11,570 --> 00:08:09,780
reliability engineer here at SpaceX it's

36
00:08:13,610 --> 00:08:11,580
great to be covering today's mission in

37
00:08:15,529 --> 00:08:13,620
partnership with NASA

38
00:08:17,570 --> 00:08:15,539

for those of you following along today's

39
00:08:19,969 --> 00:08:17,580
today marks spacex's second dragon

40
00:08:23,570 --> 00:08:19,979
mission this month 17th launch this year

41
00:08:25,490 --> 00:08:23,580
and 216th Mission overall and on your

42
00:08:27,230 --> 00:08:25,500
screen is a live view of spacex's

43
00:08:29,809 --> 00:08:27,240
two-stage Falcon 9 rocket with our

44
00:08:31,730 --> 00:08:29,819
Dragon spacecraft at the very top as a

45
00:08:33,469 --> 00:08:31,740
note dragon is one of the few vehicles

46
00:08:35,269 --> 00:08:33,479
that can deliver significant cargo to

47
00:08:37,130 --> 00:08:35,279
the space station and the only vehicle

48
00:08:39,829 --> 00:08:37,140
that can actually deliver cargo from it

49
00:08:42,230 --> 00:08:39,839
below dragon is our Falcon 9 vehicle

50
00:08:44,329 --> 00:08:42,240
which is actually two rockets in one the

51
00:08:46,070 --> 00:08:44,339
lower part also the largest part of the

52
00:08:48,050 --> 00:08:46,080
rocket is called the first stage and

53
00:08:50,750 --> 00:08:48,060
takes up about two-thirds of the stack

54
00:08:52,130 --> 00:08:50,760
it has nine Merlin 1D engines which

55
00:08:54,050 --> 00:08:52,140
accelerate the vehicle through the

56
00:08:55,610 --> 00:08:54,060
Earth's atmosphere and into various

57
00:08:57,889 --> 00:08:55,620
orbits in space

58
00:08:59,930 --> 00:08:57,899
the smaller stage above the first stage

59
00:09:01,370 --> 00:08:59,940
and the black interstage is called the

60
00:09:03,110 --> 00:09:01,380
second stage

61
00:09:05,030 --> 00:09:03,120
now the two stages will separate about

62
00:09:06,889 --> 00:09:05,040
two and a half minutes into flights and

63
00:09:09,050 --> 00:09:06,899

then the second stage will ignite its

64
00:09:10,910 --> 00:09:09,060
single Merlin vacuum engine which is the

65
00:09:13,310 --> 00:09:10,920
10th engine on the rocket to carry

66
00:09:15,410 --> 00:09:13,320
Dragon to its desired orbit

67
00:09:16,970 --> 00:09:15,420
Falcon 9 and dragon were both designed

68
00:09:18,530 --> 00:09:16,980
with reflight in mind and the vehicle

69
00:09:20,269 --> 00:09:18,540
Hardware is built support multiple

70
00:09:21,290 --> 00:09:20,279
missions with minimal refurbishment

71
00:09:23,449 --> 00:09:21,300
needed

72
00:09:25,610 --> 00:09:23,459
today's dragon is flying for its third

73
00:09:27,710 --> 00:09:25,620
time and the Falcon 9 first stage is

74
00:09:29,509 --> 00:09:27,720
flying for its seventh time and we plan

75
00:09:32,030 --> 00:09:29,519
to recover and fly both the vehicle and

76
00:09:35,810 --> 00:09:32,040
the spacecraft again in the future

77
00:09:38,449 --> 00:09:35,820
so far we've reflown 149 first stages

78
00:09:39,829 --> 00:09:38,459
including Falcon 9 and Falcon heavy and

79
00:09:41,389 --> 00:09:39,839
we're planning to recover this booster

80
00:09:43,070 --> 00:09:41,399
on our drone ship a shortfall of

81
00:09:44,810 --> 00:09:43,080
Gravitas which is currently stationed

82
00:09:45,590 --> 00:09:44,820
off the coast of Florida in the Atlantic

83
00:09:49,190 --> 00:09:45,600
Ocean

84
00:09:52,190 --> 00:09:49,200
it's successful it will Mark the 178th

85
00:09:54,710 --> 00:09:52,200
recovery of an orbital class rocket

86
00:09:56,150 --> 00:09:54,720
and lastly we wanted to give a shout out

87
00:09:58,190 --> 00:09:56,160
to the recovery team supporting today's

88
00:09:59,810 --> 00:09:58,200

mission in an industry that has

89
00:10:01,670 --> 00:09:59,820
historically been male dominated today's

90
00:10:03,949 --> 00:10:01,680
recovery operations are being managed by

91
00:10:06,110 --> 00:10:03,959
an all-female crew in fact we believe it

92
00:10:08,030 --> 00:10:06,120
to be the first all-female crew for any

93
00:10:09,350 --> 00:10:08,040
kind of operation like this and if it's

94
00:10:11,030 --> 00:10:09,360
not the first then we're in great

95
00:10:11,990 --> 00:10:11,040
company and you can see shots of the

96
00:10:14,030 --> 00:10:12,000
crew there

97
00:10:16,009 --> 00:10:14,040
our recovery teams are responsible for

98
00:10:17,509 --> 00:10:16,019
operating the recovery vessels securing

99
00:10:18,650 --> 00:10:17,519
and recovering the booster and

100
00:10:20,570 --> 00:10:18,660
everything else required to make those

101
00:10:22,430 --> 00:10:20,580
operations possible and on your screen

102
00:10:23,990 --> 00:10:22,440
right now is video of the crew breaking

103
00:10:26,329 --> 00:10:24,000
toe between our drone ship and our

104
00:10:28,190 --> 00:10:26,339
recovery vessel Doug earlier today this

105
00:10:30,110 --> 00:10:28,200
operation involves disconnecting the tow

106
00:10:32,090 --> 00:10:30,120
wire used to tow the Drone ship from

107
00:10:34,430 --> 00:10:32,100
Port onto location at the Landing Zone

108
00:10:36,110 --> 00:10:34,440
we are in great hands with today's crew

109
00:10:37,250 --> 00:10:36,120
and we wish the team a very successful

110
00:10:39,470 --> 00:10:37,260
mission

111
00:10:41,750 --> 00:10:39,480
and for now I'll turn it back over to

112
00:10:44,389 --> 00:10:41,760
Jasmine at KSC

113
00:10:46,670 --> 00:10:44,399

thank you Zach in addition to SpaceX in

114
00:10:48,650 --> 00:10:46,680
California NASA teams both here in

115
00:10:50,690 --> 00:10:48,660
Florida and Texas are monitoring today's

116
00:10:52,850 --> 00:10:50,700
launch you'll hear from Dan Hewitt

117
00:10:54,590 --> 00:10:52,860
inside Mission Control in Houston but

118
00:10:56,329 --> 00:10:54,600
first let's check in with NASA's Megan

119
00:10:59,030 --> 00:10:56,339
Cruz who's following along with the

120
00:11:00,530 --> 00:10:59,040
launch Team here at Kennedy Megan

121
00:11:03,170 --> 00:11:00,540
hey thank you Jasmine and yes welcome

122
00:11:05,329 --> 00:11:03,180
everyone into Hangar AE at nearby Cape

123
00:11:07,370 --> 00:11:05,339
Canaveral space force station the U.S

124
00:11:08,990 --> 00:11:07,380
space force monitors the range for us

125
00:11:11,449 --> 00:11:09,000
you know making sure that it's safe to

126
00:11:13,190 --> 00:11:11,459
fly where we plan to fly as well as the

127
00:11:16,009 --> 00:11:13,200
weather which is looking really great

128
00:11:19,009 --> 00:11:16,019
for us tonight so right now we are at 90

129
00:11:21,470 --> 00:11:19,019
percent go launch weather officer arlena

130
00:11:23,690 --> 00:11:21,480
Moses listing the thick Cloud layer rule

131
00:11:25,790 --> 00:11:23,700
as just a small concern basically she's

132
00:11:27,829 --> 00:11:25,800
monitoring some high clouds in the area

133
00:11:29,750 --> 00:11:27,839
that's coming in because of an upper

134
00:11:31,550 --> 00:11:29,760
level disturbance in the Gulf but really

135
00:11:33,350 --> 00:11:31,560
she doesn't think it's really much to

136
00:11:36,530 --> 00:11:33,360
think about now back out to the launch

137
00:11:38,569 --> 00:11:36,540
pad Launchpad 39a right now rp1 or

138
00:11:40,250 --> 00:11:38,579

rocket grade kerosene is being loaded

139
00:11:43,250 --> 00:11:40,260
into the first stage already more than

140
00:11:45,170 --> 00:11:43,260
85 percent full liquid oxygen is also

141
00:11:47,750 --> 00:11:45,180
going into the first stage more than 50

142
00:11:50,210 --> 00:11:47,760
already and should begin on the second

143
00:11:51,590 --> 00:11:50,220
stage momentarily those white clouds you

144
00:11:54,949 --> 00:11:51,600
see that are billowing off that's

145
00:11:57,590 --> 00:11:54,959
because uh SpaceX is venting off some of

146
00:12:00,170 --> 00:11:57,600
that liquid oxygen and that happens when

147
00:12:03,949 --> 00:12:00,180
the liquid oxygen hits the humid Florida

148
00:12:09,050 --> 00:12:07,130
tonight is at 8 30 and 42 seconds

149
00:12:10,370 --> 00:12:09,060
eastern time if we want to dock of the

150
00:12:12,110 --> 00:12:10,380
International Space Station Thursday

151
00:12:13,850 --> 00:12:12,120
morning for more on that let's head on

152
00:12:18,829 --> 00:12:13,860
over to Dan Hewitt inside Mission

153
00:12:21,530 --> 00:12:20,210
hey thank you so much Megan and

154
00:12:23,449 --> 00:12:21,540
everybody Welcome inside of Mission

155
00:12:25,610 --> 00:12:23,459
Control Houston at NASA's Johnson Space

156
00:12:27,110 --> 00:12:25,620
Center I'm NASA's Dan Hewitt it's pretty

157
00:12:29,150 --> 00:12:27,120
quiet in the room right now the orbit 3

158
00:12:31,550 --> 00:12:29,160
team is on Console led by Ace flight

159
00:12:33,350 --> 00:12:31,560
director Allison Bollinger the crew is

160
00:12:35,210 --> 00:12:33,360
asleep on board the space station right

161
00:12:37,190 --> 00:12:35,220
now and one way they wake up tomorrow

162
00:12:38,750 --> 00:12:37,200
we're hoping they've got a dragon on

163
00:12:41,509 --> 00:12:38,760

their way towards the space station it's

164
00:12:43,250 --> 00:12:41,519
going to be about 35 hours from launch

165
00:12:44,810 --> 00:12:43,260
until they dock on Thursday morning

166
00:12:46,910 --> 00:12:44,820
they're going to be docking to the

167
00:12:48,530 --> 00:12:46,920
forward port on node two that's the

168
00:12:50,329 --> 00:12:48,540
harmony module on the station that one

169
00:12:52,490 --> 00:12:50,339
was just vacated by the crew 5

170
00:12:55,009 --> 00:12:52,500
astronauts who left just a couple of

171
00:12:56,150 --> 00:12:55,019
days ago once they're able to dock

172
00:12:58,550 --> 00:12:56,160
that's going to kick off a really

173
00:13:00,530 --> 00:12:58,560
Furious month of Science and cargo

174
00:13:02,629 --> 00:13:00,540
operations for the crew they're going to

175
00:13:04,550 --> 00:13:02,639
have to work to execute a lot of these

176
00:13:06,230 --> 00:13:04,560
experiments while dragon is still

177
00:13:08,329 --> 00:13:06,240
attached before they load it back up and

178
00:13:09,650 --> 00:13:08,339
send it home because again Dragon pretty

179
00:13:12,050 --> 00:13:09,660
much the only way we're getting large

180
00:13:14,569 --> 00:13:12,060
amounts of cargo back to Earth returning

181
00:13:15,829 --> 00:13:14,579
those experiments for analysis back on

182
00:13:17,629 --> 00:13:15,839
the ground but everything's looking

183
00:13:19,790 --> 00:13:17,639
great on the station side we'll have

184
00:13:21,410 --> 00:13:19,800
some configuration work to do do right

185
00:13:23,930 --> 00:13:21,420
before Dragon shows up that everything

186
00:13:25,970 --> 00:13:23,940
looking good the team has given their go

187
00:13:27,769 --> 00:13:25,980
from Houston for launch and so we're

188
00:13:29,449 --> 00:13:27,779

looking good so let's get back to the

189
00:13:31,250 --> 00:13:29,459
countdown I'll send it over to Jasmine

190
00:13:33,110 --> 00:13:31,260
at the Kennedy Space Center

191
00:13:34,550 --> 00:13:33,120
thank you to both Dan and Megan for

192
00:13:36,650 --> 00:13:34,560
those updates it's great to hear we're

193
00:13:38,509 --> 00:13:36,660
looking good for tonight's launch we are

194
00:13:41,269 --> 00:13:38,519
now at about 18 minutes and Counting

195
00:13:42,590 --> 00:13:41,279
from list off of CRS 27 so let's get a

196
00:13:45,069 --> 00:13:42,600
closer look at some of the science

197
00:13:47,650 --> 00:13:45,079
flying on this mission

198
00:13:51,590 --> 00:13:47,660
why are we sending heart tissues

199
00:13:53,870 --> 00:13:51,600
biofilms and bacteria to space dozens of

200
00:13:55,910 --> 00:13:53,880
new experiments will soon arrive at the

201
00:13:58,550 --> 00:13:55,920
International Space Station for the

202
00:14:00,949 --> 00:13:58,560
benefit of humanity and future missions

203
00:14:04,490 --> 00:14:00,959
let's take a look at what's on board the

204
00:14:06,710 --> 00:14:04,500
27th cargo Mission from SpaceX 3D

205
00:14:08,930 --> 00:14:06,720
cultured cardiac muscle tissues are

206
00:14:10,910 --> 00:14:08,940
returning to microgravity to help

207
00:14:12,949 --> 00:14:10,920
develop new therapies for cardiac

208
00:14:15,949 --> 00:14:12,959
dysfunction on Earth

209
00:14:18,350 --> 00:14:15,959
radio tolerant organisms exposed to the

210
00:14:20,629 --> 00:14:18,360
space environment could reveal Clues to

211
00:14:23,990 --> 00:14:20,639
the survivability of these organisms in

212
00:14:26,449 --> 00:14:24,000
space and the origins of life on Earth

213
00:14:28,970 --> 00:14:26,459

researchers are sending heart organoids

214
00:14:31,490 --> 00:14:28,980
back to space to test drug combinations

215
00:14:34,670 --> 00:14:31,500
that may reduce microgravity induced

216
00:14:37,009 --> 00:14:34,680
changes in heart cell function

217
00:14:39,470 --> 00:14:37,019
a student manufactured project will

218
00:14:42,050 --> 00:14:39,480
provide an easier way for astronauts to

219
00:14:43,320 --> 00:14:42,060
position video and still cameras in the

220
00:14:44,509 --> 00:14:43,330
middle of a module

221
00:14:46,550 --> 00:14:44,519
[Music]

222
00:14:49,370 --> 00:14:46,560
astronauts will control liquids using

223
00:14:51,769 --> 00:14:49,380
capillary forces over a range of liquid

224
00:14:54,170 --> 00:14:51,779
viscosities to inform the design of more

225
00:14:55,250 --> 00:14:54,180
efficient carbon dioxide removal systems

226
00:14:57,290 --> 00:14:55,260
in space

227
00:14:59,930 --> 00:14:57,300
researchers continue to analyze

228
00:15:02,210 --> 00:14:59,940
bacterial biofilm formation and the

229
00:15:05,090 --> 00:15:02,220
antimicrobial properties of metal

230
00:15:07,129 --> 00:15:05,100
surfaces in microgravity these

231
00:15:09,290 --> 00:15:07,139
experiments join the hundreds of ongoing

232
00:15:13,129 --> 00:15:09,300
investigations aboard the orbiting

233
00:15:17,870 --> 00:15:15,290
that was just a brief look at some of

234
00:15:19,970 --> 00:15:17,880
the science on crs-27 so now let's take

235
00:15:21,829 --> 00:15:19,980
a deeper dive students from the

236
00:15:23,689 --> 00:15:21,839
University of Arkansas have a small

237
00:15:26,090 --> 00:15:23,699
satellite on board that could help us

238
00:15:28,490 --> 00:15:26,100

declutter space joining us now to talk

239
00:15:30,110 --> 00:15:28,500
more about it is Samuel Cano PhD student

240
00:15:31,970 --> 00:15:30,120
from the University of Arkansas welcome

241
00:15:34,009 --> 00:15:31,980
Sam yeah thanks for having me of course

242
00:15:35,569 --> 00:15:34,019
so Sam your team is working on something

243
00:15:38,090 --> 00:15:35,579
that can get rid of what we know as

244
00:15:39,769 --> 00:15:38,100
space junk how does it work yeah so

245
00:15:42,769 --> 00:15:39,779
nowadays the orbiting is just as

246
00:15:44,389 --> 00:15:42,779
important a mission concept as any so

247
00:15:46,790 --> 00:15:44,399
we're hoping to test the subsystem

248
00:15:48,230 --> 00:15:46,800
aboard arcsat 1 it's called the solid

249
00:15:52,850 --> 00:15:48,240
state inflatable balloon so I call it

250
00:15:54,470 --> 00:15:52,860
ssib and to put it you know simply at

251
00:15:57,710 --> 00:15:54,480
the mission's conclusion we'll activate

252
00:15:59,509 --> 00:15:57,720
this ssip board which has solid sodium

253
00:16:02,090 --> 00:15:59,519
azide inside of these Wells so we heat

254
00:16:04,310 --> 00:16:02,100
it up it releases nitrogen gas and fills

255
00:16:07,670 --> 00:16:04,320
a balloon and what that does is increase

256
00:16:09,590 --> 00:16:07,680
the drag of the spacecraft which in turn

257
00:16:11,930 --> 00:16:09,600
uh decreases the time it'll stay in

258
00:16:13,790 --> 00:16:11,940
orbit wow that's pretty complex salmon

259
00:16:16,970 --> 00:16:13,800
you guys are packing a lot of science

260
00:16:19,310 --> 00:16:16,980
into this tiny space for the cubesat so

261
00:16:21,290 --> 00:16:19,320
arcsat 1 is the first cubesat selected

262
00:16:23,389 --> 00:16:21,300
by the cubesat launch initiative from

263
00:16:25,250 --> 00:16:23,399

Arkansas and their goal is to get all 50

264
00:16:27,949 --> 00:16:25,260
states that's very exciting how do you

265
00:16:30,170 --> 00:16:27,959
feel being part of that first uh it's

266
00:16:31,490 --> 00:16:30,180
amazing I mean it's twofold so you know

267
00:16:34,129 --> 00:16:31,500
from a technical standpoint we have

268
00:16:35,990 --> 00:16:34,139
arcsat one tonight hopefully and arcsat

269
00:16:37,910 --> 00:16:36,000
2 in the next year and they're both

270
00:16:40,370 --> 00:16:37,920
technology demonstrators for arcsat 3

271
00:16:42,170 --> 00:16:40,380
and to explain that really simply I'll

272
00:16:44,449 --> 00:16:42,180
just say it's a two body spectrometer

273
00:16:46,069 --> 00:16:44,459
where we hope to maybe send a pair of

274
00:16:49,550 --> 00:16:46,079
these really small cubesats which is

275
00:16:51,230 --> 00:16:49,560
very cost effective to other planets and

276
00:16:53,449 --> 00:16:51,240
they will basically orbit information

277
00:16:55,490 --> 00:16:53,459
flights where one emits a laser one

278
00:16:57,530 --> 00:16:55,500
receives it and can create a more

279
00:16:59,689 --> 00:16:57,540
comprehensive map of the atmosphere of

280
00:17:02,210 --> 00:16:59,699
you know say Venus in a matter of weeks

281
00:17:04,010 --> 00:17:02,220
that's the idea wow and it's neat too to

282
00:17:06,169 --> 00:17:04,020
think that you kind of have a longevity

283
00:17:08,449 --> 00:17:06,179
experiment here with arcsat 1 going into

284
00:17:10,250 --> 00:17:08,459
two and three will you be working on on

285
00:17:11,929 --> 00:17:10,260
two and three as well of course yeah

286
00:17:14,210 --> 00:17:11,939
right as soon as I get back it's dark

287
00:17:15,530 --> 00:17:14,220
side two time fantastic so you instead

288
00:17:17,329 --> 00:17:15,540

of launching next year can you tell us a

289
00:17:19,549 --> 00:17:17,339
little bit more about how arcsat 1 is

290
00:17:22,370 --> 00:17:19,559
going to build up to arcsat 2. sure so

291
00:17:25,970 --> 00:17:22,380
almost all of the subsystems aboard Arc

292
00:17:27,110 --> 00:17:25,980
one are designed and tested in-house at

293
00:17:29,450 --> 00:17:27,120
the University of Arkansas so this is

294
00:17:30,830 --> 00:17:29,460
our real you know this is a big test a

295
00:17:33,350 --> 00:17:30,840
lot of the hardware we're able to use

296
00:17:35,090 --> 00:17:33,360
for arcsap2 arcsat 2 will be a little

297
00:17:37,730 --> 00:17:35,100
bit bigger but it'll build off of arcsat

298
00:17:39,590 --> 00:17:37,740
1 and it'll have thrust on board too so

299
00:17:41,330 --> 00:17:39,600
that's a new challenge for us but we're

300
00:17:42,770 --> 00:17:41,340
excited about it yes we're excited with

301
00:17:44,029 --> 00:17:42,780
YouTube and thanks so much for being

302
00:17:45,230 --> 00:17:44,039
here tonight thank you for having me of

303
00:17:47,029 --> 00:17:45,240
course best of luck to you and the team

304
00:17:48,770 --> 00:17:47,039
from Arkansas uh there's another

305
00:17:50,690 --> 00:17:48,780
student-led experiment on this Mission

306
00:17:54,230 --> 00:17:50,700
and it will help astronauts take better

307
00:17:55,669 --> 00:17:54,240
pictures in micro gravity a team of high

308
00:17:58,310 --> 00:17:55,679
school and middle school students worked

309
00:18:01,130 --> 00:17:58,320
with NASA's hunch program to create a

310
00:18:03,289 --> 00:18:01,140
ball clamp monopod and it's not your

311
00:18:05,270 --> 00:18:03,299
average selfie stick in this experiment

312
00:18:07,850 --> 00:18:05,280
a platform attaches to the space station

313
00:18:10,909 --> 00:18:07,860

handrail and is tested to hold a camera

314
00:18:12,770 --> 00:18:10,919
and track targets the temporary stable

315
00:18:17,450 --> 00:18:12,780
platform is expected to make capturing

316
00:18:20,510 --> 00:18:17,460
images much easier and faster

317
00:18:22,730 --> 00:18:20,520
all right now we are at about T minus 13

318
00:18:24,409 --> 00:18:22,740
minutes and Counting from liftoff of the

319
00:18:26,870 --> 00:18:24,419
27th Commercial resupply Services

320
00:18:29,270 --> 00:18:26,880
Mission from both NASA and SpaceX to the

321
00:18:30,890 --> 00:18:29,280
International Space Station so let's

322
00:18:33,409 --> 00:18:30,900
bring back Zach now to tell us more

323
00:18:38,570 --> 00:18:33,419
about dragonflight history and its

324
00:18:42,770 --> 00:18:41,029
thanks Jasmine as I mentioned previously

325
00:18:44,690 --> 00:18:42,780
the dragon supporting today's Mission

326
00:18:46,370 --> 00:18:44,700
will be embarking on its third flight

327
00:18:48,230 --> 00:18:46,380
and will be joining the cruise 6

328
00:18:50,810 --> 00:18:48,240
spacecraft already docked at the

329
00:18:53,210 --> 00:18:50,820
International Space Station and speaking

330
00:18:55,430 --> 00:18:53,220
of crew 6 crew 6 lifted off from the

331
00:18:57,350 --> 00:18:55,440
same launch pad just 12 days ago on

332
00:18:59,289 --> 00:18:57,360
March 2nd with NASA astronaut Stephen

333
00:19:02,570 --> 00:18:59,299
Bowen and Woody hoberg

334
00:19:05,029 --> 00:19:02,580
UAE astronaut Sultan al-nayadi and Roz

335
00:19:06,529 --> 00:19:05,039
Cosmos Cosmonaut Andre fed yayev

336
00:19:08,690 --> 00:19:06,539
arriving at the orbiting laboratory

337
00:19:10,549 --> 00:19:08,700
about 24 hours later

338
00:19:12,350 --> 00:19:10,559

upon arrival they were greeted by the

339
00:19:14,330 --> 00:19:12,360
crew 5 astronauts who have been living

340
00:20:12,289 --> 00:19:14,340
and working on station for almost six

341
00:20:16,610 --> 00:20:14,330
we are close to finding out which four

342
00:20:20,090 --> 00:20:16,620
astronauts will be among the first crew

343
00:20:21,890 --> 00:20:20,100
to lift off on the Artemis II Mission we

344
00:20:28,450 --> 00:20:21,900
have that update and More in our Artemis

345
00:20:33,830 --> 00:20:31,549
right now technicians at NASA's michoud

346
00:20:35,750 --> 00:20:33,840
assembly facility are hard at work on

347
00:20:38,630 --> 00:20:35,760
our space launch system rocket for

348
00:20:41,750 --> 00:20:38,640
Artemis 2. they moved the engine section

349
00:20:44,510 --> 00:20:41,760
to the bottom of the 212 foot tall core

350
00:20:46,850 --> 00:20:44,520
stage and next they'll add the rs-25

351
00:20:49,850 --> 00:20:46,860
engines which will help power our

352
00:20:51,710 --> 00:20:49,860
missions to the moon on April 3rd we'll

353
00:20:53,690 --> 00:20:51,720
find out which four astronauts will

354
00:20:56,930 --> 00:20:53,700
travel around the moon in the Orion

355
00:20:59,150 --> 00:20:56,940
spacecraft as part of Artemis 2. Artemis

356
00:21:02,510 --> 00:20:59,160
2 builds on the success of the uncrewed

357
00:21:04,310 --> 00:21:02,520
Artemis 1 flight test we documented its

358
00:21:06,650 --> 00:21:04,320
journey in our path to the pad series

359
00:21:09,000 --> 00:21:06,660
streaming right now on NASA's YouTube

360
00:21:14,390 --> 00:21:09,010
channel and on Hulu

361
00:21:19,789 --> 00:21:16,850
as you just heard the Artemis 2 crew

362
00:21:21,650 --> 00:21:19,799
will be announced on April 3rd at 11 A.M

363
00:21:24,409 --> 00:21:21,660

eastern time and you can watch that

364
00:21:26,270 --> 00:21:24,419
right here on NASA TV and on our social

365
00:21:28,310 --> 00:21:26,280
media channels

366
00:21:30,590 --> 00:21:28,320
our missions to the moon are setting us

367
00:21:32,870 --> 00:21:30,600
up for Mars and when we get there we

368
00:21:35,450 --> 00:21:32,880
don't want to bring any microorganisms

369
00:21:37,370 --> 00:21:35,460
with with us the European Space Agency

370
00:21:40,190 --> 00:21:37,380
will research how different bacteria

371
00:21:41,990 --> 00:21:40,200
form and grow on metal surfaces they'll

372
00:21:45,590 --> 00:21:42,000
be looking at how bacteria like staph

373
00:21:47,350 --> 00:21:45,600
form on steel copper and brass they want

374
00:21:49,850 --> 00:21:47,360
to know which metal has the best

375
00:21:52,250 --> 00:21:49,860
antibacterial properties and prior to

376
00:21:53,990 --> 00:21:52,260
this Mission scientists study biofilm on

377
00:21:56,029 --> 00:21:54,000
board the space station and looked for

378
00:21:57,770 --> 00:21:56,039
ways to protect astronaut health and

379
00:21:59,990 --> 00:21:57,780
safety while they're living in the

380
00:22:02,570 --> 00:22:00,000
orbiting Laboratory

381
00:22:04,970 --> 00:22:02,580
Additionally the japanese-based agency

382
00:22:07,730 --> 00:22:04,980
is trying to identify if any plants

383
00:22:10,610 --> 00:22:07,740
could survive and grow on the moon or

384
00:22:12,649 --> 00:22:10,620
even on Mars these seven samples of

385
00:22:14,390 --> 00:22:12,659
microbes you see here will be exposed to

386
00:22:16,549 --> 00:22:14,400
the space environment for up to six

387
00:22:18,770 --> 00:22:16,559
months then they'll come back to earth

388
00:22:20,990 --> 00:22:18,780

to see if the spores can survive and

389
00:22:25,190 --> 00:22:21,000
grow as well as their tolerance to UV

390
00:22:26,930 --> 00:22:25,200
light and conditions out in space

391
00:22:29,149 --> 00:22:26,940
well we know that the weightlessness of

392
00:22:31,789 --> 00:22:29,159
space can have a significant effect on

393
00:22:33,649 --> 00:22:31,799
our bodies but especially on our hearts

394
00:22:35,930 --> 00:22:33,659
joining us now is a member of the

395
00:22:37,789 --> 00:22:35,940
Cardinal heart 2.0 team from Stanford

396
00:22:39,230 --> 00:22:37,799
University Joseph Wu thank you so much

397
00:22:40,789 --> 00:22:39,240
for being here thank you so much for

398
00:22:42,230 --> 00:22:40,799
inviting me Jasmine of course we're

399
00:22:43,789 --> 00:22:42,240
really excited to have you here you guys

400
00:22:45,590 --> 00:22:43,799
are doing some very interesting research

401
00:22:47,390 --> 00:22:45,600
with Cardinal heart and you started with

402
00:22:49,730 --> 00:22:47,400
the first uh experiment but now you're

403
00:22:51,049 --> 00:22:49,740
on the 2.0 version so can you tell us

404
00:22:53,090 --> 00:22:51,059
what are you looking at in Cardinal

405
00:22:54,950 --> 00:22:53,100
heart 2.0 yeah that's right so we're

406
00:22:56,570 --> 00:22:54,960
very much interested in understanding

407
00:22:59,210 --> 00:22:56,580
the effect of microgravity on the

408
00:23:01,149 --> 00:22:59,220
cardiovascular system and as you may

409
00:23:05,090 --> 00:23:01,159
recall back in

410
00:23:08,690 --> 00:23:05,100
2016 we did our first experiment which

411
00:23:10,669 --> 00:23:08,700
was we sent a human induced pluripotents

412
00:23:12,350 --> 00:23:10,679
themselves that have been differentiated

413
00:23:14,630 --> 00:23:12,360

into cardiomyocytes feeding

414
00:23:16,669 --> 00:23:14,640
cardiomyocytes and we generated this

415
00:23:18,890 --> 00:23:16,679
from three different individuals we sent

416
00:23:22,149 --> 00:23:18,900
it up to space and we found there were

417
00:23:25,130 --> 00:23:22,159
changes to these to these 2D human

418
00:23:29,029 --> 00:23:25,140
cardiomyocytes so we follow it up with

419
00:23:32,930 --> 00:23:29,039
the December 2020 launch in which we use

420
00:23:34,430 --> 00:23:32,940
3D human engineer heart issues and in

421
00:23:36,409 --> 00:23:34,440
this case here this allows us to

422
00:23:38,149 --> 00:23:36,419
understand the interaction of all the

423
00:23:40,549 --> 00:23:38,159
different cell types in the heart the

424
00:23:42,830 --> 00:23:40,559
heart has cardiomyoxides has fibroblasts

425
00:23:45,230 --> 00:23:42,840
and also has endothelial cells and what

426
00:23:47,210 --> 00:23:45,240
was surprising to us is that even the

427
00:23:50,149 --> 00:23:47,220
non-beating cardiomyocytes for example

428
00:23:53,570 --> 00:23:50,159
the fibroblasts also shows some Ultra

429
00:23:55,549 --> 00:23:53,580
function due to the microgravity so in

430
00:23:58,430 --> 00:23:55,559
this current launch what we're

431
00:24:01,450 --> 00:23:58,440
interested is setting up these 3D human

432
00:24:03,490 --> 00:24:01,460
cardio organoids so we set up

433
00:24:09,710 --> 00:24:03,500
388

434
00:24:13,430 --> 00:24:09,720
different individuals two male to female

435
00:24:15,890 --> 00:24:13,440
two Caucasians two African-Americans and

436
00:24:18,230 --> 00:24:15,900
here I will try to understand what is

437
00:24:20,450 --> 00:24:18,240
the effect of microgravity on these

438
00:24:23,630 --> 00:24:20,460

cardio organoids while also screening

439
00:24:25,070 --> 00:24:23,640
for different FDA approved drugs that

440
00:24:27,289 --> 00:24:25,080
can be used to mitigate the effects

441
00:24:29,990 --> 00:24:27,299
suffer microgravity and this is

442
00:24:32,330 --> 00:24:30,000
obviously in collaboration with the the

443
00:24:36,289 --> 00:24:32,340
NIH and cats also with the International

444
00:24:38,330 --> 00:24:36,299
Space Station and also with the biosurf

445
00:24:41,029 --> 00:24:38,340
and space Technologies in Colorado and

446
00:24:42,590 --> 00:24:41,039
also with UCSB and finally we're very

447
00:24:44,090 --> 00:24:42,600
grateful for the astronauts and who's

448
00:24:46,909 --> 00:24:44,100
going to take care of these uh what we

449
00:24:48,230 --> 00:24:46,919
call babies over the next several weeks

450
00:24:51,409 --> 00:24:48,240
right yes they're taking care of those

451
00:24:52,970 --> 00:24:51,419
babies you guys worked very hard on and

452
00:24:54,830 --> 00:24:52,980
doing this on the International Space

453
00:24:56,570 --> 00:24:54,840
Station which is in low earth orbit but

454
00:24:58,010 --> 00:24:56,580
why is research like this so important

455
00:24:59,510 --> 00:24:58,020
as we're looking at going into deep

456
00:25:01,130 --> 00:24:59,520
space you know to the moon and then on

457
00:25:03,169 --> 00:25:01,140
to Mars yeah so that's a very important

458
00:25:06,490 --> 00:25:03,179
question right because uh as you know

459
00:25:09,049 --> 00:25:06,500
for these space to travel microgravity

460
00:25:10,549 --> 00:25:09,059
lack of gravity is an important issue

461
00:25:11,930 --> 00:25:10,559
and

462
00:25:13,669 --> 00:25:11,940
um you know this is part of the reason

463
00:25:15,590 --> 00:25:13,679

why the astronauts they need to be on

464
00:25:17,690 --> 00:25:15,600
stationary bikes when they're up in

465
00:25:20,510 --> 00:25:17,700
space Also part of the reason why when

466
00:25:22,070 --> 00:25:20,520
they come back a tongue Earth uh you

467
00:25:24,470 --> 00:25:22,080
know for the first two to three days

468
00:25:25,850 --> 00:25:24,480
they had to adjust to be a fact of

469
00:25:29,090 --> 00:25:25,860
gravity

470
00:25:31,909 --> 00:25:29,100
um on on a cardiovascular system so what

471
00:25:34,490 --> 00:25:31,919
happens is uh without gravity your

472
00:25:37,750 --> 00:25:34,500
muscles heart muscles skeletal muscles

473
00:25:41,510 --> 00:25:37,760
and also your blood vessels all atrophy

474
00:25:43,549 --> 00:25:41,520
and so as you go deeper and deeper into

475
00:25:45,350 --> 00:25:43,559
space for example traveling to Mars

476
00:25:47,330 --> 00:25:45,360
we're talking about a longer period of

477
00:25:49,310 --> 00:25:47,340
time without the effects of gravity on

478
00:25:51,049 --> 00:25:49,320
the cardiovascular system so you're

479
00:25:53,330 --> 00:25:51,059
going to experience more issues and

480
00:25:55,310 --> 00:25:53,340
that's part of the reason why these FDA

481
00:25:56,330 --> 00:25:55,320
Foods were so important yeah it's very

482
00:25:58,250 --> 00:25:56,340
important thank you so much for being

483
00:26:00,409 --> 00:25:58,260
here today we really appreciate it thank

484
00:26:01,909 --> 00:26:00,419
you all right now we're just about seven

485
00:26:04,490 --> 00:26:01,919
minutes we're actually six minutes until

486
00:26:06,350 --> 00:26:04,500
liftoff of crs27 so let's bring back

487
00:26:08,330 --> 00:26:06,360
Megan now here on Florida Space Coast

488
00:26:10,130 --> 00:26:08,340

and Zach live at SpaceX headquarters in

489
00:26:12,169 --> 00:26:10,140
Hawthorne California to walk us through

490
00:26:17,090 --> 00:26:12,179
the final moments of countdown over to

491
00:26:21,289 --> 00:26:19,669
80 minus 5 minutes and 48 seconds and

492
00:26:23,090 --> 00:26:21,299
the SpaceX team is working no

493
00:26:26,149 --> 00:26:23,100
significant issues and the vehicle is

494
00:26:28,789 --> 00:26:26,159
healthy weather is 90 go and the range

495
00:26:31,669 --> 00:26:28,799
is ready to support today's mission

496
00:26:33,470 --> 00:26:31,679
at this point rocket propellant 1 or rp1

497
00:26:35,390 --> 00:26:33,480
fuel is completely loaded on the second

498
00:26:38,570 --> 00:26:35,400
stage and nearly complete on the first

499
00:26:40,490 --> 00:26:38,580
stage Now liquid oxygen or locks loading

500
00:26:42,470 --> 00:26:40,500
is currently underway on both stages and

501
00:26:44,390 --> 00:26:42,480
will complete at the T minus two minutes

502
00:26:46,490 --> 00:26:44,400
Mark before launch

503
00:26:48,890 --> 00:26:46,500
we're also loading helium gas into both

504
00:26:50,330 --> 00:26:48,900
stages Falcon 9 uses helium as a

505
00:26:52,310 --> 00:26:50,340
pressure and to backfill the propellant

506
00:26:54,529 --> 00:26:52,320
tanks as locks and rp1 are consumed by

507
00:26:56,210 --> 00:26:54,539
the Merlin engines during Ascent helium

508
00:26:58,130 --> 00:26:56,220
load began before the broadcast went

509
00:27:01,730 --> 00:26:58,140
live and will continue to top off until

510
00:27:03,830 --> 00:27:01,740
about a minute and a half before launch

511
00:27:05,570 --> 00:27:03,840
now to make sure engine startup goes

512
00:27:08,090 --> 00:27:05,580
well SpaceX performs what it calls

513
00:27:10,070 --> 00:27:08,100

engine checks

514
00:27:11,750 --> 00:27:10,080
call out for Dragon being in terminal

515
00:27:13,250 --> 00:27:11,760
thanks for pressurizing for a strong

516
00:27:14,810 --> 00:27:13,260
back retract

517
00:27:16,909 --> 00:27:14,820
so back to that engine chill really

518
00:27:18,649 --> 00:27:16,919
quick happened uh T-minus seven minutes

519
00:27:20,810 --> 00:27:18,659
and that's when the team dragon is in

520
00:27:22,789 --> 00:27:20,820
terminal countenance on internal power

521
00:27:24,710 --> 00:27:22,799
team flowed a small amount of the super

522
00:27:27,110 --> 00:27:24,720
chilled locks into the Merlin engines

523
00:27:29,269 --> 00:27:27,120
turbo pumps and SpaceX does this to

524
00:27:31,669 --> 00:27:29,279
avoid a thermal shock to the system when

525
00:27:35,210 --> 00:27:31,679
that full flow of super chilled liquid

526
00:27:37,010 --> 00:27:35,220
oxygen hits the propulsion system

527
00:27:38,690 --> 00:27:37,020
now dragon is currently undergoing

528
00:27:40,850 --> 00:27:38,700
vehicle health checks with the next big

529
00:27:51,350 --> 00:27:40,860
step just before a liftoff when Dragon

530
00:27:55,430 --> 00:27:53,390
and in just about 10 seconds we should

531
00:27:57,590 --> 00:27:55,440
see those clamp arms opening on the

532
00:28:00,230 --> 00:27:57,600
transporter erector the transporter

533
00:28:01,789 --> 00:28:00,240
erector or te is that large truss

534
00:28:04,130 --> 00:28:01,799
structure adjacent to our Falcon 9

535
00:28:07,610 --> 00:28:04,140
vehicle

536
00:28:10,490 --> 00:28:07,620
route propellants and electrical power

537
00:28:12,409 --> 00:28:10,500
to the vehicle in preparation for launch

538
00:28:14,810 --> 00:28:12,419

once the clamp arms have fully opened

539
00:28:17,330 --> 00:28:14,820
the te will then retract away from the

540
00:28:19,130 --> 00:28:17,340
rocket in preparation for liftoff

541
00:28:20,690 --> 00:28:19,140
in these last few minutes before t0

542
00:28:22,190 --> 00:28:20,700
Falcon 9 is performing final health

543
00:28:24,769 --> 00:28:22,200
checks on its primary Communications

544
00:28:26,450 --> 00:28:24,779
avionics and propulsion systems

545
00:28:27,950 --> 00:28:26,460
and there's that call out for strong

546
00:28:30,350 --> 00:28:27,960
back retract

547
00:28:31,970 --> 00:28:30,360
we may also hear callouts that engines

548
00:28:34,250 --> 00:28:31,980
are sufficiently chilled if we get a

549
00:28:35,930 --> 00:28:34,260
little closer to liftoff

550
00:28:37,070 --> 00:28:35,940
and if you've seen in a couple of our

551
00:28:38,390 --> 00:28:37,080
shots here you may have noticed the

552
00:28:40,250 --> 00:28:38,400
Falcon 9 booster supporting today's

553
00:28:42,049 --> 00:28:40,260
mission is covered with quite a bit of

554
00:28:43,610 --> 00:28:42,059
soot and that's because it's no stranger

555
00:28:45,730 --> 00:28:43,620
to space travel having previously

556
00:28:49,549 --> 00:28:45,740
supported the amazonist Nexus Mission

557
00:28:51,110 --> 00:28:49,559
scs-22 ispaces Aikido R mission one and

558
00:28:52,610 --> 00:28:51,120
three starlink missions and as I

559
00:28:58,310 --> 00:28:52,620
mentioned earlier today's Mission marks

560
00:28:58,320 --> 00:29:05,930
thank you

561
00:29:10,730 --> 00:29:08,149
now this launch will bring in just under

562
00:29:12,649 --> 00:29:10,740
6 300 pounds of cargo science and

563
00:29:14,330 --> 00:29:12,659

supplies to the space station one

564
00:29:16,669 --> 00:29:14,340
research project will study the effects

565
00:29:18,470 --> 00:29:16,679
of microgravity on the human heart and a

566
00:29:20,389 --> 00:29:18,480
student project that will test ways to

567
00:29:22,310 --> 00:29:20,399
help astronauts better capture photos

568
00:29:24,350 --> 00:29:22,320
and videos while working on the space

569
00:29:26,090 --> 00:29:24,360
station Dragon will be docked to the

570
00:29:30,830 --> 00:29:26,100
space station for about a month before

571
00:29:35,289 --> 00:29:32,750
and right around now checkouts for the

572
00:29:37,970 --> 00:29:35,299
second stage thrust vector control

573
00:29:39,710 --> 00:29:37,980
actuators are underway this is often

574
00:29:42,230 --> 00:29:39,720
referred to as an engine wiggle test

575
00:29:44,510 --> 00:29:42,240
this is when SpaceX moves the thrust

576
00:29:46,370 --> 00:29:44,520
nozzles ever so slightly to make sure

577
00:29:48,470 --> 00:29:46,380
the guidance Hardware is ready for

578
00:29:50,990 --> 00:29:48,480
flight SpaceX will do the exact same

579
00:29:52,490 --> 00:29:51,000
checkouts on the first stage engines but

580
00:30:01,370 --> 00:29:52,500
that happens just seconds before

581
00:30:05,149 --> 00:30:03,230
and in just a few moments we should hear

582
00:30:17,049 --> 00:30:05,159
that call out for stage 2 lock slow

583
00:30:17,059 --> 00:30:21,590
stage two lock float is complete

584
00:30:24,769 --> 00:30:23,510
and there's that call out and this will

585
00:30:28,789 --> 00:30:24,779
wrap up propellant loading for project

586
00:30:32,029 --> 00:30:30,529
dragon is also performing its final

587
00:30:33,710 --> 00:30:32,039
health checks to make sure all the

588
00:30:34,970 --> 00:30:33,720

vehicle's primary systems are ready for

589
00:30:37,490 --> 00:30:34,980
its rendezvous with the International

590
00:30:39,529 --> 00:30:37,500
Space Station and you may have noticed

591
00:30:41,090 --> 00:30:39,539
some white clouds around the vehicle but

592
00:30:42,950 --> 00:30:41,100
that's actually quite normal those

593
00:30:45,049 --> 00:30:42,960
clouds you see are the chilled gas above

594
00:30:46,850 --> 00:30:45,059
the Lox tank liquid surface that we bent

595
00:30:49,490 --> 00:30:46,860
overboard to maintain pressure in the

596
00:30:51,470 --> 00:30:49,500
tank as needed and when that gas comes

597
00:30:53,630 --> 00:30:51,480
out into contact with a warm humid

598
00:30:57,350 --> 00:30:53,640
Florida Air the air condenses into

599
00:31:01,789 --> 00:30:59,510
now in just about five seconds a dragon

600
00:31:04,430 --> 00:31:01,799
transitions to internal power Falcon 9

601
00:31:06,130 --> 00:31:04,440
computers will enter startup mode which

602
00:31:08,169 --> 00:31:06,140
is when the Falcon 99

603
00:31:11,090 --> 00:31:08,179
there you go

604
00:31:12,710 --> 00:31:11,100
is when the Falcon 9 flight computers

605
00:31:14,029 --> 00:31:12,720
take control of the countdown and will

606
00:31:19,130 --> 00:31:14,039
guide the rocket through the last

607
00:31:22,909 --> 00:31:21,470
go for lunch

608
00:31:24,950 --> 00:31:22,919
all right both stages are now

609
00:31:26,389 --> 00:31:24,960
pressurizing for launch at launch the

610
00:31:28,789 --> 00:31:26,399
International Space Station will be over

611
00:31:34,149 --> 00:31:28,799
the Indian Ocean south of India and an

612
00:31:34,159 --> 00:31:39,409
30 seconds

613
00:31:49,130 --> 00:31:42,590

counting down for NASA and spacex's 27th

614
00:31:49,140 --> 00:31:54,169
15 seconds

615
00:32:04,549 --> 00:32:00,110
30 minus 10. nine eight seven six five

616
00:32:08,630 --> 00:32:04,559
four three two one

617
00:32:11,510 --> 00:32:08,640
engine full power and liftoff of PRS 27

618
00:32:14,269 --> 00:32:11,520
go falcon go dragon

619
00:32:16,190 --> 00:32:14,279
Falcon 9 soars off the launch pad dragon

620
00:32:18,470 --> 00:32:16,200
now on its way to the International

621
00:32:22,430 --> 00:32:18,480
Space Station with importantly science

622
00:32:22,440 --> 00:32:45,470
stage one chamber pressure is normal

623
00:32:49,430 --> 00:32:48,230
at t plus 40 seconds Falcon 9 has

624
00:32:50,889 --> 00:32:49,440
successfully lifted off from

625
00:32:53,330 --> 00:32:50,899
historically

626
00:32:56,090 --> 00:32:53,340
in Florida

627
00:32:58,970 --> 00:32:56,100
we're now coming up on our Max Q in

628
00:33:00,590 --> 00:32:58,980
about uh 20 seconds or so which is the

629
00:33:02,510 --> 00:33:00,600
point of Maximum aerodynamic pressure

630
00:33:15,970 --> 00:33:02,520
the vehicle will go through during its

631
00:33:15,980 --> 00:33:19,370
thanks you

632
00:33:24,049 --> 00:33:21,649
and there's that call out for Max Q

633
00:33:26,149 --> 00:33:24,059
coming up next are five events back to

634
00:33:28,250 --> 00:33:26,159
back first is main engine cutoff or

635
00:33:30,110 --> 00:33:28,260
Mikko which is when all nine of the

636
00:33:32,210 --> 00:33:30,120
Merlin 1D engines on the first stage

637
00:33:34,009 --> 00:33:32,220
will shut down after those nine engines

638
00:33:37,430 --> 00:33:34,019

shut down the first and second stages

639
00:33:40,130 --> 00:33:37,440
will separate uh also called out over

640
00:33:41,870 --> 00:33:40,140
the Nets as stage separation then the

641
00:33:45,049 --> 00:33:41,880
first stage will flip

642
00:33:46,850 --> 00:33:45,059
make its way back to its Landing site

643
00:33:48,950 --> 00:33:46,860
the Drone ship named a shortfall of

644
00:33:51,169 --> 00:33:48,960
Gravitas the second stage will then

645
00:33:54,110 --> 00:33:51,179
ignite its Merlin vacuum engine to boost

646
00:33:56,450 --> 00:33:54,120
Dragon to low earth orbit during scs-1

647
00:33:58,610 --> 00:33:56,460
and the last event is the Boost back

648
00:34:00,710 --> 00:33:58,620
burn to reduce velocity of the first

649
00:34:02,630 --> 00:34:00,720
stage in preparation for atmospheric

650
00:34:05,990 --> 00:34:02,640
entry and this whole sequence will take

651
00:34:07,730 --> 00:34:06,000
place over about 30 seconds or so

652
00:34:10,070 --> 00:34:07,740
now we should be hearing that call out

653
00:34:16,129 --> 00:34:10,080
four main engine cut off in about 20

654
00:34:16,139 --> 00:34:34,550
wonderful tracking shot of our rocket

655
00:34:44,810 --> 00:34:35,930
Nico

656
00:34:44,820 --> 00:34:49,950
some recognition

657
00:34:54,649 --> 00:34:52,609
[Applause]

658
00:34:56,570 --> 00:34:54,659
and there's all of those callouts for

659
00:34:58,550 --> 00:34:56,580
those Milestones so we had Mikko stage

660
00:35:00,650 --> 00:34:58,560
separation a stage one flip second

661
00:35:02,690 --> 00:35:00,660
engine start one and the start of the

662
00:35:04,609 --> 00:35:02,700
partial boost back burn while a boost

663
00:35:06,230 --> 00:35:04,619

back burn is normally performed in order

664
00:35:07,609 --> 00:35:06,240
to return the first stage to one of our

665
00:35:09,710 --> 00:35:07,619
Landing zones here we are just

666
00:35:11,630 --> 00:35:09,720
performing a partial boost back this

667
00:35:13,430 --> 00:35:11,640
short and burn possible due to payload

668
00:35:15,170 --> 00:35:13,440
weight will allow us to recover the

669
00:35:16,790 --> 00:35:15,180
Falcon 9 booster much closer to the

670
00:35:18,470 --> 00:35:16,800
coast and shorten the Drone ship's

671
00:35:20,810 --> 00:35:18,480
Journey back to Shore by about one and a

672
00:35:26,210 --> 00:35:20,820
half to two days

673
00:35:31,430 --> 00:35:28,250
and there's confirmation of boost back

674
00:35:35,810 --> 00:35:33,410
if you're just tuning in you're watching

675
00:35:37,310 --> 00:35:35,820
a live webcast for the 27th commercial

676
00:35:40,430 --> 00:35:37,320
resupply mission to the International

677
00:35:42,950 --> 00:35:40,440
Space Station for NASA this is spacex's

678
00:35:44,630 --> 00:35:42,960
17th mission for 2023 and the second

679
00:35:46,010 --> 00:35:44,640
dragon flight to the International Space

680
00:35:47,510 --> 00:35:46,020
Station this year

681
00:35:50,030 --> 00:35:47,520
we lifted off from Kennedy Space

682
00:35:53,270 --> 00:35:50,040
Center's historic launch complex 39a

683
00:35:55,069 --> 00:35:53,280
just about 3 minutes and 45 seconds ago

684
00:35:57,470 --> 00:35:55,079
on the left side of your screen is the

685
00:35:59,810 --> 00:35:57,480
Falcon 9 first stage that is making its

686
00:36:02,510 --> 00:35:59,820
way back to Earth and on the right side

687
00:36:04,490 --> 00:36:02,520
is the second stage

688
00:36:06,349 --> 00:36:04,500

the second stage and you can see that

689
00:36:08,510 --> 00:36:06,359
mvac engine there

690
00:36:10,310 --> 00:36:08,520
as a reminder today's Mission marks the

691
00:36:12,349 --> 00:36:10,320
seventh flight for this Falcon 9 booster

692
00:36:15,650 --> 00:36:12,359
which previously supported the amazonus

693
00:36:18,829 --> 00:36:15,660
Nexus Mission scs-22 ispaces Aikido R

694
00:36:20,569 --> 00:36:18,839
mission one and three starlink missions

695
00:36:22,670 --> 00:36:20,579
now in order to make its way back to our

696
00:36:24,950 --> 00:36:22,680
drone ship a shortfall of Gravitas it

697
00:36:27,050 --> 00:36:24,960
has two more Burns to execute the first

698
00:36:29,569 --> 00:36:27,060
is the entry burn where three of the

699
00:36:31,849 --> 00:36:29,579
Merlin engines the engines 159 will

700
00:36:33,890 --> 00:36:31,859
reignite this helps to slow the stage

701
00:36:35,450 --> 00:36:33,900
down as it re-enters the upper part of

702
00:36:38,270 --> 00:36:35,460
the Earth's atmosphere

703
00:36:40,370 --> 00:36:38,280
the second burn is the landing burn and

704
00:36:42,109 --> 00:36:40,380
this is a single engine burn engine 9

705
00:36:44,030 --> 00:36:42,119
that brings the vehicle's speed down

706
00:36:45,290 --> 00:36:44,040
rapidly in order to land on the Drone

707
00:36:47,470 --> 00:36:45,300
ship

708
00:36:51,290 --> 00:36:47,480
now occasionally on your screen

709
00:36:53,510 --> 00:36:51,300
when the booster is in is visible you

710
00:36:55,790 --> 00:36:53,520
may see some nitrogen gas bursts and

711
00:36:57,170 --> 00:36:55,800
these are used for attitude control as

712
00:36:58,310 --> 00:36:57,180
the booster makes its way back to the

713
00:37:00,290 --> 00:36:58,320

Drone ship

714
00:37:02,210 --> 00:37:00,300
Falcon 9 is also equipped with four

715
00:37:04,250 --> 00:37:02,220
Hypersonic grid fins positioned near the

716
00:37:05,870 --> 00:37:04,260
top of the first stage and once in the

717
00:37:07,790 --> 00:37:05,880
atmosphere stage one is only using the

718
00:37:10,190 --> 00:37:07,800
grid fins for steering as it makes its

719
00:37:13,250 --> 00:37:10,200
return to Earth the these titanium

720
00:37:19,250 --> 00:37:14,870
and there's that call out for nominal

721
00:37:23,930 --> 00:37:21,349
on the left side of your screen you can

722
00:37:39,109 --> 00:37:23,940
just make out some civilization of Earth

723
00:37:42,950 --> 00:37:41,270
in just about eight seconds from now we

724
00:37:50,030 --> 00:37:42,960
should see that first stage entry burn

725
00:38:37,250 --> 00:37:57,530
s

726
00:38:42,349 --> 00:38:37,260
Landing

727
00:38:44,450 --> 00:38:42,359
178th time that we've recovered a first

728
00:38:50,690 --> 00:38:44,460
stage booster including both Falcon 9

729
00:38:55,970 --> 00:38:53,569
and we're about 15 seconds or so away

730
00:39:00,950 --> 00:38:55,980
from Landing the vehicle is traveling

731
00:39:04,910 --> 00:39:02,810
and this really puts uh into perspective

732
00:39:06,109 --> 00:39:04,920
the deceleration of the rocket in the

733
00:39:07,190 --> 00:39:06,119
span of less than a minute will have

734
00:39:09,050 --> 00:39:07,200
reduced

735
00:39:18,829 --> 00:39:09,060
from twice the speed of a jet all the

736
00:39:18,839 --> 00:39:23,030
stage one Landing burn

737
00:39:26,690 --> 00:39:25,010
there's the start of that first stage

738
00:39:36,589 --> 00:39:26,700

Landing burn on the left side of your

739
00:39:36,599 --> 00:39:48,609
stage one Landing leg deploy

740
00:39:52,970 --> 00:39:51,230
and there you saw the Falcon 9 first

741
00:39:55,670 --> 00:39:52,980
stage successfully land and you can

742
00:39:57,829 --> 00:39:55,680
probably hear the shooting behind me

743
00:39:59,510 --> 00:39:57,839
the Falcon 9 first stage that supported

744
00:40:00,950 --> 00:39:59,520
today's Mission landed for the seventh

745
00:40:04,370 --> 00:40:00,960
time having previously supported

746
00:40:06,290 --> 00:40:04,380
amazona's Nexus scs-22 ispaces the keto

747
00:40:08,829 --> 00:40:06,300
R mission one and three starlink

748
00:40:11,089 --> 00:40:08,839
missions today's Landing also marks the

749
00:40:13,910 --> 00:40:11,099
178th successful Landing for an orbital

750
00:40:16,490 --> 00:40:13,920
class rocket

751
00:40:17,990 --> 00:40:16,500
as mentioned previously today's recovery

752
00:40:20,150 --> 00:40:18,000
operations are being managed by an

753
00:40:25,670 --> 00:40:20,160
all-female recovery team and this is a

754
00:40:33,050 --> 00:40:28,010
there's that call out that stage 2 FTS

755
00:40:45,109 --> 00:40:35,210
and we should have second stage engine

756
00:40:45,119 --> 00:40:51,410
Pico

757
00:40:58,790 --> 00:40:54,170
there's that call out of Seco

758
00:41:03,650 --> 00:41:00,589
and there's the key call out of nominal

759
00:41:05,569 --> 00:41:03,660
orbital insertion at t plus nine minutes

760
00:41:07,970 --> 00:41:05,579
into the mission we are coming up on the

761
00:41:09,829 --> 00:41:07,980
last major task for stage two commanding

762
00:41:12,230 --> 00:41:09,839
separation of dragon a couple minutes

763
00:41:14,089 --> 00:41:12,240

from now we expect to have video of

764
00:41:18,910 --> 00:41:14,099
Dragon separation from the top of the

765
00:41:23,210 --> 00:41:21,170
crs-27 will be joining the crew 6

766
00:41:24,770 --> 00:41:23,220
vehicle currently on orbit so we'll be

767
00:41:26,270 --> 00:41:24,780
back to having two dragon spacecraft

768
00:41:28,430 --> 00:41:26,280
docked at the International Space

769
00:41:32,150 --> 00:41:30,410
expected loss of signal okay as for

770
00:41:36,290 --> 00:41:32,160
cargo

771
00:41:38,870 --> 00:41:36,300
more than 6 000 pounds of science

772
00:41:40,849 --> 00:41:38,880
research crew supplies and vehicle

773
00:41:42,109 --> 00:41:40,859
Hardware to the orbital laboratory and

774
00:41:44,390 --> 00:41:42,119
its crew

775
00:41:46,430 --> 00:41:44,400
to date SpaceX has sent and brought back

776
00:41:49,010 --> 00:41:46,440
over 270

777
00:41:57,950 --> 00:41:49,020
000 pounds of crew and cargo to and from

778
00:42:01,910 --> 00:42:00,290
as a reminder this is the third flight

779
00:42:04,849 --> 00:42:01,920
for this Dragon capsule having

780
00:42:19,550 --> 00:42:04,859
previously supported crs-22 in June of

781
00:42:23,930 --> 00:42:22,130
once the Dragon capsule jettison's from

782
00:42:25,609 --> 00:42:23,940
the second stage it has 16 Draco

783
00:42:27,349 --> 00:42:25,619
thrusters each with the capability to

784
00:42:29,810 --> 00:42:27,359
deliver 90 pounds of force and those

785
00:42:32,150 --> 00:42:29,820
will be used for maneuvering there are

786
00:42:34,370 --> 00:42:32,160
four pairs of three thrusters spaced

787
00:42:36,109 --> 00:42:34,380
evenly around the capsule as well as

788
00:42:38,150 --> 00:42:36,119

four forward bulkhead thrusters

789
00:42:40,190 --> 00:42:38,160
underneath the nose cone

790
00:42:42,349 --> 00:42:40,200
now notably Dragon does not have super

791
00:42:44,750 --> 00:42:42,359
Draco thrusters seats or life support

792
00:42:46,490 --> 00:42:44,760
systems as it is not carrying crew and

793
00:42:56,240 --> 00:42:46,500
this saves on weight space and also

794
00:42:59,809 --> 00:42:57,670
[Music]

795
00:43:01,609 --> 00:42:59,819
and while initial designs of dragon

796
00:43:03,410 --> 00:43:01,619
carried solar arrays extended outward

797
00:43:04,670 --> 00:43:03,420
from the trunk to cylindrical structure

798
00:43:05,950 --> 00:43:04,680
located directly behind the Dragon

799
00:43:08,150 --> 00:43:05,960
capsule

800
00:43:09,770 --> 00:43:08,160
the current dragon has these arrays

801
00:43:11,329 --> 00:43:09,780
fixed directly to the truck and you may

802
00:43:13,370 --> 00:43:11,339
see at some point both a light and dark

803
00:43:15,290 --> 00:43:13,380
side of the trunk and that dark side is

804
00:43:17,030 --> 00:43:15,300
actually those solar panels and the

805
00:43:26,930 --> 00:43:17,040
light side is a radiator to help cool

806
00:43:30,890 --> 00:43:28,910
and once the Dragon capsule reaches the

807
00:43:32,990 --> 00:43:30,900
ISS it will be able to autonomously dock

808
00:43:35,089 --> 00:43:33,000
using its navigation sensors Center Line

809
00:43:38,329 --> 00:43:35,099
camera and light detection and ranging

810
00:43:40,970 --> 00:43:39,530
it's also good to note the Dragon

811
00:43:42,589 --> 00:43:40,980
capsule is connected to the trunk

812
00:43:44,150 --> 00:43:42,599
beneath it via the trunk claw and

813
00:43:46,430 --> 00:43:44,160

connects thermal control Power and

814
00:43:54,890 --> 00:43:46,440
avionic systems components between the

815
00:43:54,900 --> 00:44:02,569
I think

816
00:44:05,410 --> 00:44:04,130
and if you're just joining us you're

817
00:44:09,710 --> 00:44:05,420
watching

818
00:44:11,569 --> 00:44:09,720
successfully disconnecting from the

819
00:44:14,089 --> 00:44:11,579
second stage uh heading to the

820
00:44:15,770 --> 00:44:14,099
International Space Station this is the

821
00:44:17,150 --> 00:44:15,780
27th commercial race supply mission to

822
00:44:19,790 --> 00:44:17,160
the international space stations for

823
00:44:21,710 --> 00:44:19,800
NASA this is spacex's 17th Mission this

824
00:44:24,770 --> 00:44:21,720
year and second dragon Flight 2 station

825
00:44:26,990 --> 00:44:24,780
for 2023. we lifted off about 12 minutes

826
00:44:31,550 --> 00:44:27,000
and 23 seconds ago from Kennedy Space

827
00:44:33,349 --> 00:44:31,560
Center at historic launch complex 39a

828
00:44:35,450 --> 00:44:33,359
and there you can see Dragon slowly

829
00:44:37,670 --> 00:44:35,460
drifting away from the second stage

830
00:44:40,190 --> 00:44:37,680
the next Milestone coming up is the nose

831
00:44:44,750 --> 00:44:40,200
cone opening sequence which protects the

832
00:44:48,230 --> 00:44:46,550
and that's going to do it for me here in

833
00:44:53,410 --> 00:44:48,240
Hawthorne so I'm going to throw it back

834
00:44:58,069 --> 00:44:56,510
hey thank you so much Zach and hello

835
00:45:00,770 --> 00:44:58,079
everyone once again from Mission Control

836
00:45:02,450 --> 00:45:00,780
Houston great to see another dragon on

837
00:45:04,550 --> 00:45:02,460
orbit you've got a happy team here in

838
00:45:07,790 --> 00:45:04,560

mission control and we'll have a happy

839
00:45:09,530 --> 00:45:07,800
crew of Seven astronauts and cosmonauts

840
00:45:12,710 --> 00:45:09,540
on board the space station when they

841
00:45:14,750 --> 00:45:12,720
wake up tomorrow with dragon now on its

842
00:45:15,890 --> 00:45:14,760
way uh as Zach said the next Milestone

843
00:45:18,109 --> 00:45:15,900
that we're going to be keeping an eye

844
00:45:19,970 --> 00:45:18,119
out for is going to be the nose cone

845
00:45:21,650 --> 00:45:19,980
open this takes a couple of minutes and

846
00:45:23,450 --> 00:45:21,660
that's to open the nose cone so it's

847
00:45:26,089 --> 00:45:23,460
exactly what it sounds like at the very

848
00:45:28,970 --> 00:45:26,099
top or the nose part of dragon and

849
00:45:30,650 --> 00:45:28,980
that's going to slowly open up to reveal

850
00:45:32,930 --> 00:45:30,660
a couple of different components that

851
00:45:35,150 --> 00:45:32,940
nose cone stays closed during the flight

852
00:45:36,710 --> 00:45:35,160
up to orbit just to protect some of

853
00:45:39,530 --> 00:45:36,720
those more sensitive instruments from

854
00:45:41,809 --> 00:45:39,540
the thermal and aerodynamic loads that

855
00:45:43,910 --> 00:45:41,819
dragons experiencing on its ride uphill

856
00:45:45,589 --> 00:45:43,920
once it opens up we're going to be

857
00:45:47,890 --> 00:45:45,599
revealing a couple of different things

858
00:45:50,510 --> 00:45:47,900
including some propulsion elements

859
00:45:52,609 --> 00:45:50,520
primarily for forward bulkhead Draco

860
00:45:54,109 --> 00:45:52,619
thrusters those are the primary

861
00:45:56,990 --> 00:45:54,119
thrusters that dragon is going to be

862
00:45:59,390 --> 00:45:57,000
using for its major Delta velocity burn

863
00:46:01,370 --> 00:45:59,400

so those are just firings of the engines

864
00:46:03,770 --> 00:46:01,380
to gradually raise its orbit as it gets

865
00:46:07,270 --> 00:46:03,780
closer and closer to the space station

866
00:46:09,530 --> 00:46:07,280
it's also going to reveal a suite of

867
00:46:11,329 --> 00:46:09,540
navigation equipment dragon has a couple

868
00:46:13,609 --> 00:46:11,339
of different methods to essentially find

869
00:46:15,829 --> 00:46:13,619
its way through outer space and

870
00:46:17,930 --> 00:46:15,839
underneath the nose cone there is

871
00:46:20,750 --> 00:46:17,940
something called the dragon eye star

872
00:46:22,250 --> 00:46:20,760
trackers and then it will also be

873
00:46:24,890 --> 00:46:22,260
pairing that with an inertial

874
00:46:27,470 --> 00:46:24,900
measurement unit and GPS sensors all of

875
00:46:29,210 --> 00:46:27,480
these kind of working in tandem to

876
00:46:31,609 --> 00:46:29,220
essentially tell Dragon where it is in

877
00:46:34,370 --> 00:46:31,619
outer space and where it needs to head

878
00:46:36,710 --> 00:46:34,380
we also do what's called a state Vector

879
00:46:38,870 --> 00:46:36,720
upload to the spacecraft just prior to

880
00:46:41,450 --> 00:46:38,880
launch telling it where space station is

881
00:46:44,329 --> 00:46:41,460
and then once it gets closer we'll have

882
00:46:45,470 --> 00:46:44,339
what's called relative GPS systems that

883
00:46:47,870 --> 00:46:45,480
we'll be able to talk to each other

884
00:46:49,250 --> 00:46:47,880
between dragon and space station just as

885
00:46:50,990 --> 00:46:49,260
they're essentially they start talking

886
00:46:53,809 --> 00:46:51,000
to each other let them know where they

887
00:46:55,430 --> 00:46:53,819
are and those come really in handy when

888
00:46:57,290 --> 00:46:55,440

we start getting into the integrated

889
00:46:59,870 --> 00:46:57,300
operations which you're going to be

890
00:47:02,450 --> 00:46:59,880
seeing a lot more of this room once we

891
00:47:05,270 --> 00:47:02,460
arrive on Thursday morning as when we're

892
00:47:08,809 --> 00:47:05,280
in integrated operations you've got a

893
00:47:10,790 --> 00:47:08,819
team here in Houston and a team out in

894
00:47:13,730 --> 00:47:10,800
Hawthorne that are working to bring us

895
00:47:16,130 --> 00:47:13,740
uh dragon in but we are getting closer

896
00:47:19,130 --> 00:47:16,140
to that nose cone to start opening there

897
00:47:21,770 --> 00:47:19,140
are 12 hooks around the essentially the

898
00:47:23,510 --> 00:47:21,780
docking ring of the Dragon spacecraft

899
00:47:25,790 --> 00:47:23,520
six of those are actually holding the

900
00:47:28,430 --> 00:47:25,800
nose cone in place during the launch all

901
00:47:31,130 --> 00:47:28,440
12 are closed when we're launching and

902
00:47:33,050 --> 00:47:31,140
we open them up if you've watched any of

903
00:47:34,250 --> 00:47:33,060
the previous crew missions or even the

904
00:47:37,309 --> 00:47:34,260
cargo missions we do them in two

905
00:47:39,589 --> 00:47:37,319
different sets two sets of six so once

906
00:47:42,650 --> 00:47:39,599
that already open the second set opening

907
00:47:45,589 --> 00:47:42,660
now and once that second set is open the

908
00:47:48,230 --> 00:47:45,599
nose cone will start to deploy and it

909
00:47:49,849 --> 00:47:48,240
takes a couple of minutes for that nose

910
00:47:51,050 --> 00:47:49,859
cone to open usually about five minutes

911
00:47:53,390 --> 00:47:51,060
or so

912
00:47:56,809 --> 00:47:53,400
and it'll gradually open its wings open

913
00:47:59,329 --> 00:47:56,819

a little more than about 110 degrees so

914
00:48:01,309 --> 00:47:59,339
that gives Dragon plenty of clearance uh

915
00:48:03,710 --> 00:48:01,319
to dock with the space station as this

916
00:48:05,569 --> 00:48:03,720
is going to reveal also the docking ring

917
00:48:07,730 --> 00:48:05,579
and that's what dragon's going to be

918
00:48:09,890 --> 00:48:07,740
using to actually dock with the

919
00:48:11,630 --> 00:48:09,900
international docking adapter onboard

920
00:48:13,849 --> 00:48:11,640
the station and we're heading to the

921
00:48:15,470 --> 00:48:13,859
forward Port we have two of those on the

922
00:48:17,690 --> 00:48:15,480
U.S segment right now with the docket

923
00:48:19,849 --> 00:48:17,700
adapters the forward port and the Xena

924
00:48:22,490 --> 00:48:19,859
through the space facing port on node 2

925
00:48:24,230 --> 00:48:22,500
the harmony module and this dragon is

926
00:48:28,550 --> 00:48:24,240
going to be bound for the forward Port

927
00:48:31,550 --> 00:48:28,560
it was just left vacant by the crew

928
00:48:35,690 --> 00:48:31,560
Dragon endurance crew 5 home over the

929
00:48:38,210 --> 00:48:35,700
weekend after 157 days in space and this

930
00:48:41,150 --> 00:48:38,220
dragon is Bound for that one to kick off

931
00:48:44,410 --> 00:48:41,160
really about a month in change of really

932
00:48:47,030 --> 00:48:44,420
intense cargo and science operations but

933
00:48:48,470 --> 00:48:47,040
at this moment in time one set of hooks

934
00:48:51,109 --> 00:48:48,480
open we're still waiting for that second

935
00:48:53,510 --> 00:48:51,119
set of six to open up and then once the

936
00:48:55,970 --> 00:48:53,520
that happens the nose cone will start to

937
00:48:58,970 --> 00:48:55,980
or the nose cone will start to deploy

938
00:49:01,069 --> 00:48:58,980

shortly after that we'll do checkouts of

939
00:49:03,589 --> 00:49:01,079
those forward bulkhead dracos those four

940
00:49:05,870 --> 00:49:03,599
draco's that are hiding underneath the

941
00:49:07,790 --> 00:49:05,880
nose cone right now and once those are

942
00:49:08,990 --> 00:49:07,800
checked out we'll be pretty much ready

943
00:49:10,970 --> 00:49:09,000
to go

944
00:49:14,510 --> 00:49:10,980
um and as Dragon will start to do its

945
00:49:17,569 --> 00:49:14,520
different phasing Burns to get to the

946
00:49:20,990 --> 00:49:17,579
space stations sounds like we've got all

947
00:49:23,930 --> 00:49:21,000
five or all six of the second set are

948
00:49:27,050 --> 00:49:23,940
now open and just standing by and it

949
00:49:29,270 --> 00:49:27,060
looks like the nose cone has started to

950
00:49:31,250 --> 00:49:29,280
deploy so again this is going to kick

951
00:49:32,990 --> 00:49:31,260
off a couple of minutes for the nose

952
00:49:35,829 --> 00:49:33,000
cone to fully open but all hooks are

953
00:49:38,870 --> 00:49:35,839
open and the nose cone is deploying

954
00:49:40,670 --> 00:49:38,880
while we wait for the nose cone to open

955
00:49:43,970 --> 00:49:40,680
I do want to bring in we have a guest

956
00:49:45,530 --> 00:49:43,980
real quickly we have Phil Dempsey he's

957
00:49:47,569 --> 00:49:45,540
the manager of the vehicle integration

958
00:49:49,450 --> 00:49:47,579
office in NASA's International Space

959
00:49:51,530 --> 00:49:49,460
Station program basically the guy

960
00:49:53,569 --> 00:49:51,540
overseeing all the different spacecraft

961
00:49:56,270 --> 00:49:53,579
responsible for bringing crew and cargo

962
00:49:58,250 --> 00:49:56,280
up to the space station uh bill first

963
00:50:00,650 --> 00:49:58,260

thanks so much for joining me just want

964
00:50:01,790 --> 00:50:00,660
to get your thoughts real quick walk us

965
00:50:03,589 --> 00:50:01,800
through you know we've got another

966
00:50:05,569 --> 00:50:03,599
Dragon mesh and heading to the station

967
00:50:07,270 --> 00:50:05,579
what's this going to mean for those crew

968
00:50:10,069 --> 00:50:07,280
members on board

969
00:50:11,630 --> 00:50:10,079
hey yeah thanks uh so first of all just

970
00:50:13,250 --> 00:50:11,640
a really great launch from our SpaceX

971
00:50:14,870 --> 00:50:13,260
team down here in Florida

972
00:50:16,130 --> 00:50:14,880
um you know getting a new dragons really

973
00:50:17,690 --> 00:50:16,140
exciting for the crew for a couple

974
00:50:18,950 --> 00:50:17,700
reasons you know first like you just

975
00:50:20,809 --> 00:50:18,960
kind of mentioned these cargo missions

976
00:50:22,849 --> 00:50:20,819
are really action-packed times for the

977
00:50:24,650 --> 00:50:22,859
crew you know it starts when they dock

978
00:50:26,150 --> 00:50:24,660
Thursday morning we're just uh getting

979
00:50:28,490 --> 00:50:26,160
into the vehicle getting critical

980
00:50:31,430 --> 00:50:28,500
research out into its location on the

981
00:50:33,410 --> 00:50:31,440
ISS you know then the crew does some

982
00:50:35,150 --> 00:50:33,420
standard cargo Ops and payload moves

983
00:50:36,470 --> 00:50:35,160
across this 30-day admission but while

984
00:50:38,870 --> 00:50:36,480
they're doing that they're also doing

985
00:50:41,510 --> 00:50:38,880
critical research that actually has to

986
00:50:43,550 --> 00:50:41,520
be completed during the doc mission in

987
00:50:45,349 --> 00:50:43,560
order to get those results back down on

988
00:50:47,150 --> 00:50:45,359

that same vehicle when it comes down a

989
00:50:49,250 --> 00:50:47,160
little over 30 days after it goes up

990
00:50:50,270 --> 00:50:49,260
when it's time to get a repacked with

991
00:50:52,190 --> 00:50:50,280
Hardware

992
00:50:54,109 --> 00:50:52,200
um additionally these cargo missions are

993
00:50:56,450 --> 00:50:54,119
the few chances we have to get fresh or

994
00:50:57,890 --> 00:50:56,460
refrigerated food up to the crew so you

995
00:51:00,049 --> 00:50:57,900
know give them a little taste of home

996
00:51:03,049 --> 00:51:00,059
they got some fresh fruit and cheeses on

997
00:51:04,309 --> 00:51:03,059
this one and I know they're asleep but I

998
00:51:06,349 --> 00:51:04,319
think they're going to be pretty excited

999
00:51:08,690 --> 00:51:06,359
when they wake up we actually have some

1000
00:51:11,270 --> 00:51:08,700
live views now of the nose cone opening

1001
00:51:13,250 --> 00:51:11,280
we're about halfway through Abba Phil

1002
00:51:15,470 --> 00:51:13,260
Before I Let You Go just general

1003
00:51:17,690 --> 00:51:15,480
feelings from you the program this has

1004
00:51:19,609 --> 00:51:17,700
been just another incredibly busy spring

1005
00:51:21,950 --> 00:51:19,619
it feels like we're always in the busy

1006
00:51:23,630 --> 00:51:21,960
season with station we just brought a

1007
00:51:25,190 --> 00:51:23,640
crew home over the weekend after

1008
00:51:27,530 --> 00:51:25,200
launching another one what's it been

1009
00:51:30,230 --> 00:51:27,540
like to just balance all of the traffic

1010
00:51:32,210 --> 00:51:30,240
coming and going from the space station

1011
00:51:33,589 --> 00:51:32,220
yeah you know it seems like we're part

1012
00:51:35,270 --> 00:51:33,599
way through and there's a lot going on

1013
00:51:36,650 --> 00:51:35,280

it is really exciting you know as for

1014
00:51:38,150 --> 00:51:36,660
the pace

1015
00:51:40,069 --> 00:51:38,160
um most of us probably wouldn't have it

1016
00:51:41,630 --> 00:51:40,079
any other way I'll tell you you know

1017
00:51:43,430 --> 00:51:41,640
we're in our third decade of operating

1018
00:51:45,170 --> 00:51:43,440
this orbiting research facility and

1019
00:51:47,450 --> 00:51:45,180
these are the crew and cargo missions to

1020
00:51:48,829 --> 00:51:47,460
keep it going but if you look ahead add

1021
00:51:50,930 --> 00:51:48,839
it into that mix you know we got an

1022
00:51:52,670 --> 00:51:50,940
upcoming Boeing first group site we've

1023
00:51:55,190 --> 00:51:52,680
got a second private astronaut Mission

1024
00:51:57,230 --> 00:51:55,200
so uh busy times for sure you know it's

1025
00:51:58,970 --> 00:51:57,240
really inspiring what we're doing across

1026
00:52:00,950 --> 00:51:58,980
you know in this industry across this

1027
00:52:03,470 --> 00:52:00,960
you know dedicated and great

1028
00:52:05,030 --> 00:52:03,480
Partnerships with NASA commercial you

1029
00:52:06,890 --> 00:52:05,040
know providers and International Teams

1030
00:52:08,150 --> 00:52:06,900
is just uh really exciting for the

1031
00:52:09,650 --> 00:52:08,160
program and we're really proud to be

1032
00:52:11,750 --> 00:52:09,660
part of it

1033
00:52:13,490 --> 00:52:11,760
all right well again that was Phil

1034
00:52:15,650 --> 00:52:13,500
Dempsey Phil thank you so much for

1035
00:52:17,390 --> 00:52:15,660
dialing in and Phil's the manager of the

1036
00:52:19,790 --> 00:52:17,400
vehicle integration office from the

1037
00:52:21,829 --> 00:52:19,800
International Space Station program for

1038
00:52:23,569 --> 00:52:21,839

NASA thank you Phil

1039
00:52:27,770 --> 00:52:23,579
all right thanks you have a good evening

1040
00:52:30,230 --> 00:52:27,780
you too all right we are very close now

1041
00:52:34,370 --> 00:52:30,240
to the nose cone being open looks like

1042
00:52:36,410 --> 00:52:34,380
it just has a few more degrees to go

1043
00:52:37,970 --> 00:52:36,420
and we'll stand by and wait for

1044
00:52:39,650 --> 00:52:37,980
confirmation on the loops to hear that

1045
00:52:42,049 --> 00:52:39,660
again once we get the nose cone open

1046
00:52:43,730 --> 00:52:42,059
it'll be time for Dragon to reorient

1047
00:52:45,890 --> 00:52:43,740
itself

1048
00:52:47,809 --> 00:52:45,900
uh to maneuver enforce and forward

1049
00:52:50,210 --> 00:52:47,819
bulkhead Draco checkouts and then

1050
00:52:51,710 --> 00:52:50,220
that'll be the last thing we do in the

1051
00:52:54,770 --> 00:52:51,720
next couple of minutes before it's time

1052
00:52:55,910 --> 00:52:54,780
to start those phasing Burns and as I

1053
00:52:59,270 --> 00:52:55,920
was talking through there we actually

1054
00:53:01,309 --> 00:52:59,280
just heard the nose cone is now open so

1055
00:53:03,470 --> 00:53:01,319
Dragon already stepping through its

1056
00:53:05,690 --> 00:53:03,480
automated sequence getting ready to do

1057
00:53:08,690 --> 00:53:05,700
the checkouts of those forward bulkhead

1058
00:53:11,210 --> 00:53:08,700
thrusters and then once those are ready

1059
00:53:14,450 --> 00:53:11,220
will be set up and good to go and ready

1060
00:53:18,230 --> 00:53:14,460
to do our phasing Burns so uh really

1061
00:53:20,210 --> 00:53:18,240
great to have a dragon back on orbit the

1062
00:53:22,309 --> 00:53:20,220
27 degree Supply mission to the

1063
00:53:24,530 --> 00:53:22,319

International Space Station on its way a

1064
00:53:26,990 --> 00:53:24,540
safe healthy Dragon bringing over six

1065
00:53:28,609 --> 00:53:27,000
thousand pounds of cargo with the nose

1066
00:53:30,770 --> 00:53:28,619
going to open Draco checkout's underway

1067
00:53:32,750 --> 00:53:30,780
that's going to do it for us here in

1068
00:53:34,430 --> 00:53:32,760
Houston uh we'll be back on Thursday

1069
00:53:37,549 --> 00:53:34,440
morning to take you through the final

1070
00:53:39,770 --> 00:53:37,559
moments of dragon's approach and docking

1071
00:53:41,450 --> 00:53:39,780
to the International Space Station but

1072
00:53:42,829 --> 00:53:41,460
with everything successful today I'm

1073
00:53:44,809 --> 00:53:42,839
going to send it back to close things

1074
00:53:46,849 --> 00:53:44,819
out to Jasmine at the Kennedy Space

1075
00:53:48,530 --> 00:53:46,859
Center Jasmine thanks so much Dan

1076
00:53:50,690 --> 00:53:48,540
another beautiful launch from the space

1077
00:53:52,849 --> 00:53:50,700
coast this evening that's going to wrap

1078
00:53:54,650 --> 00:53:52,859
up our coverage for the launch of the

1079
00:53:57,770 --> 00:53:54,660
27th Commercial resupply Services

1080
00:53:59,089 --> 00:53:57,780
Mission from NASA and SpaceX dragon is

1081
00:54:01,490 --> 00:53:59,099
now on its way to dock to the

1082
00:54:04,490 --> 00:54:01,500
International Space Station Thursday at

1083
00:54:07,370 --> 00:54:04,500
7 52 a.m eastern time and we'll have

1084
00:54:10,250 --> 00:54:07,380
live coverage of that at 6 15 a.m on

1085
00:54:12,410 --> 00:54:10,260
NASA TV and on nasa.gov forward slash

1086
00:54:13,910 --> 00:54:12,420
live thanks again for joining us and

1087
00:54:16,670 --> 00:54:13,920
we'll leave you with a replay of today's

1088
00:54:20,569 --> 00:54:16,680

launch but until next time go NASA go

1089
00:54:25,370 --> 00:54:20,579
SpaceX and go crs27

1090
00:54:35,930 --> 00:54:31,450
T-minus ten nine eight seven six five

1091
00:54:39,890 --> 00:54:35,940
four three two one

1092
00:54:42,829 --> 00:54:39,900
engine full power and liftoff of PRS 27

1093
00:54:45,530 --> 00:54:42,839
go falcon go dragon

1094
00:54:47,450 --> 00:54:45,540
Falcon 9 soars off the launch pad dragon

1095
00:54:49,790 --> 00:54:47,460
now on its way to the International