
NASA LIVE
ARTEMIS I
HOT FIRE TEST

1
00:00:00,960 --> 00:00:04,950
20 seconds and counting

2
00:00:08,790 --> 00:00:07,030
t minus 15 seconds

3
00:00:09,750 --> 00:00:08,800
guidance is internal

4
00:00:10,790 --> 00:00:09,760
12

5
00:00:11,910 --> 00:00:10,800
11

6
00:00:13,350 --> 00:00:11,920
10

7
00:00:14,910 --> 00:00:13,360
9

8
00:00:16,790 --> 00:00:14,920
ignition sequence

9
00:00:17,750 --> 00:00:16,800
start five

10
00:00:18,790 --> 00:00:17,760
four

11
00:00:19,750 --> 00:00:18,800
three

12
00:00:24,870 --> 00:00:19,760
two

13
00:00:29,910 --> 00:00:27,349

good afternoon and welcome to nasa's

14
00:00:31,750 --> 00:00:29,920
stennis space center in mississippi we

15
00:00:34,470 --> 00:00:31,760
are bringing you live coverage as

16
00:00:37,510 --> 00:00:34,480
artemis fires up for today's green run

17
00:00:39,750 --> 00:00:37,520
test a major milestone on america's

18
00:00:42,310 --> 00:00:39,760
mission to land the first woman and the

19
00:00:43,670 --> 00:00:42,320
next man on the moon with the artemis

20
00:00:46,229 --> 00:00:43,680
program

21
00:00:48,069 --> 00:00:46,239
good evening i'm lee d'angelo and just a

22
00:00:50,950 --> 00:00:48,079
little over a mile behind me is the

23
00:00:53,430 --> 00:00:50,960
historic b-test complex where nasa

24
00:00:56,389 --> 00:00:53,440
tested rocket stages for the mighty

25
00:00:58,869 --> 00:00:56,399
saturn v rocket and the space shuttle

26
00:01:02,069 --> 00:00:58,879
today in just about 30 minutes we will

27
00:01:04,549 --> 00:01:02,079
test the core stage of our new space

28
00:01:05,750 --> 00:01:04,559
launch system rocket also known as the

29
00:01:07,590 --> 00:01:05,760
sls

30
00:01:10,789 --> 00:01:07,600
what you see behind me mounted into the

31
00:01:13,350 --> 00:01:10,799
b2 test stand is the most powerful core

32
00:01:15,990 --> 00:01:13,360
stage in the world

33
00:01:18,390 --> 00:01:16,000
this sls rocket is set to make its first

34
00:01:20,550 --> 00:01:18,400
flight from nasa's kennedy space center

35
00:01:22,950 --> 00:01:20,560
later this year on the artemis one

36
00:01:25,990 --> 00:01:22,960
mission which will send an uncrewed

37
00:01:27,510 --> 00:01:26,000
orion spacecraft beyond the moon and

38
00:01:29,350 --> 00:01:27,520

back to earth

39
00:01:32,789 --> 00:01:29,360
we're going to learn a lot more about

40
00:01:35,590 --> 00:01:32,799
artemis sls the core stage and today's

41
00:01:36,630 --> 00:01:35,600
test which we call the green run hot

42
00:01:38,469 --> 00:01:36,640
fire

43
00:01:41,030 --> 00:01:38,479
we'll also be talking with nasa

44
00:01:43,190 --> 00:01:41,040
administrator jim breidenstein hearing

45
00:01:45,270 --> 00:01:43,200
from some of those who have made this

46
00:01:47,749 --> 00:01:45,280
all happen and getting a unique

47
00:01:50,789 --> 00:01:47,759
perspective from someone who knows how

48
00:01:53,670 --> 00:01:50,799
it feels to ride a rocket into space

49
00:01:55,830 --> 00:01:53,680
astronaut tracy caldwell dyson

50
00:01:58,310 --> 00:01:55,840
we also want to hear from you and for

51
00:02:00,469 --> 00:01:58,320
that we have apollonia acker standing by

52
00:02:02,389 --> 00:02:00,479
to help you connect on social media

53
00:02:06,550 --> 00:02:02,399
apollonia

54
00:02:08,389 --> 00:02:06,560
social media coordinator with the

55
00:02:10,550 --> 00:02:08,399
communications teams here at stennis

56
00:02:13,350 --> 00:02:10,560
space center and today i'm bringing your

57
00:02:15,030 --> 00:02:13,360
comments live to nasa tv and we're glad

58
00:02:17,350 --> 00:02:15,040
to have you following along on all of

59
00:02:20,229 --> 00:02:17,360
our social media platforms we also

60
00:02:22,949 --> 00:02:20,239
invite you to follow us at nasa artemis

61
00:02:26,790 --> 00:02:22,959
on twitter and we are live on facebook

62
00:02:28,150 --> 00:02:26,800
instagram linkedin beta tv dailymotion

63
00:02:29,430 --> 00:02:28,160

and twitch

64
00:02:31,509 --> 00:02:29,440
we're going to be sharing some of your

65
00:02:32,790 --> 00:02:31,519
posts so submit your questions and your

66
00:02:34,710 --> 00:02:32,800
posts using

67
00:02:36,949 --> 00:02:34,720
ask nasa

68
00:02:38,630 --> 00:02:36,959
also we've been asking you

69
00:02:40,710 --> 00:02:38,640
what would you take on a trip to the

70
00:02:42,790 --> 00:02:40,720
moon in celebration of today's hot fire

71
00:02:44,470 --> 00:02:42,800
test and you've submitted your moon kits

72
00:02:46,150 --> 00:02:44,480
using

73
00:02:47,589 --> 00:02:46,160
nasa moon kit

74
00:02:49,750 --> 00:02:47,599
we're going to be tracking your reaction

75
00:02:52,390 --> 00:02:49,760
online and i'm just excited to see this

76
00:02:54,630 --> 00:02:52,400
in person back to you lee

77
00:02:56,550 --> 00:02:54,640
thanks so much apollonia and i'm so glad

78
00:02:58,550 --> 00:02:56,560
we get to share this event online we

79
00:03:00,790 --> 00:02:58,560
might normally have hundreds of folks on

80
00:03:03,750 --> 00:03:00,800
hand here to see this in person but of

81
00:03:05,430 --> 00:03:03,760
course we're following covet protocols

82
00:03:07,350 --> 00:03:05,440
for social distancing

83
00:03:10,790 --> 00:03:07,360
those of us who are here are looking

84
00:03:11,910 --> 00:03:10,800
forward to some fire and smoke and a lot

85
00:03:14,309 --> 00:03:11,920
of noise

86
00:03:17,030 --> 00:03:14,319
i've got alex cagnola here with me he's

87
00:03:19,190 --> 00:03:17,040
a core stage engineer who can tell us

88
00:03:20,790 --> 00:03:19,200

about the test alex thank you so much

89
00:03:21,910 --> 00:03:20,800
for joining us absolutely thank you for

90
00:03:24,229 --> 00:03:21,920
having me i want to start with the

91
00:03:26,309 --> 00:03:24,239
basics what is the core stage how does

92
00:03:27,830 --> 00:03:26,319
it fit into sls well the core stage is

93
00:03:29,990 --> 00:03:27,840
really the powerhouse of our entire

94
00:03:31,430 --> 00:03:30,000
space launch system the core stage has

95
00:03:34,149 --> 00:03:31,440
two propellant tanks one of liquid

96
00:03:36,869 --> 00:03:34,159
hydrogen and liquid oxygen four rs-25

97
00:03:38,869 --> 00:03:36,879
engines more than 18 miles of cables all

98
00:03:40,149 --> 00:03:38,879
of our electronics avionics boxes

99
00:03:41,750 --> 00:03:40,159
everything we consider the brains of the

100
00:03:43,509 --> 00:03:41,760
rocket and of course all the plumbing

101
00:03:46,869 --> 00:03:43,519
that goes into feeding our fuel to our

102
00:03:49,190 --> 00:03:46,879
4r25 engines sounds pretty big yeah it's

103
00:03:50,949 --> 00:03:49,200
very big you know our core stage is 212

104
00:03:52,390 --> 00:03:50,959
feet long you know the most powerful

105
00:03:54,550 --> 00:03:52,400
core stage ever built so we're super

106
00:03:56,470 --> 00:03:54,560
excited to see it be tested today so

107
00:03:58,390 --> 00:03:56,480
we're testing today we're not showing

108
00:04:00,550 --> 00:03:58,400
this isn't a demonstration what does a

109
00:04:01,670 --> 00:04:00,560
successful test look like right and

110
00:04:02,949 --> 00:04:01,680
that's very important to remember you

111
00:04:04,710 --> 00:04:02,959
know we'll be testing the rocket we're

112
00:04:06,789 --> 00:04:04,720
still you know learning things about our

113
00:04:08,309 --> 00:04:06,799

rocket as we as we further test so you

114
00:04:09,830 --> 00:04:08,319
know you you we might hear some test

115
00:04:11,190 --> 00:04:09,840
conductor audio interrupt our talk and

116
00:04:13,270 --> 00:04:11,200
we'll be relaying that message to

117
00:04:14,789 --> 00:04:13,280
everybody um you know we might fire a

118
00:04:16,390 --> 00:04:14,799
few minutes before a few minutes after

119
00:04:17,590 --> 00:04:16,400
our scandal time um you know we're

120
00:04:20,069 --> 00:04:17,600
really looking to get some engineering

121
00:04:21,749 --> 00:04:20,079
data once we do ignite all four engines

122
00:04:23,990 --> 00:04:21,759
um and that may include moving the

123
00:04:25,189 --> 00:04:24,000
engines a little bit or throttling up or

124
00:04:26,629 --> 00:04:25,199
throttling down you know we're gonna be

125
00:04:28,950 --> 00:04:26,639
testing everything we can to get all the

126
00:04:30,230 --> 00:04:28,960
data we need you're the expert i'm glad

127
00:04:32,150 --> 00:04:30,240
you're here with us i'm going to have a

128
00:04:34,390 --> 00:04:32,160
lot of questions for you throughout the

129
00:04:37,189 --> 00:04:34,400
show so thank you again

130
00:04:39,590 --> 00:04:37,199
and we're getting set to chat with nasa

131
00:04:42,230 --> 00:04:39,600
administrator jim bridenstine about the

132
00:04:44,230 --> 00:04:42,240
artemis program but first let's hear

133
00:04:49,830 --> 00:04:44,240
this message from stennis director rick

134
00:04:53,430 --> 00:04:51,590
hello i'm rick gilbert director of

135
00:04:55,749 --> 00:04:53,440
stennis space center and i wanted to

136
00:04:57,510 --> 00:04:55,759
welcome you to today's green run i'm

137
00:04:59,030 --> 00:04:57,520
here at the base of the b2 test stand

138
00:05:02,070 --> 00:04:59,040

where you can see the space launch

139
00:05:05,029 --> 00:05:02,080
system core stage installed in the stand

140
00:05:06,629 --> 00:05:05,039
that very stage will roar to life today

141
00:05:08,710 --> 00:05:06,639
producing over 2 million pounds of

142
00:05:11,909 --> 00:05:08,720
thrust for what we hope to be a 500

143
00:05:14,150 --> 00:05:11,919
second full duration hot fire

144
00:05:16,310 --> 00:05:14,160
the sls was designed at marshall space

145
00:05:17,670 --> 00:05:16,320
flight center was assembled just down

146
00:05:20,790 --> 00:05:17,680
the road at the michoud assembly

147
00:05:23,749 --> 00:05:20,800
facility by boeing is powered by four

148
00:05:27,029 --> 00:05:23,759
rocketdyne rs-25 engines and today we

149
00:05:29,670 --> 00:05:27,039
will do our part to verify it for flight

150
00:05:32,150 --> 00:05:29,680
i'm always humbled and feel blessed to

151
00:05:33,990 --> 00:05:32,160
lead such a talented stennis workforce

152
00:05:37,029 --> 00:05:34,000
and also to be associated with all the

153
00:05:39,189 --> 00:05:37,039
talented folks in the sls program

154
00:05:41,430 --> 00:05:39,199
i'm proud of them and you should be too

155
00:05:43,510 --> 00:05:41,440
the men and women of nasa boeing and

156
00:05:45,749 --> 00:05:43,520
aerojet rocketdyne have worked to make

157
00:05:47,830 --> 00:05:45,759
this green run a reality

158
00:05:50,230 --> 00:05:47,840
they've overcome many many challenges

159
00:05:52,390 --> 00:05:50,240
especially this year with covid with a

160
00:05:53,749 --> 00:05:52,400
busy hurricane season and a lot of

161
00:05:55,749 --> 00:05:53,759
technical issues that they've all

162
00:05:57,029 --> 00:05:55,759
overcome and persevered to make today

163
00:05:58,870 --> 00:05:57,039

possible

164
00:06:01,830 --> 00:05:58,880
personally for me this will be the

165
00:06:04,150 --> 00:06:01,840
highlight of my 29 year nasa career

166
00:06:06,309 --> 00:06:04,160
i became hooked on nasa at the ripe old

167
00:06:09,830 --> 00:06:06,319
age of seven when neil armstrong stepped

168
00:06:11,029 --> 00:06:09,840
on the moon for the first time in 1969

169
00:06:12,710 --> 00:06:11,039
well guess what we're going to make

170
00:06:14,390 --> 00:06:12,720
history again today and i'm glad you're

171
00:06:16,870 --> 00:06:14,400
here to share it with me

172
00:06:22,710 --> 00:06:16,880
welcome to the artemis generation we're

173
00:06:27,029 --> 00:06:24,790
we've shown you a little bit about what

174
00:06:29,670 --> 00:06:27,039
we're doing today but now let's talk

175
00:06:32,070 --> 00:06:29,680
about why joining us for that is nasa

176
00:06:33,670 --> 00:06:32,080
administrator jim bridenstine jim

177
00:06:35,110 --> 00:06:33,680
welcome to mississippi well thank you

178
00:06:37,590 --> 00:06:35,120
lee it's great to be here i want to

179
00:06:39,990 --> 00:06:37,600
start with the overall picture talk to

180
00:06:41,909 --> 00:06:40,000
me about the artemis program well we're

181
00:06:43,990 --> 00:06:41,919
going to the moon uh this time we're

182
00:06:45,830 --> 00:06:44,000
doing it unlike we've ever done before

183
00:06:48,309 --> 00:06:45,840
we're going with commercial partners

184
00:06:49,510 --> 00:06:48,319
we're going with international partners

185
00:06:51,430 --> 00:06:49,520
we're going to learn how to live and

186
00:06:54,390 --> 00:06:51,440
work on another world for long periods

187
00:06:56,150 --> 00:06:54,400
of time using the resources of the other

188
00:06:58,150 --> 00:06:56,160

world we're going to use the resources

189
00:07:00,309 --> 00:06:58,160
of the moon to live and work with a

190
00:07:02,230 --> 00:07:00,319
purpose because ultimately we want to go

191
00:07:04,469 --> 00:07:02,240
to mars so we're going to build the

192
00:07:05,909 --> 00:07:04,479
capacity to live and work on another

193
00:07:07,670 --> 00:07:05,919
world so that we can go to mars and the

194
00:07:09,749 --> 00:07:07,680
reason we have to do that

195
00:07:13,029 --> 00:07:09,759
mars and earth are aligned on the same

196
00:07:15,350 --> 00:07:13,039
side of the sun once every 26 months so

197
00:07:16,710 --> 00:07:15,360
when you go to mars once you're there it

198
00:07:18,710 --> 00:07:16,720
takes about nine months to get there

199
00:07:21,670 --> 00:07:18,720
once you're there you have to be willing

200
00:07:24,710 --> 00:07:21,680
to stay as it orbits the sun until earth

201
00:07:26,790 --> 00:07:24,720
and mars are aligned again the moon

202
00:07:28,790 --> 00:07:26,800
is always with the earth wherever we are

203
00:07:30,790 --> 00:07:28,800
around the sun so it's it's the perfect

204
00:07:32,629 --> 00:07:30,800
proving ground and of course there's

205
00:07:33,749 --> 00:07:32,639
tons of science we can get from the moon

206
00:07:35,670 --> 00:07:33,759
we can get

207
00:07:37,909 --> 00:07:35,680
a lot of information of the early solar

208
00:07:39,830 --> 00:07:37,919
system because of the subatomic charged

209
00:07:41,830 --> 00:07:39,840
particles that have been coming from the

210
00:07:42,790 --> 00:07:41,840
sun for billions of years and impacting

211
00:07:44,309 --> 00:07:42,800
the moon

212
00:07:45,749 --> 00:07:44,319
that we can't get from here on earth

213
00:07:48,070 --> 00:07:45,759

because we have a magnetosphere that

214
00:07:49,430 --> 00:07:48,080
protects the earth and an active geology

215
00:07:50,869 --> 00:07:49,440
and an active atmosphere in the

216
00:07:53,029 --> 00:07:50,879
hydrosphere

217
00:07:54,950 --> 00:07:53,039
so so the moon is a lot about science

218
00:07:57,430 --> 00:07:54,960
and data it's about the early solar

219
00:07:59,110 --> 00:07:57,440
system it's also about astrophysics

220
00:08:01,189 --> 00:07:59,120
looking deeper into space than ever

221
00:08:02,550 --> 00:08:01,199
before because the moon gives us an

222
00:08:05,029 --> 00:08:02,560
opportunity

223
00:08:07,110 --> 00:08:05,039
to to really to have this very quiet

224
00:08:09,749 --> 00:08:07,120
area from an electromagnetic spectrum

225
00:08:11,110 --> 00:08:09,759
perspective very quiet area on the far

226
00:08:12,469 --> 00:08:11,120
side of the moon where we can look way

227
00:08:14,790 --> 00:08:12,479
out into deep space

228
00:08:16,710 --> 00:08:14,800
and in fact look back into time if you

229
00:08:19,189 --> 00:08:16,720
can imagine that so we're going to the

230
00:08:21,510 --> 00:08:19,199
moon sustainably we're going for science

231
00:08:23,749 --> 00:08:21,520
discovery exploration but we're also

232
00:08:25,510 --> 00:08:23,759
going as a proving ground so that we can

233
00:08:27,749 --> 00:08:25,520
go to mars it sounds like you're excited

234
00:08:29,189 --> 00:08:27,759
about this all the time not just today

235
00:08:31,270 --> 00:08:29,199
but let's bring it back to earth

236
00:08:33,670 --> 00:08:31,280
actually a little bit closer just a mile

237
00:08:35,909 --> 00:08:33,680
away talk to me about sls and how unique

238
00:08:37,430 --> 00:08:35,919

this is so the sls rocket is the most

239
00:08:39,110 --> 00:08:37,440
powerful rocket ever built in the

240
00:08:42,230 --> 00:08:39,120
history of humanity

241
00:08:44,230 --> 00:08:42,240
the core stage has far four rs 25

242
00:08:46,470 --> 00:08:44,240
engines these are very similar to the

243
00:08:47,910 --> 00:08:46,480
space shuttle main engines um and of

244
00:08:49,990 --> 00:08:47,920
course we're going to light this rocket

245
00:08:51,509 --> 00:08:50,000
today for a period of eight minutes

246
00:08:53,670 --> 00:08:51,519
which is the amount of time we're going

247
00:08:55,670 --> 00:08:53,680
to need to to to light it for a launch

248
00:08:58,550 --> 00:08:55,680
so what we're doing today is we are

249
00:09:00,389 --> 00:08:58,560
replicating as much as possible a launch

250
00:09:01,910 --> 00:09:00,399
and we have to remember that that what

251
00:09:04,150 --> 00:09:01,920
we're testing today

252
00:09:06,870 --> 00:09:04,160
this is a test vehicle it's also the

253
00:09:09,110 --> 00:09:06,880
flight hardware this is the same rocket

254
00:09:11,269 --> 00:09:09,120
that by the end of this year we'll be

255
00:09:13,110 --> 00:09:11,279
launching the orion crew capsule around

256
00:09:15,190 --> 00:09:13,120
the moon now by the end of this year

257
00:09:17,750 --> 00:09:15,200
that orion crew capsule will be uncrewed

258
00:09:19,750 --> 00:09:17,760
when it goes around the moon but by 2023

259
00:09:21,590 --> 00:09:19,760
we're going to send american astronauts

260
00:09:24,230 --> 00:09:21,600
around the moon and by 2024 we're going

261
00:09:25,990 --> 00:09:24,240
to be landing on the moon well thank you

262
00:09:27,110 --> 00:09:26,000
so much administrator breinstein i'm

263
00:09:28,710 --> 00:09:27,120

sure you want to get somewhere a little

264
00:09:30,389 --> 00:09:28,720
warmer where you'll be able to watch the

265
00:09:33,350 --> 00:09:30,399
test great to be with you it's great to

266
00:09:35,990 --> 00:09:33,360
be with you too thank you so much

267
00:09:37,350 --> 00:09:36,000
it was just a few weeks ago that we

268
00:09:40,310 --> 00:09:37,360
announced

269
00:09:42,310 --> 00:09:40,320
the astronauts for the artemis program

270
00:09:51,430 --> 00:09:42,320
let's take a look and meet those

271
00:09:56,550 --> 00:09:53,910
at nasa we have always answered the

272
00:09:59,829 --> 00:09:56,560
innate call to go

273
00:10:01,829 --> 00:09:59,839
with artemis we are going to stay

274
00:10:05,110 --> 00:10:01,839
proving that humanity can live on the

275
00:10:09,350 --> 00:10:05,120
moon mars and other worlds and share the

276
00:10:15,110 --> 00:10:11,910
our story is one of people

277
00:10:17,350 --> 00:10:15,120
all those who make this journey possible

278
00:10:19,750 --> 00:10:17,360
from advocates across communities to

279
00:10:22,150 --> 00:10:19,760
companies across industries to countries

280
00:10:24,389 --> 00:10:22,160
around the world we achieve this

281
00:10:26,949 --> 00:10:24,399
collective endeavor

282
00:10:28,949 --> 00:10:26,959
our efforts create impact for all

283
00:10:31,110 --> 00:10:28,959
technologies that revolutionize

284
00:10:32,949 --> 00:10:31,120
industries and jobs that bring

285
00:10:35,110 --> 00:10:32,959
prosperity to people

286
00:10:36,790 --> 00:10:35,120
the discoveries from space benefit the

287
00:10:38,550 --> 00:10:36,800
way we live on earth today

288
00:10:42,470 --> 00:10:38,560

and those from the moon will create a

289
00:10:44,829 --> 00:10:42,480
better future for generations to come

290
00:10:48,230 --> 00:10:44,839
but to do that we must

291
00:10:51,350 --> 00:10:48,240
go hi i'm chad lindgren my name is raj

292
00:10:54,310 --> 00:10:51,360
achary kayla barron kate rubins hi i'm

293
00:10:57,190 --> 00:10:54,320
christina cook nasa astronaut joe acaba

294
00:10:59,350 --> 00:10:57,200
jessica amir woody hoberg and mclean

295
00:11:01,430 --> 00:10:59,360
stephanie wilson my name is johnny kim

296
00:11:04,069 --> 00:11:01,440
nicole mann victor glover jessica

297
00:11:08,069 --> 00:11:04,079
watkins hi i'm matthew dominic jasmine

298
00:11:10,310 --> 00:11:08,079
mcbelly frank rubio scott tingleton

299
00:11:13,269 --> 00:11:10,320
this is what we do

300
00:11:14,340 --> 00:11:13,279
this is what we will do

301
00:11:23,110 --> 00:11:14,350
let's go

302
00:11:28,069 --> 00:11:25,910
[Music]

303
00:11:33,750 --> 00:11:28,079
we go to the moon to learn how to live

304
00:11:39,030 --> 00:11:36,470
if you are just joining us welcome

305
00:11:41,269 --> 00:11:39,040
the engines on the sls core stage are

306
00:11:43,430 --> 00:11:41,279
expected to fire up at four o'clock

307
00:11:45,030 --> 00:11:43,440
eastern three o'clock local here at

308
00:11:47,350 --> 00:11:45,040
stennis space center

309
00:11:55,110 --> 00:11:47,360
before that happens let's get a closer

310
00:12:00,550 --> 00:11:57,910
nasa's space launch system is artemis's

311
00:12:03,269 --> 00:12:00,560
super heavy lift rocket and provides the

312
00:12:06,550 --> 00:12:03,279
foundation for human exploration and

313
00:12:08,790 --> 00:12:06,560

scientific missions to the moon mars and

314
00:12:11,670 --> 00:12:08,800
beyond

315
00:12:15,190 --> 00:12:11,680
powered by two solid rocket boosters and

316
00:12:17,829 --> 00:12:15,200
four rs-25 engines this rocket provides

317
00:12:20,710 --> 00:12:17,839
unprecedented power and capability

318
00:12:23,509 --> 00:12:20,720
designed to reach 23 times the speed of

319
00:12:26,470 --> 00:12:23,519
sound and an altitude of more than 100

320
00:12:29,910 --> 00:12:26,480
miles in just over eight minutes

321
00:12:33,110 --> 00:12:29,920
offering more energy volume capacity and

322
00:12:35,670 --> 00:12:33,120
payload mass than any rocket built today

323
00:12:38,230 --> 00:12:35,680
under the launch abort system orion and

324
00:12:40,629 --> 00:12:38,240
the upper stage and between two solid

325
00:12:43,509 --> 00:12:40,639
rocket boosters is the heart of every

326
00:12:46,590 --> 00:12:43,519
sls configuration the core stage

327
00:12:48,790 --> 00:12:46,600
towering 212 feet with a diameter of

328
00:12:51,990 --> 00:12:48,800
27.6 feet

329
00:12:54,629 --> 00:12:52,000
and storing 537 thousand gallons of

330
00:12:57,350 --> 00:12:54,639
liquid hydrogen and one hundred ninety

331
00:13:00,069 --> 00:12:57,360
six thousand gallons of liquid oxygen

332
00:13:01,590 --> 00:13:00,079
this is the world's largest core stage

333
00:13:04,150 --> 00:13:01,600
ever built

334
00:13:07,030 --> 00:13:04,160
the core stage for artemis one fires up

335
00:13:10,680 --> 00:13:07,040
for the first time at nasa's historic v2

336
00:13:15,829 --> 00:13:12,150
[Music]

337
00:13:18,790 --> 00:13:15,839
so there it is the artemis one sls core

338
00:13:20,870 --> 00:13:18,800

stage on the b2 test stand the teams on

339
00:13:24,310 --> 00:13:20,880
site are planning to fire up those four

340
00:13:26,470 --> 00:13:24,320
rs-25 engines at four o'clock eastern

341
00:13:29,190 --> 00:13:26,480
now alex i know this is a culmination of

342
00:13:31,509 --> 00:13:29,200
tests here but it started way long ago

343
00:13:33,110 --> 00:13:31,519
let's just go back one step and talk to

344
00:13:34,470 --> 00:13:33,120
me about how this was built and

345
00:13:35,910 --> 00:13:34,480
assembled that michigan assembly

346
00:13:38,150 --> 00:13:35,920
facility absolutely you know so

347
00:13:40,389 --> 00:13:38,160
originally the core stage was designed

348
00:13:42,470 --> 00:13:40,399
um up in huntsville by our sls program

349
00:13:44,069 --> 00:13:42,480
team and also our boeing team um and

350
00:13:46,230 --> 00:13:44,079
then you know manufacturing began at

351
00:13:47,750 --> 00:13:46,240
misha assembly in new orleans

352
00:13:49,110 --> 00:13:47,760
it's our state-of-the-art manufacturing

353
00:13:50,870 --> 00:13:49,120
rocket facility

354
00:13:51,750 --> 00:13:50,880
it's more than 44 acres under a single

355
00:13:53,110 --> 00:13:51,760
roof

356
00:13:55,269 --> 00:13:53,120
and obviously through the production of

357
00:13:56,389 --> 00:13:55,279
that rocket we eventually moved the core

358
00:13:58,710 --> 00:13:56,399
stage

359
00:14:00,389 --> 00:13:58,720
from misshu assembly facility here you

360
00:14:01,110 --> 00:14:00,399
know that process is no easy feat you

361
00:14:03,509 --> 00:14:01,120
know

362
00:14:05,110 --> 00:14:03,519
a lot of coordination at michoud to be

363
00:14:07,189 --> 00:14:05,120

able to ship that thing and get it here

364
00:14:09,269 --> 00:14:07,199
in in the proper amount of time and so

365
00:14:11,430 --> 00:14:09,279
you're talking about moving a rocket on

366
00:14:12,629 --> 00:14:11,440
the mississippi river right yeah so you

367
00:14:14,710 --> 00:14:12,639
know we have a bar it's called the

368
00:14:16,230 --> 00:14:14,720
pegasus barge and this barges um it's

369
00:14:19,110 --> 00:14:16,240
kind of our carrier for the core stage

370
00:14:21,030 --> 00:14:19,120
you know it's it's a fully covered barge

371
00:14:22,470 --> 00:14:21,040
um you know and it carries our core

372
00:14:24,069 --> 00:14:22,480
stage all across the mississippi and

373
00:14:26,629 --> 00:14:24,079
eventually the kennedy space center and

374
00:14:29,110 --> 00:14:26,639
then when it lands here how do you get

375
00:14:31,030 --> 00:14:29,120
it into the test stand so whenever the

376
00:14:32,790 --> 00:14:31,040
corsage does arrive to send us um you

377
00:14:34,550 --> 00:14:32,800
know we have a very talented and very

378
00:14:36,470 --> 00:14:34,560
experienced lift team and you know they

379
00:14:38,150 --> 00:14:36,480
bring the core stage to the sand um they

380
00:14:40,230 --> 00:14:38,160
lift the core stage in a very slow

381
00:14:42,629 --> 00:14:40,240
process and lower it into the b2 test

382
00:14:45,110 --> 00:14:42,639
and secure it and then we begin our

383
00:14:46,629 --> 00:14:45,120
rounds of testing your rounds of testing

384
00:14:47,910 --> 00:14:46,639
what does that look like well we

385
00:14:49,189 --> 00:14:47,920
actually have a series of green run

386
00:14:50,949 --> 00:14:49,199
testing you know this is actually the

387
00:14:52,230 --> 00:14:50,959
eighth test in a full series of green

388
00:14:53,750 --> 00:14:52,240

run tests that we've been performing

389
00:14:55,189 --> 00:14:53,760
over this past year

390
00:14:56,710 --> 00:14:55,199
you know we start with modal testing

391
00:14:57,990 --> 00:14:56,720
which is kind of testing the vibrations

392
00:15:00,069 --> 00:14:58,000
and the structure of the rocket to see

393
00:15:02,150 --> 00:15:00,079
how it's going to react when we do do

394
00:15:03,509 --> 00:15:02,160
the hot fire and then we do things like

395
00:15:05,030 --> 00:15:03,519
powering on the avionics all the

396
00:15:07,670 --> 00:15:05,040
electronics equipment and then we move

397
00:15:10,310 --> 00:15:07,680
into activating safety systems you know

398
00:15:11,670 --> 00:15:10,320
testing mps components and kind of piece

399
00:15:13,509 --> 00:15:11,680
piece by piece building on what we

400
00:15:15,910 --> 00:15:13,519
previously did to finally get to the

401
00:15:18,069 --> 00:15:15,920
point where we are today and today we

402
00:15:19,509 --> 00:15:18,079
call it the green run hot fire test why

403
00:15:21,350 --> 00:15:19,519
is it called the green run well the

404
00:15:23,110 --> 00:15:21,360
green one really um refers to the parts

405
00:15:23,829 --> 00:15:23,120
in the rocket never being flown before

406
00:15:24,949 --> 00:15:23,839
so

407
00:15:26,790 --> 00:15:24,959
obviously all these parts have been

408
00:15:29,269 --> 00:15:26,800
tested by themselves but they've never

409
00:15:31,350 --> 00:15:29,279
really been tested as one giant unit so

410
00:15:33,350 --> 00:15:31,360
today we're really looking to get all

411
00:15:35,189 --> 00:15:33,360
that data and fire and fire for the

412
00:15:36,790 --> 00:15:35,199
first time i mean obviously the run

413
00:15:39,030 --> 00:15:36,800

refers to all the series of tests we've

414
00:15:40,470 --> 00:15:39,040
done to get to this point well alex

415
00:15:42,389 --> 00:15:40,480
thank you so much again we're going to

416
00:15:43,990 --> 00:15:42,399
be coming back to you we're also uh

417
00:15:46,069 --> 00:15:44,000
later on in the show going to start

418
00:15:47,829 --> 00:15:46,079
hearing some audio from the control room

419
00:15:49,590 --> 00:15:47,839
so i'm going to be relying on you alex

420
00:15:51,990 --> 00:15:49,600
to let us know what they are talking

421
00:15:55,670 --> 00:15:52,000
about and the hottest part of the show

422
00:15:58,470 --> 00:15:55,680
today will be those four rs-25 engines

423
00:16:01,110 --> 00:15:58,480
at the bottom of the core stage an

424
00:16:03,430 --> 00:16:01,120
interesting fact these rs-25s we're

425
00:16:04,790 --> 00:16:03,440
testing today are repurposed from the

426
00:16:07,269 --> 00:16:04,800
shuttle program

427
00:16:09,910 --> 00:16:07,279
these four engines flew on some pretty

428
00:16:12,230 --> 00:16:09,920
iconic shuttle missions including one of

429
00:16:14,870 --> 00:16:12,240
the hubble space telescope servicing

430
00:16:17,829 --> 00:16:14,880
missions the historic return to space of

431
00:16:20,629 --> 00:16:17,839
mercury astronaut senator john glenn

432
00:16:24,389 --> 00:16:20,639
six flights to the space station and the

433
00:16:27,030 --> 00:16:24,399
final space shuttle mission in 2011.

434
00:16:29,749 --> 00:16:27,040
so you can trace a direct line from that

435
00:16:31,670 --> 00:16:29,759
final shuttle flight to the first flight

436
00:16:33,350 --> 00:16:31,680
of sls

437
00:16:36,629 --> 00:16:33,360
we've worked with our partners at

438
00:16:38,870 --> 00:16:36,639

aerojet rocketdyne to upgrade the 16

439
00:16:41,670 --> 00:16:38,880
shuttle main engines which will power

440
00:16:44,710 --> 00:16:41,680
the first four artemis flights

441
00:16:46,550 --> 00:16:44,720
and now we're building 24 new engines

442
00:16:49,910 --> 00:16:46,560
using 3d printing and other

443
00:16:53,509 --> 00:16:49,920
manufacturing innovations to reduce cost

444
00:16:55,910 --> 00:16:53,519
complexity and manufacturing time

445
00:16:58,310 --> 00:16:55,920
and a reminder the test teams here are

446
00:17:00,949 --> 00:16:58,320
looking at three o'clock central four

447
00:17:01,910 --> 00:17:00,959
o'clock eastern for today's hot fire

448
00:17:04,549 --> 00:17:01,920
test

449
00:17:07,029 --> 00:17:04,559
of course many of the teams who worked

450
00:17:09,189 --> 00:17:07,039
so hard for this day can't be here in

451
00:17:11,990 --> 00:17:09,199
person because of social dis

452
00:17:17,510 --> 00:17:12,000
distancing but they are still cheering

453
00:17:21,510 --> 00:17:19,750
hello i'm terrance jones human resource

454
00:17:23,270 --> 00:17:21,520
business partner at stennis space center

455
00:17:25,829 --> 00:17:23,280
america's largest rocket engine test

456
00:17:28,150 --> 00:17:25,839
complex we're so excited for our green

457
00:17:29,110 --> 00:17:28,160
run test team at the historic b2 test

458
00:17:30,950 --> 00:17:29,120
stand

459
00:17:35,020 --> 00:17:30,960
we are go for green run

460
00:17:39,270 --> 00:17:36,950
[Applause]

461
00:17:40,710 --> 00:17:39,280
the elegant rocketdyne rs25 engine team

462
00:17:42,310 --> 00:17:40,720
is extremely excited to show the world

463
00:17:44,070 --> 00:17:42,320

what our hard-working team has been able

464
00:17:46,230 --> 00:17:44,080
to accomplish our team is working

465
00:17:47,830 --> 00:17:46,240
tirelessly to rebuild reliable engines

466
00:17:49,909 --> 00:17:47,840
to ensure the future of human

467
00:17:51,510 --> 00:17:49,919
exploration beyond earth's orbit let's

468
00:17:56,720 --> 00:17:51,520
go back to the moon go aerojet

469
00:17:56,790 --> 00:17:56,730
rocketdyne go nasa go artemis one

470
00:18:00,150 --> 00:17:56,800
[Applause]

471
00:18:02,950 --> 00:18:00,160
[Music]

472
00:18:05,510 --> 00:18:02,960
we are boeing and we are so proud to be

473
00:18:07,170 --> 00:18:05,520
part of team artemis all right guys

474
00:18:13,750 --> 00:18:07,180
let's light it up

475
00:18:18,549 --> 00:18:15,990
it's so great to see the team cheering

476
00:18:20,549 --> 00:18:18,559
us on for this historic event and you

477
00:18:21,590 --> 00:18:20,559
guys have been cheering us on online

478
00:18:24,150 --> 00:18:21,600
also

479
00:18:26,390 --> 00:18:24,160
and in celebration of being one step

480
00:18:28,230 --> 00:18:26,400
closer to landon astronauts on the moon

481
00:18:30,789 --> 00:18:28,240
we've been asking you what would you

482
00:18:32,390 --> 00:18:30,799
take on a trip to the moon

483
00:18:34,470 --> 00:18:32,400
let's take a look at some of the entries

484
00:18:36,870 --> 00:18:34,480
that we've received

485
00:18:39,430 --> 00:18:36,880
we have an entry from the new orleans

486
00:18:42,390 --> 00:18:39,440
saints and marcus davenport from the new

487
00:18:43,830 --> 00:18:42,400
orleans saints he would pack his helmet

488
00:18:45,669 --> 00:18:43,840

and a football

489
00:18:47,350 --> 00:18:45,679
what is a trip to the moon without a

490
00:18:49,750 --> 00:18:47,360
helmet and a football

491
00:18:52,470 --> 00:18:49,760
hood at

492
00:18:55,430 --> 00:18:52,480
we also have an entry here moon kit from

493
00:18:57,029 --> 00:18:55,440
storm lake elementary stem it's great to

494
00:18:58,470 --> 00:18:57,039
see the little ones packing their moon

495
00:19:00,390 --> 00:18:58,480
kids

496
00:19:01,830 --> 00:19:00,400
storm lake says that our moon mission is

497
00:19:03,990 --> 00:19:01,840
back on track

498
00:19:07,110 --> 00:19:04,000
students k-1 are preparing to blast off

499
00:19:08,870 --> 00:19:07,120
next week by packing their moon kids

500
00:19:10,549 --> 00:19:08,880
and in their moon kits they have a

501
00:19:14,150 --> 00:19:10,559
soccer ball

502
00:19:15,590 --> 00:19:14,160
an astronaut suit shades and a camera

503
00:19:16,710 --> 00:19:15,600
you never know if it's gonna get bright

504
00:19:19,430 --> 00:19:16,720
out there

505
00:19:21,750 --> 00:19:19,440
good job we love your moon kids

506
00:19:25,190 --> 00:19:21,760
and how exciting is this we have an

507
00:19:28,390 --> 00:19:25,200
entry from the one and only marie condo

508
00:19:30,630 --> 00:19:28,400
let's take a look at maureen's moon kit

509
00:19:33,270 --> 00:19:30,640
she is packing a blanket because she

510
00:19:35,990 --> 00:19:33,280
gets cold i could use that right now

511
00:19:37,350 --> 00:19:36,000
she has boxes to keep things tidy she

512
00:19:39,590 --> 00:19:37,360
knows how to pack

513
00:19:43,270 --> 00:19:39,600

and she also has a picture of her family

514
00:19:46,390 --> 00:19:43,280
because they spark her the most joy

515
00:19:49,669 --> 00:19:48,470
and in responses to what would you take

516
00:19:51,430 --> 00:19:49,679
to the moon

517
00:19:52,630 --> 00:19:51,440
we've received some really creative

518
00:19:54,070 --> 00:19:52,640
entries

519
00:19:55,909 --> 00:19:54,080
let's take a look at some more of those

520
00:19:59,440 --> 00:19:55,919
entries that we've received i'm really

521
00:20:58,789 --> 00:19:59,450
excited to see some more of these

522
00:21:02,470 --> 00:21:00,789
wow it is absolutely incredible to see

523
00:21:04,549 --> 00:21:02,480
all of the moon kids that you guys have

524
00:21:06,710 --> 00:21:04,559
submitted we literally have them from

525
00:21:09,350 --> 00:21:06,720
all over the world and i'm being asked

526
00:21:11,110 --> 00:21:09,360
what would i pack in my moon kit

527
00:21:13,430 --> 00:21:11,120
on my moon kit i would pack my

528
00:21:15,029 --> 00:21:13,440
pomeranian azania and i would have a

529
00:21:17,110 --> 00:21:15,039
pretty big box so i could squeeze my

530
00:21:19,270 --> 00:21:17,120
three boys and my husband and my moon

531
00:21:20,789 --> 00:21:19,280
kit what about you lee what would you

532
00:21:23,110 --> 00:21:20,799
pack

533
00:21:24,710 --> 00:21:23,120
app you're absolutely right i'm not

534
00:21:26,630 --> 00:21:24,720
leaving earth without my german short

535
00:21:28,630 --> 00:21:26,640
hair pointer penny and when i told my

536
00:21:30,630 --> 00:21:28,640
husband that he was upset that i didn't

537
00:21:32,070 --> 00:21:30,640
say i was bringing him and my sister

538
00:21:34,789 --> 00:21:32,080

casey as well so we're just turning the

539
00:21:36,710 --> 00:21:34,799
moon into a family vacation

540
00:21:39,270 --> 00:21:36,720
we've been telling you a lot about the

541
00:21:41,990 --> 00:21:39,280
hardware we're testing today but none of

542
00:21:45,190 --> 00:21:42,000
this is possible without the thousands

543
00:21:47,190 --> 00:21:45,200
of people at nasa boeing aerojet

544
00:21:49,669 --> 00:21:47,200
rocketdyne and the companies around the

545
00:21:52,310 --> 00:21:49,679
country working hard through the

546
00:21:54,950 --> 00:21:52,320
coronavirus pandemic and multiple

547
00:21:57,669 --> 00:21:54,960
hurricanes to get to this day

548
00:21:59,350 --> 00:21:57,679
from here at stennis where we test to

549
00:22:01,830 --> 00:21:59,360
the michou assembly facility in my

550
00:22:03,669 --> 00:22:01,840
hometown new orleans where we build to

551
00:22:06,149 --> 00:22:03,679
our marshall space flight center in

552
00:22:09,430 --> 00:22:06,159
huntsville alabama where it all began

553
00:22:11,430 --> 00:22:09,440
there is so much going on behind the

554
00:22:13,270 --> 00:22:11,440
scenes here's a look at marshall's

555
00:22:21,270 --> 00:22:13,280
software integration lab which

556
00:22:25,669 --> 00:22:23,350
i am the lead of the team that is

557
00:22:27,909 --> 00:22:25,679
building and testing the core stage all

558
00:22:30,149 --> 00:22:27,919
the boxes you see here and all and the

559
00:22:32,070 --> 00:22:30,159
miles of cables that you see this is

560
00:22:32,870 --> 00:22:32,080
what the inside of the core stage looks

561
00:22:35,110 --> 00:22:32,880
like

562
00:22:37,110 --> 00:22:35,120
so you can see it's very complex and

563
00:22:38,950 --> 00:22:37,120

what we do here is we run a lot of

564
00:22:41,110 --> 00:22:38,960
simulations to ensure that we have

565
00:22:42,870 --> 00:22:41,120
validated the systems and integrated

566
00:22:44,870 --> 00:22:42,880
them together so we actually have

567
00:22:47,110 --> 00:22:44,880
special software that's a version of the

568
00:22:49,430 --> 00:22:47,120
flight software but it's really specific

569
00:22:51,590 --> 00:22:49,440
for our green run test and so that

570
00:22:53,430 --> 00:22:51,600
testing has also been integrated into

571
00:22:55,350 --> 00:22:53,440
this laboratory and with all these

572
00:22:57,190 --> 00:22:55,360
avionics boxes to ensure we have a

573
00:22:58,950 --> 00:22:57,200
successful hot fire

574
00:23:01,110 --> 00:22:58,960
best part of the job is working with all

575
00:23:03,990 --> 00:23:01,120
the people and the teamwork

576
00:23:05,590 --> 00:23:04,000
it's been extremely fun to watch how

577
00:23:08,390 --> 00:23:05,600
everybody has pulled together with the

578
00:23:10,230 --> 00:23:08,400
same goal in mind we have more than a

579
00:23:12,310 --> 00:23:10,240
thousand companies across the united

580
00:23:14,149 --> 00:23:12,320
states that support us some of them are

581
00:23:16,390 --> 00:23:14,159
small mom-and-pop shops all the way up

582
00:23:18,310 --> 00:23:16,400
to the big contractors and each one of

583
00:23:20,950 --> 00:23:18,320
the individuals that have been working

584
00:23:22,630 --> 00:23:20,960
with us have a significant contribution

585
00:23:24,230 --> 00:23:22,640
and they will be should be extremely

586
00:23:26,310 --> 00:23:24,240
proud not only when we do their green

587
00:23:31,270 --> 00:23:26,320
run hot fire but when we have our first

588
00:23:35,750 --> 00:23:33,190

if you're just joining us today we are

589
00:23:38,310 --> 00:23:35,760
live at nasa's stennis space center in

590
00:23:40,950 --> 00:23:38,320
mississippi for the green run hot fire

591
00:23:42,950 --> 00:23:40,960
test of the core stage of our space

592
00:23:45,269 --> 00:23:42,960
launch system rocket

593
00:23:47,909 --> 00:23:45,279
at about four o'clock eastern over there

594
00:23:51,190 --> 00:23:47,919
at our historic b2 test stand we are

595
00:23:54,070 --> 00:23:51,200
going to fire four rs-25 engines for up

596
00:23:56,549 --> 00:23:54,080
to eight minutes to prove this rocket is

597
00:23:59,510 --> 00:23:56,559
ready to launch later this year on the

598
00:24:02,390 --> 00:23:59,520
first artemis mission to the moon

599
00:24:04,549 --> 00:24:02,400
again so many people have worked to get

600
00:24:07,350 --> 00:24:04,559
us to this day and even if they're not

601
00:24:12,180 --> 00:24:07,360
here in person they are ready for this

602
00:24:15,669 --> 00:24:13,350
[Music]

603
00:24:17,510 --> 00:24:15,679
on behalf of all of nasa employees and

604
00:24:20,149 --> 00:24:17,520
nasa contractors at the me shoot

605
00:24:22,390 --> 00:24:20,159
assembly facility home of america's

606
00:24:24,549 --> 00:24:22,400
rocket factory we wanted to show our

607
00:24:27,909 --> 00:24:24,559
appreciation to everyone supporting the

608
00:24:30,970 --> 00:24:27,919
green run hot farm we are with you and

609
00:24:35,909 --> 00:24:30,980
together we are making history

610
00:24:39,669 --> 00:24:37,830
my name is preston jones from nasa's

611
00:24:42,390 --> 00:24:39,679
marshall space flight center i'd like to

612
00:24:44,870 --> 00:24:42,400
say congratulations to the sls team for

613
00:24:47,110 --> 00:24:44,880

the core stage team for this great

614
00:24:49,350 --> 00:24:47,120
milestone achievement

615
00:24:51,330 --> 00:24:49,360
as we go into green run let's say go

616
00:24:52,300 --> 00:24:51,340
green gun

617
00:24:55,830 --> 00:24:52,310
[Applause]

618
00:24:59,110 --> 00:24:55,840
[Music]

619
00:25:01,110 --> 00:24:59,120
from everyone here on team flf

620
00:25:03,909 --> 00:25:01,120
we want to wish spanish

621
00:25:07,510 --> 00:25:03,919
and everyone down there at the beach

622
00:25:15,380 --> 00:25:07,520
fan a happy and successful

623
00:25:15,390 --> 00:25:23,350
[Music]

624
00:25:28,950 --> 00:25:25,990
we have an update for you again this is

625
00:25:31,269 --> 00:25:28,960
a live show we are hearing what you're

626
00:25:34,630 --> 00:25:31,279
hearing and we are learning as we are

627
00:25:37,669 --> 00:25:34,640
moving through this day of test alex do

628
00:25:40,390 --> 00:25:37,679
you have any update for us on why we

629
00:25:42,310 --> 00:25:40,400
might be possibly going faster or slower

630
00:25:43,909 --> 00:25:42,320
or what this is like right now yeah so

631
00:25:45,190 --> 00:25:43,919
our test conductor just alerted us that

632
00:25:47,510 --> 00:25:45,200
they're working through a few issues on

633
00:25:50,070 --> 00:25:47,520
the stand um you know like we said this

634
00:25:51,750 --> 00:25:50,080
is a test so we will see some delays or

635
00:25:52,789 --> 00:25:51,760
some possibly you know some issues that

636
00:25:55,029 --> 00:25:52,799
we'll have to work through it's all part

637
00:25:57,430 --> 00:25:55,039
of testing so as we get more information

638
00:25:59,110 --> 00:25:57,440

in we'll tell everyone and we'll work

639
00:26:00,549 --> 00:25:59,120
through it and we did talk about this

640
00:26:03,269 --> 00:26:00,559
this is a test this is not a

641
00:26:05,510 --> 00:26:03,279
demonstration why is it so important to

642
00:26:07,350 --> 00:26:05,520
test today right i mean the whole point

643
00:26:08,710 --> 00:26:07,360
right it's not a demonstration flight

644
00:26:10,390 --> 00:26:08,720
you know we're out here to test a rocket

645
00:26:11,830 --> 00:26:10,400
learn as much as we can and that'll

646
00:26:13,110 --> 00:26:11,840
really not only help us for the first

647
00:26:15,029 --> 00:26:13,120
artemis mission but for all of our

648
00:26:17,029 --> 00:26:15,039
future artemis missions as well

649
00:26:19,110 --> 00:26:17,039
and so what are we actually learning

650
00:26:21,029 --> 00:26:19,120
we've got a lot of different components

651
00:26:22,630 --> 00:26:21,039
a lot of different pieces of the rocket

652
00:26:24,549 --> 00:26:22,640
that we're looking at what do these

653
00:26:26,070 --> 00:26:24,559
tests really look like we're really here

654
00:26:28,390 --> 00:26:26,080
to simulate almost what a launch would

655
00:26:29,750 --> 00:26:28,400
be like right the whole core stage um

656
00:26:31,190 --> 00:26:29,760
with the computers and everything it

657
00:26:32,390 --> 00:26:31,200
thinks that it's going to be launched

658
00:26:33,990 --> 00:26:32,400
even though we're holding it in place

659
00:26:35,990 --> 00:26:34,000
and testing it we're basically going to

660
00:26:37,990 --> 00:26:36,000
put it through a rounded testing that's

661
00:26:39,590 --> 00:26:38,000
going to simulate the launch so the

662
00:26:41,510 --> 00:26:39,600
whole point is to make sure one to

663
00:26:43,430 --> 00:26:41,520

verify that the core stage can perform

664
00:26:45,350 --> 00:26:43,440
that way and two get the data that we

665
00:26:48,230 --> 00:26:45,360
will need for launch today you've

666
00:26:50,630 --> 00:26:48,240
touched on this but how much do the nasa

667
00:26:52,310 --> 00:26:50,640
engineers really not know about this

668
00:26:54,470 --> 00:26:52,320
rocket what are you really learning and

669
00:26:56,149 --> 00:26:54,480
what are you just guessing or finding

670
00:26:57,990 --> 00:26:56,159
between the the data points you're

671
00:26:59,830 --> 00:26:58,000
already uh guessing well obviously our

672
00:27:00,950 --> 00:26:59,840
team you know is knows a lot about the

673
00:27:03,269 --> 00:27:00,960
rock you know they've been part of this

674
00:27:04,549 --> 00:27:03,279
project for a long time um everywhere

675
00:27:06,230 --> 00:27:04,559
from you know

676
00:27:08,230 --> 00:27:06,240
the beginning of the production to

677
00:27:09,669 --> 00:27:08,240
designing the rocket to testing the rock

678
00:27:11,750 --> 00:27:09,679
you know they've been part of every step

679
00:27:13,110 --> 00:27:11,760
along the way um but even then you know

680
00:27:14,149 --> 00:27:13,120
you're constantly still learning and

681
00:27:15,990 --> 00:27:14,159
that's and that's part of the whole

682
00:27:18,149 --> 00:27:16,000
process um that's part of the process

683
00:27:19,750 --> 00:27:18,159
with any new rocket um and so you know

684
00:27:21,190 --> 00:27:19,760
that's that's why green run is so

685
00:27:21,990 --> 00:27:21,200
important to us and so important to the

686
00:27:23,590 --> 00:27:22,000
team

687
00:27:26,310 --> 00:27:23,600
and so important to the future of the

688
00:27:28,149 --> 00:27:26,320

artemis mission we've heard you describe

689
00:27:31,269 --> 00:27:28,159
the rocket almost like a human we

690
00:27:33,350 --> 00:27:31,279
learned about the brains of sls um you

691
00:27:35,350 --> 00:27:33,360
talked about breathing so there's parts

692
00:27:36,710 --> 00:27:35,360
of the rocket that can actually move as

693
00:27:38,389 --> 00:27:36,720
the test goes forward today is that

694
00:27:39,750 --> 00:27:38,399
right right yeah a lot of people don't

695
00:27:42,070 --> 00:27:39,760
realize as we know we're pumping all

696
00:27:43,430 --> 00:27:42,080
that propellant into the into the core

697
00:27:45,110 --> 00:27:43,440
stage you know and that's really really

698
00:27:46,389 --> 00:27:45,120
cold you know you're talking about

699
00:27:48,070 --> 00:27:46,399
a lot of changing temperatures when

700
00:27:49,190 --> 00:27:48,080
you're hot firing the engine i mean

701
00:27:51,510 --> 00:27:49,200
you'll have a lot of parts that'll be

702
00:27:53,669 --> 00:27:51,520
moving not just you know tanks shrinking

703
00:27:55,269 --> 00:27:53,679
and growing by a few inches just because

704
00:27:56,549 --> 00:27:55,279
of that temperature change so you know

705
00:27:57,909 --> 00:27:56,559
it's almost like a like a breathing

706
00:27:59,350 --> 00:27:57,919
human being you know you'll when you

707
00:28:00,789 --> 00:27:59,360
when you turn it on it'll actually feel

708
00:28:03,269 --> 00:28:00,799
like you know it's rumbling you'll hear

709
00:28:05,350 --> 00:28:03,279
it you'll see it it'll be super exciting

710
00:28:06,789 --> 00:28:05,360
so when you turn the rocket on that's

711
00:28:08,710 --> 00:28:06,799
got to be harder than just turning your

712
00:28:11,029 --> 00:28:08,720
car on at home what's that like right

713
00:28:13,029 --> 00:28:11,039

absolutely you know we actually started

714
00:28:15,830 --> 00:28:13,039
vehicle power on a few days ago and you

715
00:28:16,710 --> 00:28:15,840
slowly turn on individual avionics boxes

716
00:28:19,110 --> 00:28:16,720
and then you have to charge the

717
00:28:20,789 --> 00:28:19,120
batteries right and so you're slowly

718
00:28:22,630 --> 00:28:20,799
turning it on one by one and doing

719
00:28:23,750 --> 00:28:22,640
verifications of each system as you do

720
00:28:25,750 --> 00:28:23,760
turn it on

721
00:28:27,909 --> 00:28:25,760
finally to the point where you have one

722
00:28:30,789 --> 00:28:27,919
large core stage working all together

723
00:28:32,710 --> 00:28:30,799
simultaneously simultaneously and you

724
00:28:35,029 --> 00:28:32,720
talked about temperature changes can you

725
00:28:36,710 --> 00:28:35,039
describe the changes that the engines

726
00:28:38,230 --> 00:28:36,720
will go through today right absolutely

727
00:28:39,990 --> 00:28:38,240
so the fuel that we're

728
00:28:42,230 --> 00:28:40,000
adding to the core stage right that's

729
00:28:44,630 --> 00:28:42,240
our liquid oxygen and liquid hydrogen

730
00:28:45,909 --> 00:28:44,640
both fuels are very very cold no yeah

731
00:28:47,830 --> 00:28:45,919
they have to be very cold to be in

732
00:28:49,430 --> 00:28:47,840
liquid form and not in their natural gas

733
00:28:51,669 --> 00:28:49,440
state so you know we're looking at

734
00:28:53,110 --> 00:28:51,679
temperatures uh negative 400 degrees you

735
00:28:54,070 --> 00:28:53,120
know a little bit more than negative 300

736
00:28:55,590 --> 00:28:54,080
degrees

737
00:28:57,350 --> 00:28:55,600
for those two propellants and then when

738
00:28:58,630 --> 00:28:57,360

it comes time for ignition you know in

739
00:29:00,149 --> 00:28:58,640
less than a second you know we're

740
00:29:01,110 --> 00:29:00,159
getting up to a few thousand degrees

741
00:29:03,669 --> 00:29:01,120
temperature

742
00:29:05,350 --> 00:29:03,679
that's a big difference really quickly

743
00:29:06,870 --> 00:29:05,360
yeah it's very fast you know and that's

744
00:29:08,870 --> 00:29:06,880
part of the thing which propels the core

745
00:29:10,389 --> 00:29:08,880
stage and the rest of the sls off the

746
00:29:12,870 --> 00:29:10,399
earth's surface i gotta say you're

747
00:29:14,549 --> 00:29:12,880
keeping calm you've got a cool level

748
00:29:15,909 --> 00:29:14,559
head right now but i have to imagine

749
00:29:17,750 --> 00:29:15,919
you're excited about this you've been

750
00:29:19,350 --> 00:29:17,760
working on this for years yeah you know

751
00:29:20,870 --> 00:29:19,360
it's an absolute surreal experience you

752
00:29:22,310 --> 00:29:20,880
know for everyone who's been working on

753
00:29:23,510 --> 00:29:22,320
this you know for the last few years and

754
00:29:25,750 --> 00:29:23,520
even longer than that you know i think

755
00:29:27,190 --> 00:29:25,760
it's everyone's really excited about the

756
00:29:28,870 --> 00:29:27,200
core stage test everyone's excited to

757
00:29:30,870 --> 00:29:28,880
see it be launched for artemis one and

758
00:29:32,149 --> 00:29:30,880
for the future artemis mission so um i

759
00:29:33,590 --> 00:29:32,159
know the whole team's working hard you

760
00:29:35,510 --> 00:29:33,600
know the team in our test control center

761
00:29:36,789 --> 00:29:35,520
is working very hard so um you know i

762
00:29:38,549 --> 00:29:36,799
think everyone's just looking forward to

763
00:29:40,310 --> 00:29:38,559

it i do want to talk a little bit more

764
00:29:42,470 --> 00:29:40,320
about the team because we see some

765
00:29:44,789 --> 00:29:42,480
people here but it's actually people

766
00:29:46,710 --> 00:29:44,799
across the country can you talk to us a

767
00:29:48,310 --> 00:29:46,720
little bit about the different companies

768
00:29:49,669 --> 00:29:48,320
that have gone into integrating with

769
00:29:51,750 --> 00:29:49,679
nasa here and how all that comes

770
00:29:53,430 --> 00:29:51,760
together yeah absolutely you know we we

771
00:29:55,430 --> 00:29:53,440
have thousands of thousands of parts on

772
00:29:57,430 --> 00:29:55,440
the rocket you know and there's tons of

773
00:29:59,830 --> 00:29:57,440
companies and subcontractors you know

774
00:30:01,190 --> 00:29:59,840
small companies big companies

775
00:30:03,510 --> 00:30:01,200
um and so you know we have more than

776
00:30:05,750 --> 00:30:03,520
four we've had parts from more than 44

777
00:30:08,389 --> 00:30:05,760
states across the nation um and then

778
00:30:09,750 --> 00:30:08,399
obviously you know our boeing contractor

779
00:30:10,950 --> 00:30:09,760
our lead contractor for the project you

780
00:30:12,549 --> 00:30:10,960
know they've been working hand in hand

781
00:30:14,549 --> 00:30:12,559
with nasa the whole time

782
00:30:16,389 --> 00:30:14,559
those teams have really been performing

783
00:30:18,950 --> 00:30:16,399
really really well thus far and then

784
00:30:21,029 --> 00:30:18,960
obviously our rs25 engine supplied by

785
00:30:22,310 --> 00:30:21,039
air jet rocketdyne you know all three of

786
00:30:23,590 --> 00:30:22,320
our teams have done a really good job of

787
00:30:25,190 --> 00:30:23,600
getting to today

788
00:30:27,510 --> 00:30:25,200

well alex thank you for being in the hot

789
00:30:29,269 --> 00:30:27,520
seat explaining everything to me and to

790
00:30:31,269 --> 00:30:29,279
everyone at home

791
00:30:32,549 --> 00:30:31,279
we are actually going to move forward

792
00:30:34,310 --> 00:30:32,559
now we're going to give you a little bit

793
00:30:36,070 --> 00:30:34,320
of a break feel free to take some water

794
00:30:37,909 --> 00:30:36,080
and listen in we actually would love for

795
00:30:40,310 --> 00:30:37,919
you to listen in to the control room so

796
00:30:41,669 --> 00:30:40,320
we can come back and ask you uh exactly

797
00:30:44,950 --> 00:30:41,679
what they're talking about give us a

798
00:30:48,710 --> 00:30:44,960
breakdown i'm excited now to be talking

799
00:30:50,389 --> 00:30:48,720
to an astronaut who is here with us

800
00:30:53,750 --> 00:30:50,399
tracy caldwell

801
00:30:55,590 --> 00:30:53,760
dyson tracy it's so great to meet you

802
00:30:58,310 --> 00:30:55,600
thank you so much for being here my

803
00:31:00,310 --> 00:30:58,320
pleasure it's real honor and a privilege

804
00:31:01,830 --> 00:31:00,320
to be here so it's gonna be exciting

805
00:31:05,509 --> 00:31:01,840
well first i want to talk to you about

806
00:31:07,630 --> 00:31:05,519
the act of launching off this planet you

807
00:31:10,549 --> 00:31:07,640
have flown on the shuttle

808
00:31:12,630 --> 00:31:10,559
sts-118 specifically and one of those

809
00:31:15,909 --> 00:31:12,640
engines that flew you to space is

810
00:31:17,590 --> 00:31:15,919
powering this very core stage that's

811
00:31:19,190 --> 00:31:17,600
pretty cool that is real really cool all

812
00:31:20,549 --> 00:31:19,200
right i have to ask you first basic

813
00:31:23,350 --> 00:31:20,559

question what does it feel like to

814
00:31:25,750 --> 00:31:23,360
launch oh gosh there's so many feelings

815
00:31:27,029 --> 00:31:25,760
uh even before you even get inside the

816
00:31:29,350 --> 00:31:27,039
vehicle as you're walking up to the

817
00:31:31,830 --> 00:31:29,360
launch pad you see this mammoth rocket

818
00:31:33,669 --> 00:31:31,840
standing before you and from the

819
00:31:35,669 --> 00:31:33,679
sensations to the the things that you

820
00:31:37,509 --> 00:31:35,679
see to the things that you realize

821
00:31:40,710 --> 00:31:37,519
you've got a job to do but yet you're

822
00:31:42,710 --> 00:31:40,720
doing this um incredible uh you're

823
00:31:44,710 --> 00:31:42,720
having this incredible experience

824
00:31:48,070 --> 00:31:44,720
from the the light off of the engines to

825
00:31:50,470 --> 00:31:48,080
the uh to the liftoff uh the the swain

826
00:31:52,630 --> 00:31:50,480
of the rocket the rumble the the all of

827
00:31:55,190 --> 00:31:52,640
the vibrations the controlled explosion

828
00:31:56,549 --> 00:31:55,200
happening underneath you to the

829
00:31:59,269 --> 00:31:56,559
constant acceleration that you're

830
00:32:00,789 --> 00:31:59,279
feeling as you're propelled into orbit

831
00:32:02,310 --> 00:32:00,799
to the you know the engines are

832
00:32:04,630 --> 00:32:02,320
throttling all you know is that you're

833
00:32:07,190 --> 00:32:04,640
just going fast and um and then you're

834
00:32:09,269 --> 00:32:07,200
you're in there with uh your bodies um

835
00:32:11,990 --> 00:32:09,279
you've been training all this time uh

836
00:32:14,470 --> 00:32:12,000
you get to um the the solid rocket

837
00:32:16,710 --> 00:32:14,480
boosters as soon as they expend their

838
00:32:18,310 --> 00:32:16,720

energy and they separate from the

839
00:32:21,669 --> 00:32:18,320
vehicle and you're just riding on those

840
00:32:23,990 --> 00:32:21,679
main engines the rs25s i remember

841
00:32:25,669 --> 00:32:24,000
being so impressed with how smooth and

842
00:32:28,070 --> 00:32:25,679
powerful that ride was it was like

843
00:32:30,230 --> 00:32:28,080
riding on rails and um and then of

844
00:32:32,549 --> 00:32:30,240
course the moment you get into uh into

845
00:32:34,710 --> 00:32:32,559
orbit it's some of the the most strange

846
00:32:36,710 --> 00:32:34,720
tranquility that you've

847
00:32:38,149 --> 00:32:36,720
ever experienced in your life

848
00:32:39,669 --> 00:32:38,159
i want to ask you to do something here

849
00:32:41,509 --> 00:32:39,679
if you'll indulge me for a second let's

850
00:32:43,909 --> 00:32:41,519
just take a look back because we are

851
00:32:47,190 --> 00:32:43,919
about a mile away

852
00:32:51,269 --> 00:32:47,200
from sls well as you take a look at that

853
00:32:55,110 --> 00:32:53,509
you know i have to i have to give it up

854
00:32:57,110 --> 00:32:55,120
for the folks there in the control room

855
00:32:59,590 --> 00:32:57,120
right now because i you know i can

856
00:33:01,669 --> 00:32:59,600
remember how i felt standing at the at

857
00:33:04,149 --> 00:33:01,679
the foot of the rocket before i launched

858
00:33:05,909 --> 00:33:04,159
on it but all those folks like alex was

859
00:33:08,470 --> 00:33:05,919
mentioning that have played a role in

860
00:33:10,630 --> 00:33:08,480
this plus uh the ones that are around

861
00:33:13,110 --> 00:33:10,640
the test stand um

862
00:33:15,590 --> 00:33:13,120
that is their baby and um when those

863
00:33:17,509 --> 00:33:15,600

when those engines light there's um

864
00:33:20,950 --> 00:33:17,519
there's a lot of hands and eyes and

865
00:33:22,310 --> 00:33:20,960
hearts and soul that are uh that are in

866
00:33:23,909 --> 00:33:22,320
every ounce of thrust that are coming

867
00:33:25,830 --> 00:33:23,919
out of those engines and so i think when

868
00:33:28,389 --> 00:33:25,840
i look at that i just think about all of

869
00:33:29,990 --> 00:33:28,399
the people um who make up the body of

870
00:33:31,190 --> 00:33:30,000
that rocket and the thrust that's coming

871
00:33:32,070 --> 00:33:31,200
out of it and i'm really excited for

872
00:33:33,830 --> 00:33:32,080
them

873
00:33:36,070 --> 00:33:33,840
excited for all of us

874
00:33:38,149 --> 00:33:36,080
and it's exciting for all of us here and

875
00:33:40,789 --> 00:33:38,159
what's the difference with the um

876
00:33:42,950 --> 00:33:40,799
excitement in the astronaut community oh

877
00:33:44,470 --> 00:33:42,960
goodness um well i'll tell you what

878
00:33:46,630 --> 00:33:44,480
there's a whole

879
00:33:48,470 --> 00:33:46,640
lot of other uh blue flight suits folks

880
00:33:49,590 --> 00:33:48,480
that wish that they were here today um

881
00:33:51,909 --> 00:33:49,600
we are

882
00:33:55,190 --> 00:33:51,919
just genuinely excited about this

883
00:33:57,669 --> 00:33:55,200
opportunity to um to go

884
00:34:01,669 --> 00:33:57,679
further than low earth orbit and explore

885
00:34:04,149 --> 00:34:01,679
again our moon and to set a foundation

886
00:34:06,549 --> 00:34:04,159
along with those footprints and to go

887
00:34:09,510 --> 00:34:06,559
beyond that and to just be here at this

888
00:34:10,470 --> 00:34:09,520

time um with all this excitement is

889
00:34:13,510 --> 00:34:10,480
a real

890
00:34:15,829 --> 00:34:13,520
privilege for all of us um but as as a

891
00:34:18,310 --> 00:34:15,839
core of astronauts um we're just really

892
00:34:20,230 --> 00:34:18,320
excited about where we're headed all

893
00:34:22,230 --> 00:34:20,240
right you said moon so as we progress

894
00:34:25,270 --> 00:34:22,240
towards the moon talk to us about the

895
00:34:26,869 --> 00:34:25,280
significance of the human element in

896
00:34:29,750 --> 00:34:26,879
space why is it so important to put

897
00:34:30,869 --> 00:34:29,760
humans back on the moon oh goodness um

898
00:34:31,669 --> 00:34:30,879
i think

899
00:34:33,589 --> 00:34:31,679
it's

900
00:34:34,550 --> 00:34:33,599
there's so many ways to answer this but

901
00:34:36,710 --> 00:34:34,560
i think

902
00:34:38,310 --> 00:34:36,720
you know we we have it inside each one

903
00:34:41,030 --> 00:34:38,320
of us to

904
00:34:41,990 --> 00:34:41,040
to to discover to explore

905
00:34:44,710 --> 00:34:42,000
to

906
00:34:45,990 --> 00:34:44,720
let out our creativity and

907
00:34:47,750 --> 00:34:46,000
i think the reason it's important for

908
00:34:49,750 --> 00:34:47,760
humans i mean techno technically it's

909
00:34:51,190 --> 00:34:49,760
important because um we know how to make

910
00:34:53,829 --> 00:34:51,200
decisions right then and there

911
00:34:55,669 --> 00:34:53,839
especially with time delays and and uh

912
00:34:57,910 --> 00:34:55,679
not having a camera view every single

913
00:35:00,150 --> 00:34:57,920

place you need to look it's uh i think

914
00:35:02,390 --> 00:35:00,160
vital to have humans involved but the

915
00:35:04,790 --> 00:35:02,400
spirit the of exploration

916
00:35:07,030 --> 00:35:04,800
is within our hearts and uh there's no

917
00:35:09,910 --> 00:35:07,040
other way to live it out but to send our

918
00:35:11,349 --> 00:35:09,920
humans um to these destinations and

919
00:35:13,510 --> 00:35:11,359
there's a lot of people watching today

920
00:35:15,270 --> 00:35:13,520
and a lot of kids watching today young

921
00:35:16,550 --> 00:35:15,280
girls watching today do you have

922
00:35:18,550 --> 00:35:16,560
anything you want to say to them

923
00:35:20,950 --> 00:35:18,560
specifically oh goodness

924
00:35:22,790 --> 00:35:20,960
uh well with what time we have left i

925
00:35:24,790 --> 00:35:22,800
would say that um the most important

926
00:35:26,550 --> 00:35:24,800
thing to do is to uh

927
00:35:27,910 --> 00:35:26,560
is to know what you enjoy doing and

928
00:35:30,470 --> 00:35:27,920
start now

929
00:35:32,230 --> 00:35:30,480
taking note of those things because what

930
00:35:34,069 --> 00:35:32,240
we really want is

931
00:35:37,190 --> 00:35:34,079
is the best in you and what brings the

932
00:35:39,190 --> 00:35:37,200
best in you out for everyone to see is

933
00:35:39,990 --> 00:35:39,200
doing the things that you enjoy and so i

934
00:35:42,470 --> 00:35:40,000
would

935
00:35:45,030 --> 00:35:42,480
encourage everyone to to go

936
00:35:47,030 --> 00:35:45,040
and explore all the all the things that

937
00:35:48,950 --> 00:35:47,040
you um are doing right now and ask

938
00:35:51,109 --> 00:35:48,960

yourself if um

939
00:35:52,630 --> 00:35:51,119
if you didn't have to uh

940
00:35:54,790 --> 00:35:52,640
if you didn't have to get a grade in

941
00:35:57,589 --> 00:35:54,800
this would you still be doing it um and

942
00:35:59,990 --> 00:35:57,599
so i just think that it's it's within

943
00:36:01,430 --> 00:36:00,000
their reach to um

944
00:36:03,270 --> 00:36:01,440
to fulfill their dreams as long as what

945
00:36:05,750 --> 00:36:03,280
they're doing is what they enjoy

946
00:36:07,990 --> 00:36:05,760
stay curious stay curious absolutely

947
00:36:09,670 --> 00:36:08,000
well tracy i'm lucky to be with you

948
00:36:11,270 --> 00:36:09,680
we're both lucky to be here right now

949
00:36:13,190 --> 00:36:11,280
but there are a lot of people at home

950
00:36:14,790 --> 00:36:13,200
who've got questions for you too would

951
00:36:17,270 --> 00:36:14,800
you mind if i asked you some questions

952
00:36:20,150 --> 00:36:17,280
off of twitter please do all right

953
00:36:22,470 --> 00:36:20,160
we're gonna jump to uh a few questions

954
00:36:26,470 --> 00:36:22,480
we've gotten in the first one is from

955
00:36:28,630 --> 00:36:26,480
amber amber on twitter asks what is the

956
00:36:31,270 --> 00:36:28,640
main mission or what do you hope to

957
00:36:33,589 --> 00:36:31,280
learn with these next series of landings

958
00:36:34,710 --> 00:36:33,599
on the moon i think what we are trying

959
00:36:36,390 --> 00:36:34,720
to learn is

960
00:36:39,349 --> 00:36:36,400
just make sure we know how to get back

961
00:36:43,030 --> 00:36:39,359
there and then to

962
00:36:44,710 --> 00:36:43,040
to set up uh to set up our um

963
00:36:47,109 --> 00:36:44,720

our mission so that we can come back and

964
00:36:49,030 --> 00:36:47,119
we and our whole goal is to is to lay a

965
00:36:50,790 --> 00:36:49,040
foundation on the moon and make it

966
00:36:53,510 --> 00:36:50,800
sustainable so that we can continue to

967
00:36:57,030 --> 00:36:53,520
come back and so i think the most um the

968
00:36:59,510 --> 00:36:57,040
most important thing is uh is to um is

969
00:37:01,670 --> 00:36:59,520
to test our systems and uh to make sure

970
00:37:03,589 --> 00:37:01,680
that we can uh duplicate it so make sure

971
00:37:05,829 --> 00:37:03,599
we don't get lost and that we know what

972
00:37:07,510 --> 00:37:05,839
we're doing when we get there okay

973
00:37:09,270 --> 00:37:07,520
highly important that's a great answer

974
00:37:11,670 --> 00:37:09,280
all right another user on twitter asks

975
00:37:15,190 --> 00:37:11,680
what would be your final meal before

976
00:37:17,430 --> 00:37:15,200
leaving for the moon oh goodness ah

977
00:37:19,430 --> 00:37:17,440
what would be my final meal

978
00:37:21,190 --> 00:37:19,440
you know what i would i would this is

979
00:37:23,910 --> 00:37:21,200
gonna be boring but i would want a salad

980
00:37:25,270 --> 00:37:23,920
why why because i want fresh food before

981
00:37:27,349 --> 00:37:25,280
i go because the rest was going to be

982
00:37:30,550 --> 00:37:27,359
all dehydrated i'm pretty sure did you

983
00:37:32,950 --> 00:37:30,560
get queasy on the launch too no uh

984
00:37:34,950 --> 00:37:32,960
i didn't um and i think part of that's

985
00:37:37,349 --> 00:37:34,960
because you are so highly trained and

986
00:37:38,870 --> 00:37:37,359
you've got a job to do and you're highly

987
00:37:40,790 --> 00:37:38,880
focused

988
00:37:41,589 --> 00:37:40,800

and with all the g's pressing against

989
00:37:44,870 --> 00:37:41,599
you

990
00:37:47,190 --> 00:37:44,880
keeping it down

991
00:37:49,510 --> 00:37:47,200
there one last question for you

992
00:37:50,550 --> 00:37:49,520
what is the coolest thing you've

993
00:37:53,270 --> 00:37:50,560
experienced

994
00:37:55,829 --> 00:37:53,280
being an astronaut oh i gotta say that

995
00:37:57,430 --> 00:37:55,839
it is um being in

996
00:37:59,109 --> 00:37:57,440
shorts and a t-shirt

997
00:38:00,630 --> 00:37:59,119
living on board the space station

998
00:38:02,870 --> 00:38:00,640
looking out the window and gazing at

999
00:38:04,550 --> 00:38:02,880
this beautiful planet that that probably

1000
00:38:06,550 --> 00:38:04,560
is the most exciting coolest thing i've

1001
00:38:08,790 --> 00:38:06,560
ever done as an astronaut

1002
00:38:11,349 --> 00:38:08,800
well tracy thank you so much for being

1003
00:38:13,430 --> 00:38:11,359
here i hope you get to enjoy the show

1004
00:38:15,589 --> 00:38:13,440
and uh thank you to everyone watching

1005
00:38:17,349 --> 00:38:15,599
and submitting questions online what

1006
00:38:19,670 --> 00:38:17,359
we're going to do right now is we are

1007
00:38:21,589 --> 00:38:19,680
just going to watch with you we're going

1008
00:38:23,109 --> 00:38:21,599
to take a step back we are going to

1009
00:38:25,829 --> 00:38:23,119
watch the test stand and we're going to

1010
00:38:27,670 --> 00:38:25,839
listen in and we are going to ask alex

1011
00:38:29,190 --> 00:38:27,680
to uh please

1012
00:38:30,790 --> 00:38:29,200
pay extra special attention because

1013
00:38:32,550 --> 00:38:30,800

we're going to come back and ask you

1014
00:38:34,390 --> 00:38:32,560
what's going on in the control room so

1015
00:38:36,390 --> 00:38:34,400
again we are going to take a step back

1016
00:39:48,220 --> 00:38:36,400
and i'll just watch the test stand for

1017
00:39:48,230 --> 00:41:26,870
[Applause]

1018
00:41:32,470 --> 00:41:29,030
and a reminder we are in a dynamic

1019
00:41:34,950 --> 00:41:32,480
situation the teams are in a hold right

1020
00:41:37,589 --> 00:41:34,960
now we are still well within our window

1021
00:41:41,030 --> 00:41:37,599
for today's test the teams are working

1022
00:41:44,309 --> 00:41:41,040
towards getting an updated test time for

1023
00:41:45,990 --> 00:41:44,319
today so we have alex with us and alex

1024
00:41:48,309 --> 00:41:46,000
um we were listening into a little bit

1025
00:41:50,150 --> 00:41:48,319
of the control room audio what does it

1026
00:41:51,910 --> 00:41:50,160
mean that we're in a hold and what were

1027
00:41:53,270 --> 00:41:51,920
you hearing from the control room right

1028
00:41:55,109 --> 00:41:53,280
so right now we're still in a stable

1029
00:41:56,790 --> 00:41:55,119
replenish and basically what that means

1030
00:41:58,950 --> 00:41:56,800
is we're still getting fuel into the

1031
00:42:00,230 --> 00:41:58,960
tanks from the facility and there are

1032
00:42:01,270 --> 00:42:00,240
plenty of cycles kind of meant to

1033
00:42:02,550 --> 00:42:01,280
maintain

1034
00:42:04,390 --> 00:42:02,560
topping off the tanks to their full

1035
00:42:05,910 --> 00:42:04,400
capacity as some of that liquid does

1036
00:42:07,829 --> 00:42:05,920
turn back to gas and we've been off that

1037
00:42:10,069 --> 00:42:07,839
gas so we are in a stable replenish

1038
00:42:11,670 --> 00:42:10,079

phase um obviously some some of our

1039
00:42:13,510 --> 00:42:11,680
engineers in the test control center are

1040
00:42:15,510 --> 00:42:13,520
seeing some data that they don't like or

1041
00:42:18,069 --> 00:42:15,520
might be um not exactly normal for what

1042
00:42:19,510 --> 00:42:18,079
they usually see um so those teams are

1043
00:42:21,349 --> 00:42:19,520
off now kind of having sidebar

1044
00:42:22,630 --> 00:42:21,359
conversations with each other to kind of

1045
00:42:24,710 --> 00:42:22,640
determine what we need to do to go

1046
00:42:26,470 --> 00:42:24,720
forward so i want to go back because all

1047
00:42:27,750 --> 00:42:26,480
this might be obvious to you but we're

1048
00:42:29,430 --> 00:42:27,760
trying to figure out where we are in

1049
00:42:30,710 --> 00:42:29,440
this whole process we thought you know

1050
00:42:32,069 --> 00:42:30,720
we might just come here and see the

1051
00:42:34,470 --> 00:42:32,079
engines light up but that's not what

1052
00:42:36,390 --> 00:42:34,480
happens so what happened up until this

1053
00:42:38,470 --> 00:42:36,400
point and what are we waiting on now

1054
00:42:39,829 --> 00:42:38,480
right so like we said you know we

1055
00:42:41,190 --> 00:42:39,839
powered on the vehicle right over the

1056
00:42:42,710 --> 00:42:41,200
last few days you know we've we've

1057
00:42:45,030 --> 00:42:42,720
repaired all the systems we've tested

1058
00:42:47,829 --> 00:42:45,040
all the systems and then this morning we

1059
00:42:49,510 --> 00:42:47,839
started tanking you know by uh filling

1060
00:42:51,589 --> 00:42:49,520
both our liquid hydrogen and our liquid

1061
00:42:53,109 --> 00:42:51,599
oxygen tanks with propellant and so

1062
00:42:54,950 --> 00:42:53,119
that's really been the long process

1063
00:42:57,190 --> 00:42:54,960

today i mean obviously we have to chill

1064
00:42:59,109 --> 00:42:57,200
down our main propulsion system so all

1065
00:43:00,950 --> 00:42:59,119
of our mechanical parts have to be

1066
00:43:03,109 --> 00:43:00,960
chilled down to a certain temperature

1067
00:43:04,550 --> 00:43:03,119
before we do a hot fire as well so you

1068
00:43:07,349 --> 00:43:04,560
know right now they're obviously working

1069
00:43:09,030 --> 00:43:07,359
through some some issues in that process

1070
00:43:10,870 --> 00:43:09,040
you know and as we learn more as they

1071
00:43:13,030 --> 00:43:10,880
learn more we'll learn more

1072
00:43:14,550 --> 00:43:13,040
and so whenever we do hear audio we'll

1073
00:43:16,069 --> 00:43:14,560
be able to give a better update so why

1074
00:43:17,670 --> 00:43:16,079
don't you tell us a little bit about

1075
00:43:19,750 --> 00:43:17,680
that process we're talking about

1076
00:43:21,349 --> 00:43:19,760
chilling down the engines themselves

1077
00:43:22,870 --> 00:43:21,359
right yeah all the engines and all the

1078
00:43:24,470 --> 00:43:22,880
components inside the engine section

1079
00:43:25,589 --> 00:43:24,480
which holds the engines

1080
00:43:27,990 --> 00:43:25,599
have to be towed down to a certain

1081
00:43:29,430 --> 00:43:28,000
temperature before you uh start the

1082
00:43:31,030 --> 00:43:29,440
actual hot fire the ignition of the

1083
00:43:31,910 --> 00:43:31,040
engines um and that's just because

1084
00:43:34,230 --> 00:43:31,920
they're you know they're meant to

1085
00:43:36,470 --> 00:43:34,240
operate under those cold cryo cryogenic

1086
00:43:37,829 --> 00:43:36,480
temperatures um and then obviously when

1087
00:43:39,270 --> 00:43:37,839
you're hot firing the engines you start

1088
00:43:40,790 --> 00:43:39,280

to heat up those parts right so you want

1089
00:43:42,710 --> 00:43:40,800
to cool them down to a certain to a

1090
00:43:44,710 --> 00:43:42,720
certain point and then obviously you'll

1091
00:43:47,910 --> 00:43:44,720
heat them back up whenever you're firing

1092
00:43:50,870 --> 00:43:47,920
the engines so say this hold is lifted

1093
00:43:53,349 --> 00:43:50,880
um what will happen next so if when we

1094
00:43:55,349 --> 00:43:53,359
do or when they talk about the hole and

1095
00:43:56,950 --> 00:43:55,359
they lift it to continue operations you

1096
00:43:58,230 --> 00:43:56,960
know we'll from that point we're at the

1097
00:44:01,270 --> 00:43:58,240
point where we'll start to move into our

1098
00:44:03,030 --> 00:44:01,280
t minus ten minute countdown um and that

1099
00:44:05,829 --> 00:44:03,040
countdown kind of moves into our final

1100
00:44:07,349 --> 00:44:05,839
sequence of activities uh to

1101
00:44:09,109 --> 00:44:07,359
finalize right before we get to the

1102
00:44:11,030 --> 00:44:09,119
actual hot fire so there's a whole set

1103
00:44:13,910 --> 00:44:11,040
of activities we get um every few

1104
00:44:16,069 --> 00:44:13,920
minutes and that'll kind of determine um

1105
00:44:18,069 --> 00:44:16,079
like what time we will fire and then

1106
00:44:20,069 --> 00:44:18,079
that we are actually going to fight will

1107
00:44:22,150 --> 00:44:20,079
we be able to see anything during that

1108
00:44:23,750 --> 00:44:22,160
t-minus 10 countdown or really not see

1109
00:44:24,870 --> 00:44:23,760
anything until the last second yeah

1110
00:44:25,990 --> 00:44:24,880
you'll probably see a few things and

1111
00:44:27,430 --> 00:44:26,000
it's a few of those things you might be

1112
00:44:28,950 --> 00:44:27,440
able to see right now

1113
00:44:31,109 --> 00:44:28,960

the water suppression system is

1114
00:44:32,309 --> 00:44:31,119
operating it's not operating at 100

1115
00:44:33,829 --> 00:44:32,319
right now because we're obviously not

1116
00:44:35,910 --> 00:44:33,839
hot firing the engines

1117
00:44:38,870 --> 00:44:35,920
but when we do you'll be pumping 100 000

1118
00:44:41,030 --> 00:44:38,880
gallons of water every 20 seconds um you

1119
00:44:42,870 --> 00:44:41,040
know you'll be able to see obviously uh

1120
00:44:44,150 --> 00:44:42,880
some of the engines gimbal which we're

1121
00:44:46,550 --> 00:44:44,160
moving in a few degrees in different

1122
00:44:48,630 --> 00:44:46,560
directions um and that'll be part of the

1123
00:44:50,390 --> 00:44:48,640
the run up until we actually do activate

1124
00:44:52,309 --> 00:44:50,400
each engine and you've told me this

1125
00:44:54,390 --> 00:44:52,319
before off stage but i thought this was

1126
00:44:57,190 --> 00:44:54,400
fascinating so we haven't had a test

1127
00:44:58,950 --> 00:44:57,200
like this since the apollo era and there

1128
00:45:01,109 --> 00:44:58,960
was something that happened then with a

1129
00:45:02,630 --> 00:45:01,119
giant plume that actually made it start

1130
00:45:04,390 --> 00:45:02,640
raining on everyone out here can you

1131
00:45:05,910 --> 00:45:04,400
tell us that story yeah absolutely a lot

1132
00:45:07,589 --> 00:45:05,920
of people don't realize is no we have

1133
00:45:09,750 --> 00:45:07,599
our two propellants our liquid hydrogen

1134
00:45:10,950 --> 00:45:09,760
and our liquid oxygen um you know and

1135
00:45:12,950 --> 00:45:10,960
when you

1136
00:45:15,510 --> 00:45:12,960
react with those two chemicals you know

1137
00:45:17,270 --> 00:45:15,520
you're really just creating h2o so when

1138
00:45:19,190 --> 00:45:17,280

you see the big plume coming out it's

1139
00:45:21,430 --> 00:45:19,200
just water vapor right and you know

1140
00:45:23,670 --> 00:45:21,440
since when we attested apollo you know

1141
00:45:26,470 --> 00:45:23,680
back during the um

1142
00:45:28,309 --> 00:45:26,480
saturn 5 program you know

1143
00:45:30,470 --> 00:45:28,319
that the amount of water vapor coming

1144
00:45:32,150 --> 00:45:30,480
out during that test is quite

1145
00:45:34,069 --> 00:45:32,160
breathtaking and also it's so much that

1146
00:45:35,430 --> 00:45:34,079
it can create clouds and sometimes rain

1147
00:45:37,430 --> 00:45:35,440
clouds so sometimes you can get rained

1148
00:45:39,190 --> 00:45:37,440
on from that all right so we can expect

1149
00:45:40,150 --> 00:45:39,200
possible rain even though it's a

1150
00:45:42,390 --> 00:45:40,160
beautiful

1151
00:45:44,069 --> 00:45:42,400
cold but sunny day today what else can

1152
00:45:45,670 --> 00:45:44,079
we expect to see

1153
00:45:47,829 --> 00:45:45,680
right so you'll hear the test conductor

1154
00:45:49,510 --> 00:45:47,839
audio um when we get into our t-minus

1155
00:45:52,230 --> 00:45:49,520
10-minute countdown

1156
00:45:53,829 --> 00:45:52,240
so after that you'll hear you know every

1157
00:45:55,349 --> 00:45:53,839
few minutes him come on come on the

1158
00:45:57,190 --> 00:45:55,359
phone and say hey we're you know we're

1159
00:45:59,829 --> 00:45:57,200
getting to this step and then you'll

1160
00:46:01,990 --> 00:45:59,839
hear the engines rev up for the hot fire

1161
00:46:04,309 --> 00:46:02,000
well alex thank you so much we are going

1162
00:46:07,030 --> 00:46:04,319
to remain live i might be coming back to

1163
00:46:08,309 --> 00:46:07,040

you in a minute in 10 minutes but we are

1164
00:46:09,829 --> 00:46:08,319
really excited to have you here

1165
00:46:12,150 --> 00:46:09,839
explaining everything to us and a

1166
00:46:14,950 --> 00:46:12,160
reminder to everyone at home this is a

1167
00:46:17,109 --> 00:46:14,960
live test we are still listening in for

1168
00:46:19,910 --> 00:46:17,119
the control room teams as they review

1169
00:46:21,910 --> 00:46:19,920
the data of the test up to this point

1170
00:46:24,790 --> 00:46:21,920
they are having a conversation right now

1171
00:46:26,950 --> 00:46:24,800
about the appropriate steps to move

1172
00:46:28,950 --> 00:46:26,960
forward so alex

1173
00:46:30,390 --> 00:46:28,960
we've had a little bit of a talk about

1174
00:46:32,790 --> 00:46:30,400
those discussions again we're going to

1175
00:46:34,870 --> 00:46:32,800
be coming back and forth to you um and

1176
00:46:37,589 --> 00:46:34,880
again a note to our viewers we're going

1177
00:46:40,630 --> 00:46:37,599
to be hearing calls from the test

1178
00:46:43,270 --> 00:46:40,640
conductor at regular intervals over the

1179
00:46:45,349 --> 00:46:43,280
next 10 minutes or possibly more when we

1180
00:46:47,829 --> 00:46:45,359
hear those call outs what we're going to

1181
00:46:49,510 --> 00:46:47,839
do is we're going to pause and listen in

1182
00:46:51,750 --> 00:46:49,520
i might turn to alex and and have you

1183
00:46:54,069 --> 00:46:51,760
explain them to us again

1184
00:46:56,150 --> 00:46:54,079
for right now what we're going to do is

1185
00:46:58,230 --> 00:46:56,160
pause and listen for some of those so we

1186
00:47:00,230 --> 00:46:58,240
can try to catch up with the rest of you

1187
00:47:02,470 --> 00:47:00,240
and everyone in the control room find

1188
00:47:05,349 --> 00:47:02,480

out what's going on and just take a step

1189
00:47:45,190 --> 00:47:05,359
back and look at the beautiful sls on

1190
00:47:45,200 --> 00:50:49,910
[Applause]

1191
00:50:53,349 --> 00:50:51,270
okay all personnel to kind of keep it

1192
00:50:55,430 --> 00:50:53,359
down the control room please

1193
00:50:57,589 --> 00:50:55,440
we are coming up on another event here

1194
00:50:59,349 --> 00:50:57,599
in the terminal countdown timeline

1195
00:51:49,590 --> 00:50:59,359
coming up on about team minus 40 minutes

1196
00:53:31,190 --> 00:51:59,870
[Applause]

1197
00:53:35,670 --> 00:53:32,870
all right all personnel we're going to

1198
00:53:37,589 --> 00:53:35,680
be picking up on page 3.27 we're at the

1199
00:53:41,030 --> 00:53:37,599
teamize 40 minute the

1200
00:53:42,630 --> 00:53:41,040
time market event step 4.61 sce let's go

1201
00:53:45,589 --> 00:53:42,640
ahead and initiate the terminal account

1202
00:53:48,390 --> 00:53:45,599
sequencer ioc for sub step alpha let's

1203
00:53:57,270 --> 00:53:48,400
go ahead and enable tcc user underscore

1204
00:54:01,750 --> 00:53:59,190
use your hold enabled in green got me

1205
00:54:03,349 --> 00:54:01,760
and then please enable stctr 48 please

1206
00:54:05,750 --> 00:54:03,359
the stage controller from countdown

1207
00:54:06,750 --> 00:54:05,760
engine anomaly if not already enabled

1208
00:54:09,829 --> 00:54:06,760
uh

1209
00:54:12,470 --> 00:54:09,839
stctr48 enabled in green copy that takes

1210
00:54:14,230 --> 00:54:12,480
us to step 4.62 sequencer let's go ahead

1211
00:54:16,630 --> 00:54:14,240
and perform the stage contour terminal

1212
00:54:18,790 --> 00:54:16,640
count sequencer set up as follows

1213
00:54:20,790 --> 00:54:18,800

please ensure the countdown timer is

1214
00:54:25,990 --> 00:54:20,800
open

1215
00:54:27,349 --> 00:54:26,000
display test commit criteria is also

1216
00:54:31,910 --> 00:54:27,359
open

1217
00:54:34,150 --> 00:54:31,920
and we're going to give a sub step

1218
00:54:36,230 --> 00:54:34,160
charlie if you would verifies on the

1219
00:54:38,789 --> 00:54:36,240
terminal account sequencer that the isc

1220
00:54:40,630 --> 00:54:38,799
has been initiated

1221
00:54:43,109 --> 00:54:40,640
uh verifying initialization was

1222
00:54:46,069 --> 00:54:43,119
successful coming and verify engine

1223
00:54:48,150 --> 00:54:46,079
configuration is hot fire

1224
00:54:50,549 --> 00:54:48,160
engine configuration is high fire and

1225
00:54:51,430 --> 00:54:50,559
verified display configuration is hot

1226
00:54:53,589 --> 00:54:51,440
fire

1227
00:54:55,109 --> 00:54:53,599
display configuration is also how far

1228
00:54:56,870 --> 00:54:55,119
for sub step four please record the

1229
00:54:58,710 --> 00:54:56,880
version of the gls events table being

1230
00:55:02,230 --> 00:54:58,720
used for today

1231
00:55:03,430 --> 00:55:02,240
okay version hot fire version r 98 rail

1232
00:55:06,630 --> 00:55:03,440
eight

1233
00:55:08,630 --> 00:55:06,640
did you copy that vqa no sir

1234
00:55:09,990 --> 00:55:08,640
engine configuration then used today is

1235
00:55:11,910 --> 00:55:10,000
hot fire

1236
00:55:13,349 --> 00:55:11,920
version r

1237
00:55:24,150 --> 00:55:13,359
98

1238
00:55:27,349 --> 00:55:24,160

correct quick alpha copy that takes the

1239
00:55:33,109 --> 00:55:27,359
toughest i have that alpha right

1240
00:55:36,710 --> 00:55:34,630
okay that takes us to the top of page

1241
00:55:38,549 --> 00:55:36,720
328 for sub step five

1242
00:55:41,030 --> 00:55:38,559
verified that the engine configuration

1243
00:55:43,910 --> 00:55:41,040
is the desired version of the gls events

1244
00:55:45,109 --> 00:55:43,920
table you just mentioned

1245
00:55:47,190 --> 00:55:45,119
and fire

1246
00:55:49,670 --> 00:55:47,200
and verify the display configuration is

1247
00:55:51,030 --> 00:55:49,680
also the desired version of the gls

1248
00:55:53,589 --> 00:55:51,040
event stable

1249
00:55:56,309 --> 00:55:53,599
also confirmed okay under your tcs

1250
00:56:02,230 --> 00:55:56,319
engine status verify activate sequencer

1251
00:56:07,510 --> 00:56:05,990
tcf engine status activated uh copy that

1252
00:56:09,589 --> 00:56:07,520
okay for the note there she says we'll

1253
00:56:10,789 --> 00:56:09,599
automatically stop at the t minus 10

1254
00:56:14,829 --> 00:56:10,799
minute hold point

1255
00:56:17,109 --> 00:56:14,839
h-e-a if you're on 16 step 4.63 is

1256
00:56:23,270 --> 00:56:17,119
yours copy that

1257
00:56:23,280 --> 00:56:27,030
getting a second here's coming to 16.

1258
00:56:32,309 --> 00:56:29,750
go for ncc

1259
00:56:34,549 --> 00:56:32,319
ntc can you please verify and or perform

1260
00:56:38,549 --> 00:56:34,559
a helium spin start panel activation for

1261
00:56:40,470 --> 00:56:38,559
dop 11 to provide 1 000 to 1 300 psig to

1262
00:56:41,670 --> 00:56:40,480
the captures

1263
00:56:47,109 --> 00:56:41,680

roger that

1264
00:56:50,630 --> 00:56:48,230
copy that

1265
00:56:54,470 --> 00:56:50,640
and it's complete

1266
00:56:55,910 --> 00:56:54,480
record a utc on that of 0

1267
00:56:56,950 --> 00:56:55,920
1 6

1268
00:56:59,670 --> 00:56:56,960
21

1269
00:57:04,470 --> 00:56:59,680
17

1270
00:57:11,109 --> 00:57:06,390
coming into ntc the next step is yours

1271
00:57:14,390 --> 00:57:12,390
roger that

1272
00:57:17,750 --> 00:57:14,400
and uh in btc

1273
00:57:21,829 --> 00:57:17,760
let's go ahead and prepare this

1274
00:57:23,750 --> 00:57:21,839
the deflector for test configuration

1275
00:57:26,630 --> 00:57:23,760
and he's on the phone but he's been

1276
00:57:28,950 --> 00:57:26,640
coordinating with water plant and he'll

1277
00:57:32,309 --> 00:57:28,960
get the bypasses open in just a moment

1278
00:57:36,150 --> 00:57:34,069
and then to see per our discussion we

1279
00:57:37,670 --> 00:57:36,160
will keep the main we will maintain the

1280
00:57:40,710 --> 00:57:37,680
current timeline in the current

1281
00:59:49,390 --> 00:57:40,720
countdown time for our discussion rajat

1282
00:59:49,400 --> 01:00:17,829
[Applause]

1283
01:00:23,190 --> 01:00:20,549
you are watching nasa's green run hot

1284
01:00:25,510 --> 01:00:23,200
fire test here at stennis space center

1285
01:00:27,750 --> 01:00:25,520
the teams are in a hold

1286
01:00:30,470 --> 01:00:27,760
but we are still well within our window

1287
01:00:32,630 --> 01:00:30,480
for today's test still and i am lucky to

1288
01:00:35,030 --> 01:00:32,640

have alex here with me we've heard a lot

1289
01:00:37,349 --> 01:00:35,040
of conversations from the control room

1290
01:00:40,230 --> 01:00:37,359
over the past few minutes i heard hot

1291
01:00:42,390 --> 01:00:40,240
fire a lot i heard water a few times

1292
01:00:44,150 --> 01:00:42,400
you're the expert what were you hearing

1293
01:00:45,589 --> 01:00:44,160
so um the test conductor instructed

1294
01:00:47,510 --> 01:00:45,599
everyone to go back into our terminal

1295
01:00:49,430 --> 01:00:47,520
countdown sequence um and so at this

1296
01:00:51,190 --> 01:00:49,440
point we are about 30 minutes away from

1297
01:00:52,710 --> 01:00:51,200
the hot fire according to the terminal

1298
01:00:53,829 --> 01:00:52,720
countdown sequence

1299
01:00:55,510 --> 01:00:53,839
some of the other things they're kind of

1300
01:00:56,950 --> 01:00:55,520
talking about um

1301
01:00:58,470 --> 01:00:56,960
turning on the water deflectors right

1302
01:01:00,870 --> 01:00:58,480
for the engine test so there are certain

1303
01:01:02,630 --> 01:01:00,880
configurations that we need to put each

1304
01:01:04,470 --> 01:01:02,640
thing on the stand or or thing on the

1305
01:01:06,390 --> 01:01:04,480
ground in a certain configuration for

1306
01:01:07,910 --> 01:01:06,400
that hot fire so um they're you know

1307
01:01:09,510 --> 01:01:07,920
they're supplying certain amount of

1308
01:01:11,190 --> 01:01:09,520
pressure to different components inside

1309
01:01:12,950 --> 01:01:11,200
the engine section and like we said

1310
01:01:14,470 --> 01:01:12,960
turning on those water deflectors

1311
01:01:16,069 --> 01:01:14,480
retracting some of the stands around

1312
01:01:17,670 --> 01:01:16,079
those engines really to prepare the

1313
01:01:19,589 --> 01:01:17,680

stand and the

1314
01:01:21,270 --> 01:01:19,599
core stage for hot fire we heard at

1315
01:01:22,950 --> 01:01:21,280
least two people talking is that right

1316
01:01:24,630 --> 01:01:22,960
what were those people

1317
01:01:26,309 --> 01:01:24,640
what are those positions back there

1318
01:01:28,069 --> 01:01:26,319
right so the test conductor is basically

1319
01:01:29,349 --> 01:01:28,079
relaying information to individuals

1320
01:01:30,549 --> 01:01:29,359
working the console and each of those

1321
01:01:32,390 --> 01:01:30,559
console

1322
01:01:34,069 --> 01:01:32,400
workers are either going through test

1323
01:01:35,190 --> 01:01:34,079
criteria right so we have test commit

1324
01:01:36,710 --> 01:01:35,200
criteria

1325
01:01:37,990 --> 01:01:36,720
for each part of the test you know

1326
01:01:39,270 --> 01:01:38,000
they're looking at different things that

1327
01:01:40,710 --> 01:01:39,280
are happening with the stand they may be

1328
01:01:42,549 --> 01:01:40,720
controlling the water going on to the

1329
01:01:44,470 --> 01:01:42,559
stand so um he is in direct

1330
01:01:46,150 --> 01:01:44,480
communication with each person that is

1331
01:01:47,990 --> 01:01:46,160
working each individual component on the

1332
01:01:49,589 --> 01:01:48,000
stand so you'll hear them giving out a

1333
01:01:51,910 --> 01:01:49,599
lot of commands of things that need to

1334
01:01:53,910 --> 01:01:51,920
go according to our countdown sequence

1335
01:01:55,910 --> 01:01:53,920
and where are they they're even closer

1336
01:01:57,670 --> 01:01:55,920
than we are right and they're in a safe

1337
01:02:00,390 --> 01:01:57,680
place i hope right absolutely they're in

1338
01:02:03,029 --> 01:02:00,400

a test a test control center um closer

1339
01:02:05,430 --> 01:02:03,039
to the stand i mean that stand

1340
01:02:08,230 --> 01:02:05,440
is wired has wires running all the way

1341
01:02:09,349 --> 01:02:08,240
to the test control center um and in the

1342
01:02:10,789 --> 01:02:09,359
test control center they can see

1343
01:02:13,109 --> 01:02:10,799
everything going on they can see all the

1344
01:02:14,230 --> 01:02:13,119
cameras um and they're each sitting at

1345
01:02:16,230 --> 01:02:14,240
console and they'll be able to make

1346
01:02:18,390 --> 01:02:16,240
decisions real time so you know they're

1347
01:02:20,390 --> 01:02:18,400
sitting in a in a building it's fully

1348
01:02:22,309 --> 01:02:20,400
blast proof right has giant blast doors

1349
01:02:23,510 --> 01:02:22,319
closed in there so um you know the

1350
01:02:24,789 --> 01:02:23,520
team's working really hard you know

1351
01:02:26,230 --> 01:02:24,799
there's a lot of people in there looking

1352
01:02:28,230 --> 01:02:26,240
at a lot of stuff

1353
01:02:30,390 --> 01:02:28,240
um so you know they're obviously working

1354
01:02:32,470 --> 01:02:30,400
through it and uh working towards hot

1355
01:02:34,150 --> 01:02:32,480
fire and those two people we heard are

1356
01:02:35,510 --> 01:02:34,160
they sitting close to each other are

1357
01:02:37,109 --> 01:02:35,520
they hearing each other kind of like

1358
01:02:39,349 --> 01:02:37,119
we're hearing them now so the test

1359
01:02:41,109 --> 01:02:39,359
conductor audio um you know he's he's in

1360
01:02:43,589 --> 01:02:41,119
he's in one part inside the test control

1361
01:02:46,069 --> 01:02:43,599
room so you know he's he's talking on a

1362
01:02:47,670 --> 01:02:46,079
in a regular voice kind of like we are

1363
01:02:49,750 --> 01:02:47,680

and then he could be communicating with

1364
01:02:50,789 --> 01:02:49,760
someone on the far end of the room or he

1365
01:02:52,069 --> 01:02:50,799
could be communicating with someone

1366
01:02:53,430 --> 01:02:52,079
sitting right next to him but that's all

1367
01:02:54,309 --> 01:02:53,440
over the audio kind of like we're

1368
01:02:56,870 --> 01:02:54,319
hearing

1369
01:02:59,190 --> 01:02:56,880
so is this considered normal when you

1370
01:03:00,470 --> 01:02:59,200
think about testing a rocket yeah

1371
01:03:01,510 --> 01:03:00,480
absolutely you know that there's a ton

1372
01:03:03,430 --> 01:03:01,520
of people

1373
01:03:04,870 --> 01:03:03,440
who play a part in the actual test of a

1374
01:03:06,710 --> 01:03:04,880
rocket or in the launch of a rocket

1375
01:03:08,069 --> 01:03:06,720
right so you have to have a proper way

1376
01:03:10,549 --> 01:03:08,079
of communicating

1377
01:03:11,910 --> 01:03:10,559
proper one-way or two-way channels so

1378
01:03:13,430 --> 01:03:11,920
that the correct people can be heard at

1379
01:03:14,710 --> 01:03:13,440
the correct time so

1380
01:03:16,950 --> 01:03:14,720
everything that's happening is you know

1381
01:03:19,510 --> 01:03:16,960
is obviously planned as far as you know

1382
01:03:21,270 --> 01:03:19,520
communication and working through issues

1383
01:03:22,950 --> 01:03:21,280
and then now that we're in our

1384
01:03:24,630 --> 01:03:22,960
close to 30 minute terminal countdown

1385
01:03:25,750 --> 01:03:24,640
we'll be hearing a lot more things over

1386
01:03:27,990 --> 01:03:25,760
the radio

1387
01:03:29,670 --> 01:03:28,000
and we heard about this window so

1388
01:03:31,750 --> 01:03:29,680

there's a certain amount of time that

1389
01:03:33,510 --> 01:03:31,760
they have to be able to light these

1390
01:03:35,349 --> 01:03:33,520
engines it's not like a launch window

1391
01:03:36,710 --> 01:03:35,359
where we're trying to reach the moon so

1392
01:03:38,390 --> 01:03:36,720
we have to pay attention to that but

1393
01:03:40,230 --> 01:03:38,400
what does this window mean

1394
01:03:42,069 --> 01:03:40,240
so you know there's there's certain

1395
01:03:43,510 --> 01:03:42,079
operating um

1396
01:03:44,950 --> 01:03:43,520
guidelines that we have for certain

1397
01:03:47,029 --> 01:03:44,960
things in the engine there are certain

1398
01:03:48,390 --> 01:03:47,039
times that we can have avionics

1399
01:03:49,990 --> 01:03:48,400
boxes powered on and there's certain

1400
01:03:51,510 --> 01:03:50,000
times that we're allowed to have the

1401
01:03:52,789 --> 01:03:51,520
batteries running on internal power

1402
01:03:54,470 --> 01:03:52,799
things like that

1403
01:03:55,990 --> 01:03:54,480
obviously while the core stage is

1404
01:03:57,270 --> 01:03:56,000
integrated to the stand we have a little

1405
01:03:59,029 --> 01:03:57,280
more leeway because the stand is

1406
01:04:00,630 --> 01:03:59,039
supplying a lot of that power supplying

1407
01:04:03,270 --> 01:04:00,640
a lot of you know the materials we need

1408
01:04:05,190 --> 01:04:03,280
to continue testing um you know it's

1409
01:04:07,270 --> 01:04:05,200
going to be more of a process for them

1410
01:04:09,109 --> 01:04:07,280
to determine what the next step forward

1411
01:04:10,309 --> 01:04:09,119
is for testing i mean i'm sure it's

1412
01:04:12,150 --> 01:04:10,319
something we'll hear over the test

1413
01:04:14,549 --> 01:04:12,160

conductor audio okay i'm going to be

1414
01:04:16,230 --> 01:04:14,559
coming back to you a lot more again

1415
01:04:18,230 --> 01:04:16,240
we're going to keep you in the hot seat

1416
01:04:21,990 --> 01:04:18,240
here even though it's cold outside we're

1417
01:04:23,829 --> 01:04:22,000
all excited for the the big hot blast um

1418
01:04:26,549 --> 01:04:23,839
coming and i think you said about 30

1419
01:04:28,549 --> 01:04:26,559
minutes is what we're expecting so again

1420
01:04:30,710 --> 01:04:28,559
what we're going to do a reminder this

1421
01:04:32,390 --> 01:04:30,720
is a live test we're still listening in

1422
01:04:34,789 --> 01:04:32,400
for the control room teams as they're

1423
01:04:37,029 --> 01:04:34,799
reviewing this data as we're leading up

1424
01:04:38,630 --> 01:04:37,039
to the test point they're still having a

1425
01:04:41,829 --> 01:04:38,640
conversation right now about the

1426
01:04:43,829 --> 01:04:41,839
appropriate steps to move forward so

1427
01:04:45,829 --> 01:04:43,839
again we're going to join you we're

1428
01:04:47,510 --> 01:04:45,839
going to take a step back and just watch

1429
01:04:49,829 --> 01:04:47,520
we're going to look at the test stand

1430
01:04:51,990 --> 01:04:49,839
and listen in for the control center

1431
01:04:53,670 --> 01:04:52,000
we're going to let alex digest it all

1432
01:07:57,600 --> 01:04:53,680
for us and we'll come back to you in

1433
01:27:18,629 --> 01:08:10,970
[Applause]

1434
01:27:23,430 --> 01:27:21,270
and you are watching nasa's green run

1435
01:27:26,709 --> 01:27:23,440
hot fire test here at stennis space

1436
01:27:29,270 --> 01:27:26,719
center the teams are in a hold but we

1437
01:27:32,229 --> 01:27:29,280
are still well within our window for

1438
01:27:34,709 --> 01:27:32,239

today's test and we did just get an

1439
01:27:37,350 --> 01:27:34,719
update and so we've got our expert here

1440
01:27:39,430 --> 01:27:37,360
alex a core stage engineer alex what did

1441
01:27:40,950 --> 01:27:39,440
we just hear from the control room so

1442
01:27:42,470 --> 01:27:40,960
our test conductor is kind of discussing

1443
01:27:44,470 --> 01:27:42,480
um a path forward obviously with our

1444
01:27:46,550 --> 01:27:44,480
test um right now we're about the t

1445
01:27:48,870 --> 01:27:46,560
minus 10 minute mark so we're in a

1446
01:27:50,149 --> 01:27:48,880
holding pattern for that t minus 10.

1447
01:27:51,990 --> 01:27:50,159
they're going to go around continuing to

1448
01:27:54,070 --> 01:27:52,000
monitor our fuel levels you know our

1449
01:27:55,990 --> 01:27:54,080
propellant how much repellent we have

1450
01:27:58,070 --> 01:27:56,000
not only in the core stage itself but

1451
01:27:59,590 --> 01:27:58,080
also we have on reserve and then over

1452
01:28:01,110 --> 01:27:59,600
the next 10 to 15 minutes they'll kind

1453
01:28:03,669 --> 01:28:01,120
of have a discussion

1454
01:28:05,189 --> 01:28:03,679
about you know our proponent reserves

1455
01:28:06,950 --> 01:28:05,199
the path forward and whether we're going

1456
01:28:09,110 --> 01:28:06,960
to go into that t minus 10 minute

1457
01:28:11,669 --> 01:28:09,120
countdown sequence okay so we heard

1458
01:28:13,910 --> 01:28:11,679
about one hold earlier when we started

1459
01:28:15,750 --> 01:28:13,920
taking our pauses and listening in this

1460
01:28:17,750 --> 01:28:15,760
sounds like we're in a different hold is

1461
01:28:19,669 --> 01:28:17,760
that right right so the t-minus tin hold

1462
01:28:21,669 --> 01:28:19,679
is is really the last major milestone

1463
01:28:24,229 --> 01:28:21,679

before we get into a lot of the major

1464
01:28:26,149 --> 01:28:24,239
operations that we use um to get into

1465
01:28:28,790 --> 01:28:26,159
the actual hot fire so you know starting

1466
01:28:30,790 --> 01:28:28,800
at the t-10 mark we every minute we have

1467
01:28:31,750 --> 01:28:30,800
a lot of very important tasks that we'll

1468
01:28:33,510 --> 01:28:31,760
be doing

1469
01:28:35,189 --> 01:28:33,520
up until hot fire okay so let's walk

1470
01:28:38,470 --> 01:28:35,199
through those what else will we expect

1471
01:28:40,310 --> 01:28:38,480
to hear once we hit t-10 and then what

1472
01:28:42,950 --> 01:28:40,320
are some of the calls we can expect to

1473
01:28:45,030 --> 01:28:42,960
listen in on and expect going forward

1474
01:28:46,310 --> 01:28:45,040
right so once we start t minus 10 count

1475
01:28:48,709 --> 01:28:46,320
um we'll have a lot of software that

1476
01:28:50,390 --> 01:28:48,719
gets initiated to to start the the hot

1477
01:28:52,310 --> 01:28:50,400
fire right on some of that's automated

1478
01:28:53,990 --> 01:28:52,320
some of it's not um you know we'll move

1479
01:28:55,910 --> 01:28:54,000
into activation of some of our major

1480
01:28:57,990 --> 01:28:55,920
propulsion components

1481
01:28:59,430 --> 01:28:58,000
we'll turn on our campus at about the

1482
01:29:00,629 --> 01:28:59,440
four minute mark and those are used to

1483
01:29:02,070 --> 01:29:00,639
kind of steer our engines with our

1484
01:29:04,390 --> 01:29:02,080
hydraulic system

1485
01:29:06,310 --> 01:29:04,400
from there we'll start certain purges

1486
01:29:08,149 --> 01:29:06,320
inside the engine section and then we'll

1487
01:29:10,709 --> 01:29:08,159
move into internal power within the

1488
01:29:12,470 --> 01:29:10,719

rocket so it's fully powering itself

1489
01:29:15,430 --> 01:29:12,480
and then we'll start the engine sequence

1490
01:29:17,669 --> 01:29:15,440
and a reminder this is a live show we

1491
01:29:19,510 --> 01:29:17,679
are listening into the control room it's

1492
01:29:21,110 --> 01:29:19,520
very important that alex doesn't just

1493
01:29:22,790 --> 01:29:21,120
keep talking giving us interesting

1494
01:29:25,669 --> 01:29:22,800
answers the whole time because he needs

1495
01:29:26,870 --> 01:29:25,679
to listen in to be able to digest what

1496
01:29:29,030 --> 01:29:26,880
we're hearing

1497
01:29:31,669 --> 01:29:29,040
so uh he can tell us what's going on and

1498
01:29:33,189 --> 01:29:31,679
we can get more of an update so we're

1499
01:29:35,430 --> 01:29:33,199
going to do that now we're going to take

1500
01:29:37,110 --> 01:29:35,440
another pause we're going to sit back

1501
01:29:39,350 --> 01:29:37,120
with you just like you are at home and

1502
01:29:41,110 --> 01:29:39,360
we're going to watch the test stand

1503
01:29:42,950 --> 01:29:41,120
we're going to have alex listen into the

1504
01:29:46,550 --> 01:29:42,960
control room so we can come back and

1505
01:31:49,570 --> 01:29:46,560
find out when we can watch the sls core

1506
01:44:57,510 --> 01:35:20,560
[Applause]

1507
01:45:00,709 --> 01:44:59,109
and if you've been with us since the top

1508
01:45:03,109 --> 01:45:00,719
of the show you've heard me say this a

1509
01:45:05,109 --> 01:45:03,119
few times but we are so happy you're

1510
01:45:08,470 --> 01:45:05,119
still here with us you are watching

1511
01:45:10,790 --> 01:45:08,480
nasa's green run hot fire test here at

1512
01:45:13,510 --> 01:45:10,800
stennis space center in mississippi the

1513
01:45:15,990 --> 01:45:13,520

teams are still in a hold and we are

1514
01:45:18,310 --> 01:45:16,000
still within today's window for the test

1515
01:45:20,870 --> 01:45:18,320
we do have an update so i'm excited

1516
01:45:23,270 --> 01:45:20,880
again to have alex cagnola here with us

1517
01:45:24,709 --> 01:45:23,280
alex what's happening right now so right

1518
01:45:26,629 --> 01:45:24,719
now our teams are still kind of doing

1519
01:45:28,229 --> 01:45:26,639
some preps before we move into our t

1520
01:45:29,669 --> 01:45:28,239
minus 10 minute account

1521
01:45:31,270 --> 01:45:29,679
there's a lot of just individual preps

1522
01:45:32,709 --> 01:45:31,280
you have to do on the stand um

1523
01:45:34,229 --> 01:45:32,719
individual components you know certain

1524
01:45:35,590 --> 01:45:34,239
configurations we have to put everything

1525
01:45:37,430 --> 01:45:35,600
in before we actually do perform that

1526
01:45:39,350 --> 01:45:37,440
hot fire um you know they're going

1527
01:45:41,270 --> 01:45:39,360
around they're polling uh all of our

1528
01:45:43,590 --> 01:45:41,280
program management and our and our chief

1529
01:45:44,950 --> 01:45:43,600
engineers to see um you know

1530
01:45:46,709 --> 01:45:44,960
you know are we good to go on you know

1531
01:45:47,830 --> 01:45:46,719
or we need to move on um you know we're

1532
01:45:49,430 --> 01:45:47,840
also monitoring other things you know

1533
01:45:51,430 --> 01:45:49,440
we're monitoring how much propellant we

1534
01:45:53,669 --> 01:45:51,440
have in the tanks how much propellant we

1535
01:45:56,149 --> 01:45:53,679
have um on reserve on the barges to to

1536
01:45:57,430 --> 01:45:56,159
use for the hot fire um and then just as

1537
01:45:58,470 --> 01:45:57,440
we work through those issues we'll hear

1538
01:46:00,629 --> 01:45:58,480

more information

1539
01:46:02,870 --> 01:46:00,639
as we get closer so you said monitoring

1540
01:46:05,430 --> 01:46:02,880
how much propellant we have on the tanks

1541
01:46:07,430 --> 01:46:05,440
why is that important at this step right

1542
01:46:08,950 --> 01:46:07,440
so this whole time before we go into hot

1543
01:46:10,709 --> 01:46:08,960
fire we're in a phase called replenish

1544
01:46:13,030 --> 01:46:10,719
phase i know we kind of talked about

1545
01:46:14,870 --> 01:46:13,040
that but you know that fuel is very very

1546
01:46:17,510 --> 01:46:14,880
cold and you know in the outside right

1547
01:46:18,790 --> 01:46:17,520
now it's not as cold right um and so you

1548
01:46:20,390 --> 01:46:18,800
know constantly that fuel is being

1549
01:46:22,310 --> 01:46:20,400
converted into gas and then vented out

1550
01:46:23,590 --> 01:46:22,320
of the tanks and then so the entire time

1551
01:46:25,350 --> 01:46:23,600
we're in a phase

1552
01:46:26,870 --> 01:46:25,360
called replenish where we're constantly

1553
01:46:28,229 --> 01:46:26,880
pumping a little bit of fuel back into

1554
01:46:30,470 --> 01:46:28,239
the tanks to make sure it's at max

1555
01:46:32,229 --> 01:46:30,480
capacity and we've said at the beginning

1556
01:46:34,390 --> 01:46:32,239
of this show that this hot fire test can

1557
01:46:36,629 --> 01:46:34,400
last up to eight minutes what i

1558
01:46:38,229 --> 01:46:36,639
understand is we can learn a lot in just

1559
01:46:39,510 --> 01:46:38,239
the first few minutes is that right

1560
01:46:40,950 --> 01:46:39,520
right you know a lot of the engineering

1561
01:46:43,270 --> 01:46:40,960
data we're looking to get um really

1562
01:46:45,750 --> 01:46:43,280
comes in the first 250 seconds so you

1563
01:46:47,030 --> 01:46:45,760

know whenever we do initiate hot fire

1564
01:46:48,229 --> 01:46:47,040
you know we're going to be gambling our

1565
01:46:49,510 --> 01:46:48,239
engines a little bit right so we'll be

1566
01:46:50,790 --> 01:46:49,520
moving the engines and it's in a certain

1567
01:46:52,870 --> 01:46:50,800
pattern that'll kind of mirror what we

1568
01:46:54,310 --> 01:46:52,880
might expect during launch um we know

1569
01:46:55,910 --> 01:46:54,320
we'll be throttling down the engines for

1570
01:46:57,350 --> 01:46:55,920
a while then we might throttle them back

1571
01:46:58,550 --> 01:46:57,360
up you know there's there's a lot of

1572
01:46:59,830 --> 01:46:58,560
things that we're going to try out and

1573
01:47:02,390 --> 01:46:59,840
most of those things will be in the

1574
01:47:03,910 --> 01:47:02,400
first 250 seconds obviously when we want

1575
01:47:06,070 --> 01:47:03,920
to go for the full eight minutes that we

1576
01:47:07,590 --> 01:47:06,080
will see during launch um but you know i

1577
01:47:09,669 --> 01:47:07,600
think we'll get a lot of really useful

1578
01:47:11,910 --> 01:47:09,679
data in those first few minutes so you

1579
01:47:14,790 --> 01:47:11,920
said gimbling the engines moving them a

1580
01:47:16,149 --> 01:47:14,800
little bit it's not like a nascar turn

1581
01:47:17,910 --> 01:47:16,159
or anything like that we'll be seeing

1582
01:47:19,430 --> 01:47:17,920
the engines right just small movements

1583
01:47:20,870 --> 01:47:19,440
yeah it's very very small movements and

1584
01:47:23,830 --> 01:47:20,880
you might not even notice you know it's

1585
01:47:25,270 --> 01:47:23,840
only a few degrees in each way you know

1586
01:47:27,750 --> 01:47:25,280
and you might see a couple of them move

1587
01:47:29,669 --> 01:47:27,760
the same time or you might not

1588
01:47:30,950 --> 01:47:29,679

but that few degrees can can really

1589
01:47:32,470 --> 01:47:30,960
change your trajectory of your rocket

1590
01:47:35,350 --> 01:47:32,480
when you do launch it so it's important

1591
01:47:36,790 --> 01:47:35,360
to be able to test that here at stennis

1592
01:47:38,070 --> 01:47:36,800
while we're hot firing and not just when

1593
01:47:39,189 --> 01:47:38,080
the engines are just sitting there it's

1594
01:47:40,390 --> 01:47:39,199
a lot different when you have all that

1595
01:47:41,510 --> 01:47:40,400
thrust coming out the bottom of the

1596
01:47:43,669 --> 01:47:41,520
rocket

1597
01:47:45,189 --> 01:47:43,679
than it is just testing it without it so

1598
01:47:47,669 --> 01:47:45,199
i'd love for you to take a second with

1599
01:47:50,149 --> 01:47:47,679
me and just take a look back we can see

1600
01:47:52,310 --> 01:47:50,159
a little bit of white steam smoke coming

1601
01:47:54,229 --> 01:47:52,320
out can you describe that for us

1602
01:47:56,950 --> 01:47:54,239
right so what you're kind of seeing

1603
01:47:58,709 --> 01:47:56,960
right now is the max deflectors um the

1604
01:47:59,910 --> 01:47:58,719
water deflectors on the flame ramp right

1605
01:48:01,910 --> 01:47:59,920
so we kind of talked about how much

1606
01:48:04,470 --> 01:48:01,920
water they're pumping you know 110 000

1607
01:48:06,070 --> 01:48:04,480
gallons every 20 minutes or so

1608
01:48:09,109 --> 01:48:06,080
so it's a lot you know it's a lot of

1609
01:48:11,030 --> 01:48:09,119
water coming out um you know and roughly

1610
01:48:12,790 --> 01:48:11,040
32 000 holes on that flame ramp that are

1611
01:48:14,470 --> 01:48:12,800
all pumping water so

1612
01:48:16,550 --> 01:48:14,480
you know obviously you're going to see a

1613
01:48:17,750 --> 01:48:16,560

lot of mist before the hot fire and

1614
01:48:19,189 --> 01:48:17,760
they'll actually even increase the

1615
01:48:21,109 --> 01:48:19,199
amount of water coming up when we do get

1616
01:48:22,950 --> 01:48:21,119
closer as well and those are called

1617
01:48:25,109 --> 01:48:22,960
flame buckets am i right yeah that's

1618
01:48:26,550 --> 01:48:25,119
right it's a flame bucket um you know

1619
01:48:27,750 --> 01:48:26,560
you might even see some flame coming out

1620
01:48:29,590 --> 01:48:27,760
of there whenever we do light up all

1621
01:48:31,590 --> 01:48:29,600
four engines so it'll be very exciting

1622
01:48:33,990 --> 01:48:31,600
um you know in you know obviously all

1623
01:48:35,830 --> 01:48:34,000
the safety systems are in place to

1624
01:48:38,310 --> 01:48:35,840
take care of that when we do do hot fire

1625
01:48:40,950 --> 01:48:38,320
okay and again we are still in a hold in

1626
01:48:42,790 --> 01:48:40,960
some way this is a planned hold we've

1627
01:48:45,590 --> 01:48:42,800
got different versions of holds

1628
01:48:47,510 --> 01:48:45,600
throughout the test uh and as we get

1629
01:48:48,390 --> 01:48:47,520
more information we're going to come

1630
01:48:50,950 --> 01:48:48,400
back

1631
01:48:52,149 --> 01:48:50,960
we still have alex here with us i'm not

1632
01:48:54,310 --> 01:48:52,159
going to let him leave you're going to

1633
01:48:56,950 --> 01:48:54,320
stay miked into your chair right here

1634
01:48:58,550 --> 01:48:56,960
because we want your expertise on what's

1635
01:49:00,390 --> 01:48:58,560
going on and as soon as we have more

1636
01:49:01,990 --> 01:49:00,400
information from the control room we're

1637
01:49:04,070 --> 01:49:02,000
going to come right back to you for now

1638
01:49:05,990 --> 01:49:04,080

we are going to take a step back and

1639
01:49:07,590 --> 01:49:06,000
look at the test stand just like you are

1640
01:53:20,240 --> 01:49:07,600
at home and we'll be back in a few

1641
01:56:11,270 --> 01:54:05,980
[Applause]

1642
01:56:17,030 --> 01:56:14,229
we've got our most exciting update uh in

1643
01:56:18,790 --> 01:56:17,040
a few minutes we are now inside

1644
01:56:20,870 --> 01:56:18,800
terminal count and again i'm not the

1645
01:56:22,310 --> 01:56:20,880
expert here we've got alex cagnola with

1646
01:56:24,149 --> 01:56:22,320
us who's going to explain what that

1647
01:56:25,669 --> 01:56:24,159
means and how did we get to this point

1648
01:56:27,830 --> 01:56:25,679
right so the test conductor just came on

1649
01:56:29,350 --> 01:56:27,840
the auto and on the audio and alerted us

1650
01:56:31,030 --> 01:56:29,360
that we're about nine minutes away

1651
01:56:32,950 --> 01:56:31,040
actually so um we'll be getting some

1652
01:56:34,790 --> 01:56:32,960
pretty regular updates here um you know

1653
01:56:36,310 --> 01:56:34,800
we will be hearing some activation of

1654
01:56:38,149 --> 01:56:36,320
some different components on the rocket

1655
01:56:39,270 --> 01:56:38,159
before the hot fire i mean obviously

1656
01:56:40,950 --> 01:56:39,280
there's a lot of steps that we'll be

1657
01:56:42,550 --> 01:56:40,960
hearing um going into the actual hot

1658
01:56:44,550 --> 01:56:42,560
fire with things like like we talked

1659
01:56:46,550 --> 01:56:44,560
about cap activation you know move to

1660
01:56:48,550 --> 01:56:46,560
internal power um you know there's any

1661
01:56:49,990 --> 01:56:48,560
kind of audio that might slow down the

1662
01:56:51,750 --> 01:56:50,000
terminal count they'll kind of come on

1663
01:56:53,510 --> 01:56:51,760

the air and tell us that too but right

1664
01:56:55,030 --> 01:56:53,520
now we are in that final sequence that

1665
01:56:56,870 --> 01:56:55,040
last you know eight and a half to eight

1666
01:56:58,470 --> 01:56:56,880
minutes um so we're going to sit back

1667
01:57:00,550 --> 01:56:58,480
and kind of listen for the updates from

1668
01:57:02,790 --> 01:57:00,560
the test conductor and this wasn't one

1669
01:57:04,310 --> 01:57:02,800
person's decision this is a full group

1670
01:57:06,550 --> 01:57:04,320
that has to make the decision that we

1671
01:57:08,470 --> 01:57:06,560
are ready to keep going right every bit

1672
01:57:10,310 --> 01:57:08,480
one second what i do want to remind

1673
01:57:13,990 --> 01:57:10,320
everyone now is that you're actually

1674
01:57:16,149 --> 01:57:14,000
able to hear the control room audio just

1675
01:57:18,629 --> 01:57:16,159
like we are so what we're going to try

1676
01:57:21,350 --> 01:57:18,639
to do is when the test conductor starts

1677
01:57:23,109 --> 01:57:21,360
talking i'm going to rudely cut alex off

1678
01:57:24,629 --> 01:57:23,119
in the middle of what he's talking about

1679
01:57:26,550 --> 01:57:24,639
and try to make sure that we can all

1680
01:57:28,870 --> 01:57:26,560
listen and give him enough time to

1681
01:57:31,589 --> 01:57:28,880
understand that call so uh we just

1682
01:57:33,430 --> 01:57:31,599
missed one again this is a live show but

1683
01:57:35,030 --> 01:57:33,440
i want to get back to how we got to this

1684
01:57:36,950 --> 01:57:35,040
decision and again it's not just one

1685
01:57:39,109 --> 01:57:36,960
person right you know that goes back to

1686
01:57:40,629 --> 01:57:39,119
you know we have a great team working on

1687
01:57:42,149 --> 01:57:40,639
all the engineering issues you know and

1688
01:57:43,750 --> 01:57:42,159

then obviously you know they kind of

1689
01:57:45,430 --> 01:57:43,760
come up with a story about what's going

1690
01:57:47,270 --> 01:57:45,440
on and they present that in the best way

1691
01:57:49,109 --> 01:57:47,280
possible to our program management and

1692
01:57:50,870 --> 01:57:49,119
to you know those who are the big

1693
01:57:52,390 --> 01:57:50,880
decision makers and so every time we

1694
01:57:53,589 --> 01:57:52,400
have a big milestone like this we have

1695
01:57:55,910 --> 01:57:53,599
to pull the whole board you know

1696
01:57:57,270 --> 01:57:55,920
everyone brings up their concerns um or

1697
01:57:59,669 --> 01:57:57,280
if they think you know going forward

1698
01:58:01,270 --> 01:57:59,679
what they think um and then do a go no

1699
01:58:02,629 --> 01:58:01,280
go pull and it sounds like everyone

1700
01:58:04,790 --> 01:58:02,639
wants to go

1701
01:58:06,950 --> 01:58:04,800
so we're moving forward terminal count

1702
01:58:09,430 --> 01:58:06,960
okay and again you can hear some of that

1703
01:58:10,870 --> 01:58:09,440
test conductor audio i'm sure you

1704
01:58:13,109 --> 01:58:10,880
couldn't hear that one because you were

1705
01:58:15,030 --> 01:58:13,119
talking giving us a great explanation

1706
01:58:16,790 --> 01:58:15,040
but now i do want to know so um in

1707
01:58:18,870 --> 01:58:16,800
within these 10 minutes we're now about

1708
01:58:20,550 --> 01:58:18,880
seven minutes i understand what are we

1709
01:58:22,790 --> 01:58:20,560
expecting to hear from the test

1710
01:58:26,149 --> 01:58:22,800
conductor right yo you're here test

1711
01:58:28,390 --> 01:58:26,159
conductor say a few things things like

1712
01:58:30,310 --> 01:58:28,400
initiate purge start and that purge will

1713
01:58:32,310 --> 01:58:30,320

be a nitrogen gas purge inside the

1714
01:58:34,310 --> 01:58:32,320
engine section that's part of just the

1715
01:58:36,790 --> 01:58:34,320
normal sequence of purging the whole

1716
01:58:39,109 --> 01:58:36,800
area around the engines before you

1717
01:58:40,629 --> 01:58:39,119
initiate hot fire um you'll hear move to

1718
01:58:42,470 --> 01:58:40,639
internal power that's a big one we'll

1719
01:58:44,070 --> 01:58:42,480
take all the now all the boxes and all

1720
01:58:46,070 --> 01:58:44,080
the batteries everything on board the

1721
01:58:47,830 --> 01:58:46,080
core stage will be powering itself

1722
01:58:50,070 --> 01:58:47,840
almost like you would have during launch

1723
01:58:52,149 --> 01:58:50,080
um and then you'll move into als start

1724
01:58:53,750 --> 01:58:52,159
which is our pre-ignition engine start

1725
01:58:55,830 --> 01:58:53,760
um and that'll be right before 30

1726
01:58:58,390 --> 01:58:55,840
seconds before t-zero where we'll power

1727
01:59:00,709 --> 01:58:58,400
up the engines okay so we're about six

1728
01:59:02,310 --> 01:59:00,719
minutes on my mark we just heard about

1729
01:59:03,830 --> 01:59:02,320
six minutes was that right that is six

1730
01:59:05,990 --> 01:59:03,840
minutes away so they're gonna start

1731
01:59:07,589 --> 01:59:06,000
really um having a lot more calls on the

1732
01:59:09,350 --> 01:59:07,599
audio we're gonna hear we might even

1733
01:59:11,189 --> 01:59:09,360
hear some things being turned on inside

1734
01:59:12,709 --> 01:59:11,199
inside the core stage so um you know

1735
01:59:14,709 --> 01:59:12,719
obviously we'll start talking less as we

1736
01:59:17,189 --> 01:59:14,719
hear more audio comes through okay sure

1737
01:59:19,589 --> 01:59:17,199
what will those things sound like uh so

1738
01:59:20,870 --> 01:59:19,599

you'll hear tcc you know um you know

1739
01:59:22,390 --> 01:59:20,880
more and more calls they'll be talking

1740
01:59:24,390 --> 01:59:22,400
to more in the control of individuals

1741
01:59:26,070 --> 01:59:24,400
who'll be talking to people

1742
01:59:28,870 --> 01:59:26,080
yeah sir looks like somebody would

1743
01:59:30,950 --> 01:59:28,880
interpret the tcs window yeah nobody

1744
01:59:33,270 --> 01:59:30,960
else should have the tcsq if you have it

1745
01:59:34,310 --> 01:59:33,280
open please close it at this time

1746
01:59:35,510 --> 01:59:34,320
so right they're just working through

1747
01:59:36,550 --> 01:59:35,520
some small things between all the

1748
01:59:37,830 --> 01:59:36,560
monitors you know they're they're

1749
01:59:39,350 --> 01:59:37,840
opening and closing certain things that

1750
01:59:41,109 --> 01:59:39,360
need to be closed inside the rocket you

1751
01:59:42,390 --> 01:59:41,119
know from the stand um you know there's

1752
01:59:43,510 --> 01:59:42,400
going to completely secure the stand

1753
01:59:45,510 --> 01:59:43,520
with everything that needs to be done

1754
01:59:47,350 --> 01:59:45,520
before the hot fire and really it's just

1755
01:59:50,550 --> 01:59:47,360
the final preps before we do

1756
01:59:52,550 --> 01:59:50,560
initiate engine start okay again you are

1757
01:59:54,709 --> 01:59:52,560
all hearing what we're hearing we're

1758
01:59:56,390 --> 01:59:54,719
pausing whenever the test conductor is

1759
01:59:57,830 --> 01:59:56,400
speaking or other people

1760
01:59:59,109 --> 01:59:57,840
in the control center are speaking

1761
02:00:00,870 --> 01:59:59,119
because we're trying to learn what's

1762
02:00:03,189 --> 02:00:00,880
happening to the russians

1763
02:00:05,350 --> 02:00:03,199

it sounds like about five minutes away

1764
02:00:07,030 --> 02:00:05,360
on their mark again remind us who's the

1765
02:00:08,709 --> 02:00:07,040
one in our ear what's that role so

1766
02:00:11,109 --> 02:00:08,719
that's our green run test conductor and

1767
02:00:13,270 --> 02:00:11,119
he's kind of been um the one in control

1768
02:00:14,790 --> 02:00:13,280
of all the green run test cases not just

1769
02:00:16,470 --> 02:00:14,800
this one being at this point so he has a

1770
02:00:18,709 --> 02:00:16,480
great working relationship

1771
02:00:20,550 --> 02:00:18,719
with all those that are on the test team

1772
02:00:22,310 --> 02:00:20,560
and so um

1773
02:00:23,990 --> 02:00:22,320
obviously right now we're in t minus

1774
02:00:26,149 --> 02:00:24,000
five minutes um you know so there'll be

1775
02:00:28,390 --> 02:00:26,159
a lot of activation going up until we do

1776
02:00:30,790 --> 02:00:28,400
hot fire so you know like we said caffu

1777
02:00:32,870 --> 02:00:30,800
spin up um you know move to internal

1778
02:00:34,390 --> 02:00:32,880
power purge sequence and then we'll move

1779
02:00:35,430 --> 02:00:34,400
into independent activation it's all

1780
02:00:38,229 --> 02:00:35,440
going to come forward

1781
02:00:47,910 --> 02:00:38,239
for a second pcc violation we're holding

1782
02:00:52,830 --> 02:00:50,709
copy that we'll wait till we get to the

1783
02:00:54,470 --> 02:00:52,840
hold at t minus

1784
02:00:56,070 --> 02:00:54,480
440.

1785
02:00:57,430 --> 02:00:56,080
we're in the whole time we're in the go

1786
02:00:59,270 --> 02:00:57,440
and if you want to go ahead and use that

1787
02:01:01,030 --> 02:00:59,280
pre-plan bleach

1788
02:01:03,510 --> 02:01:01,040

let's

1789
02:01:08,709 --> 02:01:03,520
go to manual mode and try to dial in

1790
02:01:11,750 --> 02:01:10,149
if this is the right time can you break

1791
02:01:14,070 --> 02:01:11,760
down what we just heard so they're

1792
02:01:16,790 --> 02:01:14,080
moving into some some final sequencing

1793
02:01:19,350 --> 02:01:16,800
um obviously you can see um on the flame

1794
02:01:20,629 --> 02:01:19,360
bucket they've now initiated max water

1795
02:01:27,669 --> 02:01:20,639
flow into the flame buckets you'll be

1796
02:01:31,830 --> 02:01:30,149
two minutes 35 seconds on the on before

1797
02:01:34,149 --> 02:01:31,840
the one minute and 40 hold from what i

1798
02:01:36,790 --> 02:01:34,159
understand um so obviously that one

1799
02:01:38,149 --> 02:01:36,800
minute 40 hold will be the last little

1800
02:01:40,550 --> 02:01:38,159
timer

1801
02:01:42,149 --> 02:01:40,560
um before we do start uh start up the

1802
02:01:43,830 --> 02:01:42,159
engine so it's very exciting

1803
02:01:45,669 --> 02:01:43,840
we're getting excited i can hear

1804
02:01:47,270 --> 02:01:45,679
everyone around us getting excited this

1805
02:01:48,950 --> 02:01:47,280
is great and what we're going to make

1806
02:01:51,430 --> 02:01:48,960
sure we do is we have to make sure we're

1807
02:01:53,830 --> 02:01:51,440
all being safe here reset that whenever

1808
02:01:55,910 --> 02:01:53,840
you get ready we are at the one minute

1809
02:01:57,669 --> 02:01:55,920
and 30 seconds in the whole timer okay

1810
02:01:59,990 --> 02:01:57,679
if you're in the band go ahead and reset

1811
02:02:01,189 --> 02:02:00,000
mps 17 please so we're going to go ahead

1812
02:02:04,390 --> 02:02:01,199
and take a step back we're going to put

1813
02:02:07,669 --> 02:02:04,400

our ear protection on uh so we'll be

1814
02:02:10,149 --> 02:02:07,679
moving into internal power um and again

1815
02:02:12,870 --> 02:02:10,159
putting our ear protection on listening

1816
02:02:16,070 --> 02:02:12,880
in from here on out and observing this

1817
02:02:26,149 --> 02:02:16,080
major milestone on america's return to

1818
02:02:26,159 --> 02:02:31,990
three two one

1819
02:03:01,430 --> 02:02:34,629
we're counting down

1820
02:03:07,430 --> 02:03:03,350
coming up on t minus four minutes on my

1821
02:05:01,589 --> 02:04:02,229
mark

1822
02:05:08,069 --> 02:05:03,189
coming up in team eyes two minutes on my

1823
02:05:08,079 --> 02:05:30,550
mark

1824
02:05:30,560 --> 02:05:38,069
come up on t minus 130

1825
02:05:38,079 --> 02:06:01,750
mark

1826
02:06:07,990 --> 02:06:03,350
coming up in two minus one minute on my

1827
02:06:08,000 --> 02:06:23,109
mark

1828
02:06:29,189 --> 02:06:25,270
if um for all personnel report that

1829
02:06:30,229 --> 02:06:29,199
you're ready to go pea okay

1830
02:06:39,350 --> 02:06:30,239
go aea

1831
02:06:39,360 --> 02:06:56,550
all right we're in als

1832
02:06:56,560 --> 02:07:14,069
foreign

1833
02:07:32,310 --> 02:07:16,790
please continue on to your system and

1834
02:07:32,320 --> 02:07:58,709
all right 25 seconds

1835
02:07:58,719 --> 02:08:12,390
we got four good engines right

1836
02:08:17,270 --> 02:08:14,470
it passes through at 60. let's see plus

1837
02:08:25,910 --> 02:08:20,550
get into our first gimbal profile

1838
02:08:29,669 --> 02:08:28,390

and we got to shut down

1839
02:08:31,990 --> 02:08:29,679
personnel

1840
02:08:33,510 --> 02:08:32,000
uh shutdown looks like uh let's all get

1841
02:08:35,750 --> 02:08:33,520
it to page

1842
02:08:46,110 --> 02:08:35,760
656 page

1843
02:08:46,120 --> 02:08:50,629
[Applause]

1844
02:08:54,149 --> 02:08:52,149
okay offers now it's going to be post

1845
02:08:56,470 --> 02:08:54,159
hoc fights post caught fired or shut

1846
02:08:59,589 --> 02:08:56,480
down securing operations in page

1847
02:09:04,390 --> 02:09:01,430
i need you to verify with the engine

1848
02:09:06,709 --> 02:09:04,400
guys yeah

1849
02:09:10,069 --> 02:09:06,719
that does take us to the last page there

1850
02:09:12,950 --> 02:09:10,079
on page 632. ar1 if you wouldn't step

1851
02:09:14,790 --> 02:09:12,960
4.241 please verify course of engine

1852
02:09:16,830 --> 02:09:14,800
ones and four have shut down for that

1853
02:09:17,270 --> 02:09:16,840
step and we have a safe

1854
02:09:19,189 --> 02:09:17,280
shutdown down standby engines one

1855
02:09:19,199 --> 02:10:04,390
through four

1856
02:10:10,069 --> 02:10:07,910
we just saw the core stage of sls fire

1857
02:10:11,669 --> 02:10:10,079
up of course we also heard some test

1858
02:10:13,350 --> 02:10:11,679
conductor come in so we want to go

1859
02:10:14,629 --> 02:10:13,360
straight to alex alex can you please

1860
02:10:16,310 --> 02:10:14,639
describe to us

1861
02:10:18,550 --> 02:10:16,320
first of all what we saw and then what

1862
02:10:20,390 --> 02:10:18,560
we heard yeah absolutely obviously we

1863
02:10:21,270 --> 02:10:20,400

had a very successful initiation of the

1864
02:10:22,790 --> 02:10:21,280
engines

1865
02:10:24,310 --> 02:10:22,800
you know our the beginning of our thrust

1866
02:10:25,910 --> 02:10:24,320
profile there when we were firing for

1867
02:10:27,270 --> 02:10:25,920
the first minute or so

1868
02:10:29,270 --> 02:10:27,280
you know we obviously are getting some

1869
02:10:31,109 --> 02:10:29,280
really good data coming through um you

1870
02:10:32,790 --> 02:10:31,119
know but like we said earlier this is a

1871
02:10:34,310 --> 02:10:32,800
test you know we have test commit

1872
02:10:35,990 --> 02:10:34,320
criteria and we have certain boundaries

1873
02:10:37,910 --> 02:10:36,000
that we have to keep all the opera all

1874
02:10:39,669 --> 02:10:37,920
the operations under so you know we

1875
02:10:41,350 --> 02:10:39,679
really are trying to make sure that you

1876
02:10:43,189 --> 02:10:41,360
know everything's operating properly and

1877
02:10:44,790 --> 02:10:43,199
safely so you know the test team was

1878
02:10:47,189 --> 02:10:44,800
kind of seeing some data that they might

1879
02:10:48,709 --> 02:10:47,199
not like and so obviously you know our

1880
02:10:51,109 --> 02:10:48,719
engines were shut down ahead of the

1881
02:10:53,189 --> 02:10:51,119
eight minute schedule time frame but we

1882
02:10:55,189 --> 02:10:53,199
do have a lot of good data to go look at

1883
02:10:56,870 --> 02:10:55,199
and hopefully i know we can move on from

1884
02:10:58,550 --> 02:10:56,880
here and maybe get you know see what's

1885
02:11:00,310 --> 02:10:58,560
going to go on further so i was looking

1886
02:11:02,790 --> 02:11:00,320
at your face when that started lighting

1887
02:11:05,430 --> 02:11:02,800
up and that was incredible we saw the

1888
02:11:07,350 --> 02:11:05,440

cloud forming we both saw rainbows just

1889
02:11:09,270 --> 02:11:07,360
forming right over side just how did it

1890
02:11:10,550 --> 02:11:09,280
feel in those first few seconds yeah

1891
02:11:11,990 --> 02:11:10,560
it's amazing you know it never really

1892
02:11:13,669 --> 02:11:12,000
gets old that feeling that you get you

1893
02:11:15,350 --> 02:11:13,679
know in your chest or you know seeing

1894
02:11:17,510 --> 02:11:15,360
you know just how powerful those rockets

1895
02:11:19,350 --> 02:11:17,520
are when they're testing so um obviously

1896
02:11:21,350 --> 02:11:19,360
you know it was an awesome thing to see

1897
02:11:23,189 --> 02:11:21,360
you know and uh you know i can't wait to

1898
02:11:24,790 --> 02:11:23,199
get the core stage to kennedy and get

1899
02:11:25,990 --> 02:11:24,800
ready for launch and you told us you

1900
02:11:28,149 --> 02:11:26,000
know over eight minutes we might have

1901
02:11:31,430 --> 02:11:28,159
had tons and tons terabytes worth of

1902
02:11:32,790 --> 02:11:31,440
data but we already have data just from

1903
02:11:34,629 --> 02:11:32,800
right now what are they going to do with

1904
02:11:35,910 --> 02:11:34,639
that right away right and so just like

1905
02:11:37,270 --> 02:11:35,920
all of our other green run tests you

1906
02:11:39,189 --> 02:11:37,280
know our we have teams that are going to

1907
02:11:40,629 --> 02:11:39,199
go and break down that data

1908
02:11:42,709 --> 02:11:40,639
and and kind of see what we're seeing in

1909
02:11:44,950 --> 02:11:42,719
our profiles right so i mean that all

1910
02:11:46,629 --> 02:11:44,960
goes into the you know the profile that

1911
02:11:48,069 --> 02:11:46,639
we'll use for launch eventually kennedy

1912
02:11:49,270 --> 02:11:48,079
so i mean obviously there's a lot of

1913
02:11:50,950 --> 02:11:49,280

things looking at the data you know we

1914
02:11:52,550 --> 02:11:50,960
kind of talked about you know over the

1915
02:11:55,109 --> 02:11:52,560
span of our green run testing we have

1916
02:11:56,390 --> 02:11:55,119
roughly 800 uh terabytes of data and

1917
02:11:58,470 --> 02:11:56,400
that's a lot of data you know we're

1918
02:12:00,629 --> 02:11:58,480
talking about it's it's hard to grasp

1919
02:12:02,149 --> 02:12:00,639
how much data that is so you know we'll

1920
02:12:03,109 --> 02:12:02,159
obviously take the time to dig through

1921
02:12:04,790 --> 02:12:03,119
everything

1922
02:12:06,390 --> 02:12:04,800
and then obviously have a path forward

1923
02:12:08,390 --> 02:12:06,400
from there and i know it happened really

1924
02:12:10,550 --> 02:12:08,400
fast but can you tell us what the people

1925
02:12:12,629 --> 02:12:10,560
were talking about that we could hear

1926
02:12:14,229 --> 02:12:12,639
from the test conductor in that audio

1927
02:12:15,669 --> 02:12:14,239
right so after we did uh engine

1928
02:12:17,270 --> 02:12:15,679
initiation you know they're kind of

1929
02:12:19,270 --> 02:12:17,280
going through and monitoring everything

1930
02:12:20,550 --> 02:12:19,280
right so obviously once we are actually

1931
02:12:22,390 --> 02:12:20,560
firing the engines we have to look at

1932
02:12:24,069 --> 02:12:22,400
you know all of our

1933
02:12:25,669 --> 02:12:24,079
engine engine readings when it comes to

1934
02:12:27,270 --> 02:12:25,679
temperatures you know how they're

1935
02:12:28,149 --> 02:12:27,280
reacting how they're moving and all that

1936
02:12:29,750 --> 02:12:28,159
stuff

1937
02:12:31,270 --> 02:12:29,760
we were just getting into our gimbal

1938
02:12:32,550 --> 02:12:31,280

profiling test which is you know moving

1939
02:12:34,390 --> 02:12:32,560
the engines around

1940
02:12:36,470 --> 02:12:34,400
right before we terminated the hot fire

1941
02:12:38,629 --> 02:12:36,480
so we're obviously going to have a lot

1942
02:12:41,109 --> 02:12:38,639
of good data to look at great thank you

1943
02:12:43,830 --> 02:12:41,119
alex i'm so glad you're here and so as

1944
02:12:47,270 --> 02:12:43,840
the engineers gather data from today we

1945
02:12:49,830 --> 02:12:47,280
look ahead to the next steps this core

1946
02:12:51,910 --> 02:12:49,840
stage will be lifted out of the b2 test

1947
02:12:54,149 --> 02:12:51,920
stand and refurbished to patch up that

1948
02:12:56,390 --> 02:12:54,159
orange foam insulation

1949
02:12:58,629 --> 02:12:56,400
then the team will load it onto our

1950
02:13:01,350 --> 02:12:58,639
pegasus barge about as long as a

1951
02:13:03,589 --> 02:13:01,360
football field to make a six-day journey

1952
02:13:06,149 --> 02:13:03,599
from the gulf of mexico to our kennedy

1953
02:13:08,470 --> 02:13:06,159
space center on florida's atlantic coast

1954
02:13:10,069 --> 02:13:08,480
there it will be stacked in the iconic

1955
02:13:13,430 --> 02:13:10,079
vehicle assembly building with other

1956
02:13:15,830 --> 02:13:13,440
elements of the sls rocket including the

1957
02:13:18,310 --> 02:13:15,840
twin solid rocket boosters which our

1958
02:13:19,669 --> 02:13:18,320
teams have already begun stacking on the

1959
02:13:22,149 --> 02:13:19,679
mobile launcher

1960
02:13:25,430 --> 02:13:22,159
the core stage will join the boosters

1961
02:13:27,589 --> 02:13:25,440
and then be stacked with the upper stage

1962
02:13:30,709 --> 02:13:27,599
and then the orion spacecraft with the

1963
02:13:33,830 --> 02:13:30,719

launch abort system on top

1964
02:13:37,589 --> 02:13:33,840
all of this work putting us on track to

1965
02:13:40,149 --> 02:13:37,599
roll out to launch pad 39b for a liftoff

1966
02:13:42,470 --> 02:13:40,159
later this year on artemis one

1967
02:13:45,350 --> 02:13:42,480
we are going to pause again and just

1968
02:13:47,589 --> 02:13:45,360
talk about what we just experienced the

1969
02:13:49,189 --> 02:13:47,599
stage was rattling that we're on here we

1970
02:13:51,830 --> 02:13:49,199
saw everybody with their phones out

1971
02:13:53,589 --> 02:13:51,840
who's able to be here today um talk us

1972
02:13:55,750 --> 02:13:53,599
through from right when the engine

1973
02:13:57,270 --> 02:13:55,760
started what did we just see right so

1974
02:13:58,470 --> 02:13:57,280
you kind of those last minute and a half

1975
02:14:00,069 --> 02:13:58,480
right you're kind of hearing the test

1976
02:14:03,030 --> 02:14:00,079
conductor talk about you know move to

1977
02:14:04,709 --> 02:14:03,040
internal power um all go for als startup

1978
02:14:06,149 --> 02:14:04,719
which is engine startup right and then

1979
02:14:07,669 --> 02:14:06,159
at t minus zero you heard the final

1980
02:14:09,030 --> 02:14:07,679
count where they're kind of pulling all

1981
02:14:10,550 --> 02:14:09,040
the people who are really watching the

1982
02:14:11,910 --> 02:14:10,560
critical components of the rock you know

1983
02:14:14,229 --> 02:14:11,920
those critical readings we need right

1984
02:14:15,430 --> 02:14:14,239
before we initiate engine start um so

1985
02:14:17,189 --> 02:14:15,440
after you know everyone kind of gave

1986
02:14:19,589 --> 02:14:17,199
their go we initiate an engine start

1987
02:14:21,109 --> 02:14:19,599
obviously um and that als you kind of

1988
02:14:22,229 --> 02:14:21,119

saw the pre-burners going on that rock

1989
02:14:23,510 --> 02:14:22,239
you kind of see some of the sparks

1990
02:14:25,350 --> 02:14:23,520
flowing right and that's all part of the

1991
02:14:26,470 --> 02:14:25,360
part of the test and then right before

1992
02:14:28,229 --> 02:14:26,480
they start flowing

1993
02:14:30,149 --> 02:14:28,239
um that fuel and that mixture and then

1994
02:14:31,750 --> 02:14:30,159
it ignites and you see it at t minus

1995
02:14:33,910 --> 02:14:31,760
zero so that's kind of what we were

1996
02:14:35,510 --> 02:14:33,920
seeing running up to the test and then

1997
02:14:37,189 --> 02:14:35,520
after that you obviously saw the plume

1998
02:14:38,629 --> 02:14:37,199
and then the rest of the test as well

1999
02:14:41,270 --> 02:14:38,639
and we saw a few different angles we

2000
02:14:42,950 --> 02:14:41,280
were up really close to the engines how

2001
02:14:45,189 --> 02:14:42,960
are we able to see that well obviously

2002
02:14:46,950 --> 02:14:45,199
we have you know the cameras and um all

2003
02:14:48,310 --> 02:14:46,960
of our views on the standard you know

2004
02:14:49,750 --> 02:14:48,320
obviously well engineered cameras you

2005
02:14:50,950 --> 02:14:49,760
know very protective casings and all

2006
02:14:53,350 --> 02:14:50,960
that you know it's all important that we

2007
02:14:55,030 --> 02:14:53,360
not only get the data but all the video

2008
02:14:56,229 --> 02:14:55,040
and the view of what of what exactly is

2009
02:14:57,910 --> 02:14:56,239
going on

2010
02:14:59,669 --> 02:14:57,920
great well thank you again we may still

2011
02:15:02,229 --> 02:14:59,679
come back to you but i want to remind

2012
02:15:05,030 --> 02:15:02,239
everyone it's not just artemis one we've

2013
02:15:07,350 --> 02:15:05,040

got several firsts on the horizon

2014
02:15:10,390 --> 02:15:07,360
this year the first of our commercial

2015
02:15:12,390 --> 02:15:10,400
lunar payload services or clips missions

2016
02:15:15,189 --> 02:15:12,400
begin with two companies delivering

2017
02:15:17,830 --> 02:15:15,199
instruments to the lunar surface

2018
02:15:20,310 --> 02:15:17,840
the golf cart sized viper rover will

2019
02:15:21,189 --> 02:15:20,320
search for water at the moon's south

2020
02:15:23,910 --> 02:15:21,199
pole

2021
02:15:26,470 --> 02:15:23,920
a small cubesat called capstone will

2022
02:15:29,750 --> 02:15:26,480
head to the moon scouting the orbit to

2023
02:15:32,390 --> 02:15:29,760
be used on later human missions

2024
02:15:35,430 --> 02:15:32,400
and artemis one launches on an uncrewed

2025
02:15:37,910 --> 02:15:35,440
flight to test both sls and orion on a

2026
02:15:39,189 --> 02:15:37,920
journey beyond the moon and back to

2027
02:15:41,669 --> 02:15:39,199
earth

2028
02:15:44,229 --> 02:15:41,679
later on we'll be launching the power

2029
02:15:47,030 --> 02:15:44,239
and propulsion element or ppe and the

2030
02:15:49,350 --> 02:15:47,040
habitation and logistics outpost or halo

2031
02:15:52,069 --> 02:15:49,360
to lunar orbit to become the first

2032
02:15:54,550 --> 02:15:52,079
pieces of our lunar gateway which will

2033
02:15:55,669 --> 02:15:54,560
provide the jumping off point for lunar

2034
02:15:59,030 --> 02:15:55,679
missions

2035
02:16:01,430 --> 02:15:59,040
artemis 2 will be a 10-day crude test

2036
02:16:04,310 --> 02:16:01,440
flight where astronauts will set a new

2037
02:16:05,750 --> 02:16:04,320
record for farthest distance traveled

2038
02:16:06,950 --> 02:16:05,760

from earth

2039
02:16:11,030 --> 02:16:06,960
and finally

2040
02:16:13,430 --> 02:16:11,040
artemis iii in 2024

2041
02:16:16,229 --> 02:16:13,440
the hardware for those next two artemis

2042
02:16:19,030 --> 02:16:16,239
missions is coming together right now at

2043
02:16:21,910 --> 02:16:19,040
michoud the boeing team is already

2044
02:16:24,790 --> 02:16:21,920
demonstrating faster manufacturing times

2045
02:16:27,109 --> 02:16:24,800
by implementing all the experiences and

2046
02:16:28,149 --> 02:16:27,119
lessons from the building the first core

2047
02:16:30,310 --> 02:16:28,159
stage

2048
02:16:32,389 --> 02:16:30,320
in utah northrop grumman is already

2049
02:16:35,110 --> 02:16:32,399
building the booster segments for the

2050
02:16:37,910 --> 02:16:35,120
next several missions as well

2051
02:16:40,309 --> 02:16:37,920
we've also got the orion spacecraft for

2052
02:16:42,950 --> 02:16:40,319
artemis ii down at kennedy undergoing

2053
02:16:46,309 --> 02:16:42,960
assembly and the spacecraft for artemis

2054
02:16:48,709 --> 02:16:46,319
iii is also being manufactured right now

2055
02:16:50,309 --> 02:16:48,719
at michoud in our hometown of new

2056
02:16:53,429 --> 02:16:50,319
orleans

2057
02:16:56,469 --> 02:16:53,439
so that wraps it up for us here today

2058
02:16:58,870 --> 02:16:56,479
after a major milestone on america's

2059
02:17:01,669 --> 02:16:58,880
return of astronauts to the lunar

2060
02:17:04,870 --> 02:17:01,679
surface a successful test of the core

2061
02:17:06,870 --> 02:17:04,880
stage of the space launch system rocket

2062
02:17:09,190 --> 02:17:06,880
up next we'll be replaying the test and

2063
02:17:12,389 --> 02:17:09,200

we will have a post-test briefing in

2064
02:17:14,389 --> 02:17:12,399
about two hours on nasa television we

2065
02:17:17,830 --> 02:17:14,399
invite you to follow all of our progress

2066
02:17:20,070 --> 02:17:17,840
online at nasa.gov artemis program or

2067
02:17:23,669 --> 02:17:20,080
join the conversation online with at

2068
02:17:26,150 --> 02:17:23,679
nasa artemis and at nasa underscore sls

2069
02:17:27,990 --> 02:17:26,160
thank you so much alex for being with

2070
02:17:29,750 --> 02:17:28,000
here and being our expert tonight thank

2071
02:17:32,070 --> 02:17:29,760
you to the administrator jim bradenstein

2072
02:17:33,190 --> 02:17:32,080
and astronaut tracy caldwell dyson and

2073
02:17:35,429 --> 02:17:33,200
most of all

2074
02:18:08,950 --> 02:17:35,439
thank you for joining us

2075
02:18:26,230 --> 02:18:10,629
system and

2076
02:18:26,240 --> 02:18:51,030
all right where's 25 seconds

2077
02:19:16,389 --> 02:18:52,950
we're we're still running so we got four

2078
02:19:16,399 --> 02:19:19,990
violations

2079
02:19:23,509 --> 02:19:21,910
we gotta shut down

2080
02:19:25,910 --> 02:19:23,519
y'all personnel

2081
02:19:27,790 --> 02:19:25,920
uh shut down let's let's go let's all go

2082
02:20:11,349 --> 02:19:27,800
to page uh

2083
02:20:16,309 --> 02:20:13,670
working with nasa to send astronauts to

2084
02:20:18,389 --> 02:20:16,319
the moon and onto mars we are making

2085
02:20:20,830 --> 02:20:18,399
huge upgrades to the space shuttle main

2086
02:20:23,590 --> 02:20:20,840
engines that flew on every one of the

2087
02:20:26,710 --> 02:20:23,600
135 space shuttle missions

2088
02:20:29,990 --> 02:20:26,720

this new engine is called the rs25

2089
02:20:31,510 --> 02:20:30,000
nasa has 16 rs-25 engines remaining from

2090
02:20:33,590 --> 02:20:31,520
the shuttle program that have been

2091
02:20:35,910 --> 02:20:33,600
modernized with new controllers and

2092
02:20:37,670 --> 02:20:35,920
other components for the sls

2093
02:20:39,990 --> 02:20:37,680
these new engines will be used for the

2094
02:20:42,950 --> 02:20:40,000
first four flights now the team is