1
00:00:03,510 --> 00:00:02,710
line with one hour 49 minutes of run

2
00:00:05,829 --> 00:00:03,520
time

3
00:00:07,909 --> 00:00:05,839
test bay ups is online with a minimum of

4
00:00:11,589 --> 00:00:07,919
30 minutes of runtime

5
00:00:51,350 --> 00:00:11,599
data center ups is online with one

6
00:00:51,360 --> 00:01:51,350
t minus seven minutes

7
00:01:57,830 --> 00:01:55,030
t minus six minutes

8
00:02:02,709 --> 00:01:57,840
central sports systems operator turn on

9
00:02:02,719 --> 00:02:07,990
the water boost pumps are on

10
00:02:08,000 --> 00:02:51,509
roger

11
00:02:51,519 --> 00:02:55,990
t-minus five minutes

12
00:02:58,710 --> 00:02:57,830
i'm melissa lee and you're joining us

13
00:03:00,229 --> 00:02:58,720

live

14
00:03:02,949 --> 00:03:00,239
we're at the northrop grumman facility

15
00:03:04,470 --> 00:03:02,959
in promontory

16
00:03:06,710 --> 00:03:04,480
community space center utah florida are

17
00:03:08,790 --> 00:03:06,720
preparing for the first artemis launch

18
00:03:10,869 --> 00:03:08,800
and we're here in utah as teams evaluate

19
00:03:12,309 --> 00:03:10,879
materials and processes for future

20
00:03:14,630 --> 00:03:12,319
booster designs

21
00:03:16,309 --> 00:03:14,640
we are moments away from

22
00:03:18,070 --> 00:03:16,319
the space launch system booster motor

23
00:03:20,470 --> 00:03:18,080
for those future artemis missions to the

24
00:03:22,949 --> 00:03:20,480
moon today's test is called flight

25
00:03:24,789 --> 00:03:22,959
support booster 2. we did see a delay of

26
00:03:26,710 --> 00:03:24,799
this test today but we are here and we

27
00:03:28,789 --> 00:03:26,720
are ready to fire up this booster

28
00:03:30,949 --> 00:03:28,799
the booster motors for nasa space launch

29
00:03:32,869 --> 00:03:30,959
system are the largest most powerful

30
00:03:35,030 --> 00:03:32,879
ever built for flight

31
00:03:37,350 --> 00:03:35,040
sls has two solid rocket boosters that

32
00:03:38,949 --> 00:03:37,360
flank either side of the rocket and for

33
00:03:40,390 --> 00:03:38,959
two minutes today we're going to see the

34
00:03:41,990 --> 00:03:40,400
power of just one of those here in the

35
00:03:43,509 --> 00:03:42,000
utah desert

36
00:03:45,350 --> 00:03:43,519
if you're just now joining us we're

37
00:03:47,589 --> 00:03:45,360
about five minutes away from the flight

38
00:03:49,509 --> 00:03:47,599

support booster 2 test in utah the

39
00:03:52,550 --> 00:03:49,519
booster motor used for today's test is

40
00:03:54,710 --> 00:03:52,560
locked to the test stand just behind me

41
00:03:56,949 --> 00:03:54,720
be sure to follow us on social media at

42
00:03:59,110 --> 00:03:56,959
nasa's space launch system on facebook

43
00:04:00,630 --> 00:03:59,120
and nasa sls on twitter

44
00:04:02,949 --> 00:04:00,640
no matter where you're watching

45
00:04:04,309 --> 00:04:02,959
you can ask us your questions by using

46
00:04:07,270 --> 00:04:04,319
systems

47
00:04:09,589 --> 00:04:07,280
some booster experts join you here after

48
00:04:10,949 --> 00:04:09,599
the test to answer the temperatures

49
00:04:13,270 --> 00:04:10,959
and now i'd like to introduce you to a

50
00:04:16,069 --> 00:04:13,280
special guest with me today

51
00:04:17,830 --> 00:04:16,079
this is reid wiseman nasa astronaut

52
00:04:19,590 --> 00:04:17,840
engineer aviator and chief of the

53
00:04:20,870 --> 00:04:19,600
astronaut office it's an honor to have

54
00:04:22,550 --> 00:04:20,880
you here today reed thank you for

55
00:04:25,030 --> 00:04:22,560
joining us you bet it's great to be here

56
00:04:26,629 --> 00:04:25,040
yeah so we did see a delay today can you

57
00:04:28,150 --> 00:04:26,639
explain more about what that was about

58
00:04:29,749 --> 00:04:28,160
so what we were told is they were having

59
00:04:32,390 --> 00:04:29,759
trouble communicating with a few of the

60
00:04:33,830 --> 00:04:32,400
cameras that are up at the test facility

61
00:04:35,749 --> 00:04:33,840
there by the booster but they're going

62
00:04:37,189 --> 00:04:35,759
to proceed without that data because it

63
00:04:39,510 --> 00:04:37,199

was not critical for the test so we're

64
00:04:40,950 --> 00:04:39,520
back under the count and about three

65
00:04:42,469 --> 00:04:40,960
minutes away from lighting this thing

66
00:04:44,150 --> 00:04:42,479
yeah and we're excited to see it i mean

67
00:04:45,749 --> 00:04:44,160
it's going to be a great experience i

68
00:04:47,749 --> 00:04:45,759
believe this is your first is this your

69
00:04:49,189 --> 00:04:47,759
first test it is all right so both of us

70
00:04:50,310 --> 00:04:49,199
this is our first test yes this is the

71
00:04:52,550 --> 00:04:50,320
first time i've been at one of these

72
00:04:53,670 --> 00:04:52,560
booster tests and i just think it's

73
00:04:55,590 --> 00:04:53,680
absolutely awesome that we'll be

74
00:04:57,270 --> 00:04:55,600
launching artemis one in just a few

75
00:04:58,629 --> 00:04:57,280
weeks on two of these boosters so it's

76
00:05:00,469 --> 00:04:58,639
really neat to get to be here today yeah

77
00:05:02,469 --> 00:05:00,479
we're excited for launch now can you

78
00:05:03,830 --> 00:05:02,479
tell me more about why testing like this

79
00:05:05,510 --> 00:05:03,840
is so important

80
00:05:07,749 --> 00:05:05,520
uh because when we put humans on these

81
00:05:09,270 --> 00:05:07,759
things we want to make sure they work so

82
00:05:10,870 --> 00:05:09,280
they're testing a few critical systems

83
00:05:12,550 --> 00:05:10,880
on this booster today that's not related

84
00:05:14,550 --> 00:05:12,560
at all to artemis one but is related to

85
00:05:16,550 --> 00:05:14,560
our future crude artemis flights yeah i

86
00:05:18,469 --> 00:05:16,560
think artemis three and beyond is uh

87
00:05:19,909 --> 00:05:18,479
what we're testing for today and so can

88
00:05:21,590 --> 00:05:19,919

you kind of tell me more about what

89
00:05:24,310 --> 00:05:21,600
we're expecting to see with this booster

90
00:05:25,830 --> 00:05:24,320
test uh about two minutes of a lot of

91
00:05:28,710 --> 00:05:25,840
heat and fire coming out the back of

92
00:05:30,070 --> 00:05:28,720
that motor and uh i know about four

93
00:05:31,350 --> 00:05:30,080
seconds after it lights off we should

94
00:05:33,830 --> 00:05:31,360
feel the pressure wave and hear the

95
00:05:35,590 --> 00:05:33,840
sound uh much like we were watching a

96
00:05:36,790 --> 00:05:35,600
shuttle or an sls launch at the cape i

97
00:05:38,310 --> 00:05:36,800
think it'd be pretty awesome i mean the

98
00:05:39,590 --> 00:05:38,320
wind is coming down the hill kind of

99
00:05:42,150 --> 00:05:39,600
right at us so it should be carrying the

100
00:05:44,629 --> 00:05:42,160
sound down this valley you can see

101
00:05:46,469 --> 00:05:44,639
like literally thousand plus uh

102
00:05:48,469 --> 00:05:46,479
employees uh from northrop grumman out

103
00:05:50,390 --> 00:05:48,479
here to watch and nasa so i think it's

104
00:05:51,590 --> 00:05:50,400
gonna be amazing yeah and i think um the

105
00:05:53,350 --> 00:05:51,600
cameras might even shake a little bit

106
00:05:55,270 --> 00:05:53,360
from this test i mean you got to think

107
00:05:57,110 --> 00:05:55,280
about we're only getting a little taste

108
00:05:59,029 --> 00:05:57,120
of what we could see at launch you know

109
00:06:00,230 --> 00:05:59,039
this is only a single booster and at

110
00:06:01,749 --> 00:06:00,240
launch we're going to have two of those

111
00:06:02,550 --> 00:06:01,759
so it's going to be a great site to see

112
00:06:04,629 --> 00:06:02,560
two

113
00:06:06,309 --> 00:06:04,639

and then the four rs 25s on the bottom

114
00:06:07,749 --> 00:06:06,319
of the core stage going off uh you know

115
00:06:09,510 --> 00:06:07,759
about six seconds before the boosters

116
00:06:11,909 --> 00:06:09,520
light off so that's it's just going to

117
00:06:13,430 --> 00:06:11,919
be absolutely amazing to watch uh what

118
00:06:15,590 --> 00:06:13,440
american ingenuity what the american

119
00:06:16,710 --> 00:06:15,600
workforce can put together uh when we

120
00:06:17,909 --> 00:06:16,720
launch artemis one here in a couple

121
00:06:19,749 --> 00:06:17,919
weeks i can't wait to be there to watch

122
00:06:21,430 --> 00:06:19,759
it i absolutely agree well thank you

123
00:06:22,469 --> 00:06:21,440
reed for that great insight

124
00:06:24,629 --> 00:06:22,479
now remember we're going to have some

125
00:06:27,029 --> 00:06:24,639
booster experts join me here after the

126
00:06:29,830 --> 00:06:27,039
test to answer your questions use that

127
00:06:32,150 --> 00:06:29,840
hashtag ask nasa on social media to send

128
00:06:33,830 --> 00:06:32,160
those to us now let's get ready to fire

129
00:06:35,670 --> 00:06:33,840
up this booster you're going to hear a

130
00:06:37,510 --> 00:06:35,680
countdown from the test conductor

131
00:06:38,710 --> 00:06:37,520
followed by a two-minute booster firing

132
00:06:43,510 --> 00:06:38,720
we're going to cut away and we'll be

133
00:06:51,270 --> 00:06:46,070
commit the motor

134
00:06:51,280 --> 00:06:58,309
t-minus 60 seconds

135
00:07:05,670 --> 00:07:01,830
all high-speed systems are recording

136
00:07:05,680 --> 00:07:11,909
tbc is go for static test

137
00:07:11,919 --> 00:07:21,749
t minus 40 seconds

138
00:07:21,759 --> 00:07:31,510

t minus 30 seconds

139
00:07:31,520 --> 00:07:37,110
t minus 20 seconds

140
00:07:37,120 --> 00:07:41,749
t minus 15 seconds

141
00:07:44,469 --> 00:07:43,510
t minus 10

142
00:07:45,510 --> 00:07:44,479
9

143
00:07:46,550 --> 00:07:45,520
8

144
00:07:47,589 --> 00:07:46,560
7

145
00:07:48,629 --> 00:07:47,599
6

146
00:07:49,589 --> 00:07:48,639
5

147
00:07:50,629 --> 00:07:49,599
4

148
00:07:51,589 --> 00:07:50,639
3

149
00:07:52,550 --> 00:07:51,599
2

150
00:08:01,589 --> 00:07:52,560
1

151
00:08:01,599 --> 00:08:12,230
okay

152
00:08:12,240 --> 00:08:32,149
first one

153
00:08:32,159 --> 00:08:42,070
let's go

154
00:08:42,080 --> 00:09:18,230
okay

155
00:09:18,240 --> 00:09:33,910
open the accumulator enable now

156
00:09:33,920 --> 00:09:57,990
activate absolutely

157
00:10:03,030 --> 00:10:00,550
activate head nco2

158
00:10:09,509 --> 00:10:03,040
activated activate quench tool forward

159
00:10:13,590 --> 00:10:11,190
activated

160
00:10:26,870 --> 00:10:13,600
so the script has ended pvc power is

161
00:10:26,880 --> 00:10:36,949
plus 160 seconds

162
00:10:46,710 --> 00:10:39,350
plus 170 seconds high speed data

163
00:10:55,110 --> 00:10:48,870

high speed recording is complete low

164
00:10:55,120 --> 00:11:15,110
low speed data recording complete

165
00:11:20,790 --> 00:11:18,630
t plus 3 minutes 30 seconds post fire

166
00:11:51,350 --> 00:11:20,800
crew report to the instrument room post

167
00:11:56,310 --> 00:11:53,990
welcome back and wow what an amazing

168
00:11:57,829 --> 00:11:56,320
sight to see this powerful solid rocket

169
00:11:59,590 --> 00:11:57,839
booster fired up

170
00:12:01,829 --> 00:11:59,600
again we're here at the northrop grumman

171
00:12:03,590 --> 00:12:01,839
facility in promontory utah where we

172
00:12:05,829 --> 00:12:03,600
just witnessed a two-minute booster

173
00:12:08,230 --> 00:12:05,839
firing of a solid rocket booster for the

174
00:12:10,230 --> 00:12:08,240
sls rocket here with me to talk about

175
00:12:12,870 --> 00:12:10,240
that test and to just to answer your

176
00:12:15,190 --> 00:12:12,880
questions we have julia codabande motor

177
00:12:17,030 --> 00:12:15,200
team lead for sls boosters at nasa's

178
00:12:19,509 --> 00:12:17,040
marshall space flight center and we have

179
00:12:22,069 --> 00:12:19,519
jessica rose chemical engineer for

180
00:12:22,870 --> 00:12:22,079
northrup grumman for the sls boosters as

181
00:12:25,509 --> 00:12:22,880
well

182
00:12:27,350 --> 00:12:25,519
so uh before we begin i just wanted to

183
00:12:29,110 --> 00:12:27,360
say you know we heard the test conductor

184
00:12:31,990 --> 00:12:29,120
talking a little bit before

185
00:12:33,750 --> 00:12:32,000
the uh the firing can you explain a

186
00:12:35,430 --> 00:12:33,760
little bit more about what they were

187
00:12:36,790 --> 00:12:35,440
saying so i'll start with julia yeah

188
00:12:38,790 --> 00:12:36,800

thanks alyssa

189
00:12:40,870 --> 00:12:38,800
wow that was fantastic

190
00:12:43,590 --> 00:12:40,880
so yeah we heard the test conductor

191
00:12:45,670 --> 00:12:43,600
before the firing of the motor she gave

192
00:12:48,150 --> 00:12:45,680
the go for test

193
00:12:51,350 --> 00:12:48,160
the test counted down and they committed

194
00:12:55,110 --> 00:12:51,360
the motor they armed the motor and then

195
00:12:57,350 --> 00:12:55,120
at t0 we saw smoke and fire

196
00:13:00,710 --> 00:12:57,360
we have out there today

197
00:13:03,750 --> 00:13:00,720
five segments of solid rocket motor

198
00:13:06,389 --> 00:13:03,760
at the t0 mark a signal was given from a

199
00:13:07,990 --> 00:13:06,399
ground controller to an igniter assembly

200
00:13:10,389 --> 00:13:08,000
which in turn

201
00:13:11,750 --> 00:13:10,399
ignited the five segments at the other

202
00:13:13,590 --> 00:13:11,760
end of the motor

203
00:13:15,509 --> 00:13:13,600
we have a nozzle assembly which had a

204
00:13:17,990 --> 00:13:15,519
nozzle plug and that would have come out

205
00:13:21,269 --> 00:13:18,000
as pressure built up inside the motor we

206
00:13:24,629 --> 00:13:21,279
also have an aft skirt assembly and it

207
00:13:26,870 --> 00:13:24,639
houses our advanced booster electronic

208
00:13:29,269 --> 00:13:26,880
thrust vector control system and that

209
00:13:31,030 --> 00:13:29,279
vectored the nozzle during the test

210
00:13:33,030 --> 00:13:31,040
a little bit later you heard the test

211
00:13:35,509 --> 00:13:33,040
conductor call for

212
00:13:37,590 --> 00:13:35,519
the water deluge which actually sprays

213
00:13:39,509 --> 00:13:37,600

water on the belly of the motor in order

214
00:13:41,750 --> 00:13:39,519
to cool the case and we do that because

215
00:13:42,870 --> 00:13:41,760
we want to preserve and protect our

216
00:13:46,310 --> 00:13:42,880
hardware

217
00:13:49,750 --> 00:13:46,320
and then a little bit later we had the

218
00:13:53,030 --> 00:13:49,760
ford co2 cooling and an aft boom swing

219
00:13:55,350 --> 00:13:53,040
around and uh send co2 cooling into the

220
00:13:58,629 --> 00:13:55,360
aft end of the motor so yeah the motor

221
00:14:00,710 --> 00:13:58,639
burned for 126 seconds which is how long

222
00:14:03,509 --> 00:14:00,720
it will power the artemis rockets during

223
00:14:04,790 --> 00:14:03,519
liftoff and early flight and it was a

224
00:14:06,069 --> 00:14:04,800
great test

225
00:14:08,949 --> 00:14:06,079
well thank you for that great detail

226
00:14:10,069 --> 00:14:08,959
julia so jessica how did you feel and

227
00:14:12,710 --> 00:14:10,079
can you tell us a little bit more about

228
00:14:13,509 --> 00:14:12,720
how we got to this moment yes absolutely

229
00:14:21,189 --> 00:14:13,519
so

230
00:14:22,949 --> 00:14:21,199
be able to see after it and i've seen

231
00:14:25,670 --> 00:14:22,959
many of these and it's just so

232
00:14:27,910 --> 00:14:25,680
impressive every single time and that's

233
00:14:30,310 --> 00:14:27,920
what every all these employees out here

234
00:14:31,750 --> 00:14:30,320
that work at northrop grumman and nasa

235
00:14:33,910 --> 00:14:31,760
that are here that work on the artemis

236
00:14:35,910 --> 00:14:33,920
segment are so thrilled for to see that

237
00:14:38,389 --> 00:14:35,920
what we do daily

238
00:14:39,910 --> 00:14:38,399

impacts that success that you saw

239
00:14:42,710 --> 00:14:39,920
and alyssa to answer your second

240
00:14:44,870 --> 00:14:42,720
question uh here in utah we manufacture

241
00:14:47,350 --> 00:14:44,880
these boosters from the beginning to the

242
00:14:49,829 --> 00:14:47,360
end of them we start with case prep

243
00:14:52,550 --> 00:14:49,839
during case prep they prep the case and

244
00:14:54,870 --> 00:14:52,560
then the line insulate the case and then

245
00:14:57,110 --> 00:14:54,880
line it once the case is lined it'll

246
00:14:59,509 --> 00:14:57,120
then go down to the casting pits where

247
00:15:02,310 --> 00:14:59,519
they invert this horizontal segment into

248
00:15:05,590 --> 00:15:02,320
a vertical position lower it down into

249
00:15:07,750 --> 00:15:05,600
this deep pit that fully covers the

250
00:15:09,430 --> 00:15:07,760
motor and then after that they start

251
00:15:11,670 --> 00:15:09,440
prepping it for what they call as a cast

252
00:15:13,430 --> 00:15:11,680
campaign during the cast camp they will

253
00:15:15,590 --> 00:15:13,440
lower the propellant into the motor at a

254
00:15:17,590 --> 00:15:15,600
continuous rate and then once the motor

255
00:15:19,189 --> 00:15:17,600
is full with propellant it'll cure for

256
00:15:21,590 --> 00:15:19,199
about one week

257
00:15:23,509 --> 00:15:21,600
after that week they'll condition and

258
00:15:25,110 --> 00:15:23,519
send it on down to x-ray

259
00:15:27,030 --> 00:15:25,120
during x-ray they will see if there are

260
00:15:28,790 --> 00:15:27,040
any voids in the propellant

261
00:15:30,629 --> 00:15:28,800
if not they will go down to the final

262
00:15:33,030 --> 00:15:30,639
assembly building where they finalize

263
00:15:35,430 --> 00:15:33,040

these motors they will put a igniter in

264
00:15:37,509 --> 00:15:35,440
the forward segment and a nozzle into

265
00:15:39,430 --> 00:15:37,519
the aft segment they will then either

266
00:15:41,269 --> 00:15:39,440
send them here to the test area for a

267
00:15:43,269 --> 00:15:41,279
static test or put them into a

268
00:15:44,870 --> 00:15:43,279
conditioned storage building for when

269
00:15:46,710 --> 00:15:44,880
kennedy space center requests our

270
00:15:48,629 --> 00:15:46,720
artemis segments down to them

271
00:15:50,230 --> 00:15:48,639
so it's quite privileged that we get to

272
00:15:52,150 --> 00:15:50,240
take from the beginning to the end of

273
00:15:53,670 --> 00:15:52,160
these boosters yeah it sounds like a lot

274
00:15:55,110 --> 00:15:53,680
of work from both nasa and northrop

275
00:15:57,269 --> 00:15:55,120
grumman has gone into this two-minute

276
00:15:58,550 --> 00:15:57,279
booster firing that's awesome so now

277
00:16:00,389 --> 00:15:58,560
we're going to get into some viewer

278
00:16:03,110 --> 00:16:00,399
questions it looks like our first

279
00:16:05,110 --> 00:16:03,120
question is for julia asking how big are

280
00:16:10,069 --> 00:16:05,120
the sls boosters

281
00:16:12,870 --> 00:16:10,079
177 feet tall so that's going to be

282
00:16:15,269 --> 00:16:12,880
equivalent of a 17 story building it's

283
00:16:17,990 --> 00:16:15,279
also as tall as the statue of liberty is

284
00:16:19,749 --> 00:16:18,000
from her base to her torch now the motor

285
00:16:22,629 --> 00:16:19,759
that we had out here today in our test

286
00:16:24,629 --> 00:16:22,639
stand wasn't quite that tall it was 154

287
00:16:26,389 --> 00:16:24,639
feet and the reason is is because we

288
00:16:28,550 --> 00:16:26,399

don't have the forward assembly that we

289
00:16:30,710 --> 00:16:28,560
have on our flight boosters in the test

290
00:16:32,550 --> 00:16:30,720
stand the ford assembly consists of a

291
00:16:34,629 --> 00:16:32,560
nose cone and a fresh drum and a forward

292
00:16:36,710 --> 00:16:34,639
skirt that houses our flight avionics

293
00:16:39,590 --> 00:16:36,720
however in a static test we actually use

294
00:16:41,749 --> 00:16:39,600
avionics that are part of the test stand

295
00:16:44,069 --> 00:16:41,759
great i mean that that was impressive to

296
00:16:45,590 --> 00:16:44,079
see and you know you don't realize how

297
00:16:47,110 --> 00:16:45,600
big these boosters are until you're

298
00:16:48,550 --> 00:16:47,120
actually standing there in front of them

299
00:16:50,629 --> 00:16:48,560
you know i actually got the opportunity

300
00:16:53,350 --> 00:16:50,639
to see the artemis one roll out and

301
00:16:54,790 --> 00:16:53,360
seeing how about for jessica why do we

302
00:16:57,030 --> 00:16:54,800
test in utah

303
00:16:59,269 --> 00:16:57,040
okay perfect so like i talked about we

304
00:17:01,509 --> 00:16:59,279
do manufacture these here and they're

305
00:17:03,590 --> 00:17:01,519
about on average three hundred thousand

306
00:17:05,590 --> 00:17:03,600
pounds each and we have a test stand

307
00:17:07,829 --> 00:17:05,600
that can withstand these

308
00:17:10,549 --> 00:17:07,839
the test stand has 13 million pounds of

309
00:17:13,029 --> 00:17:10,559
concrete in it most of that underground

310
00:17:15,510 --> 00:17:13,039
and so from that there's 3.6 million

311
00:17:17,350 --> 00:17:15,520
pounds of thrust that comes from the 1.6

312
00:17:19,189 --> 00:17:17,360
million pounds of propellant the

313
00:17:21,189 --> 00:17:19,199

propellant that we manufacture here

314
00:17:23,669 --> 00:17:21,199
consists of aluminum powder ammonium

315
00:17:26,390 --> 00:17:23,679
perchlorate a binder and a curing agent

316
00:17:28,630 --> 00:17:26,400
which then when cured is about like an

317
00:17:31,350 --> 00:17:28,640
eraser so

318
00:17:33,350 --> 00:17:31,360
that's a strange consistency i must say

319
00:17:35,430 --> 00:17:33,360
it's pretty cool yeah

320
00:17:37,029 --> 00:17:35,440
all right i'm gonna ask uh julia here

321
00:17:38,310 --> 00:17:37,039
another question can you tell us a bit

322
00:17:40,789 --> 00:17:38,320
more about the artemis missions maybe

323
00:17:42,310 --> 00:17:40,799
give us an update sure so

324
00:17:45,669 --> 00:17:42,320
we have um

325
00:17:49,110 --> 00:17:45,679
an artemis an sls program which has

326
00:17:51,350 --> 00:17:49,120
a number of artemis missions planned the

327
00:17:54,150 --> 00:17:51,360
boosters that were actually artemis

328
00:17:57,029 --> 00:17:54,160
mitchell and we're using the remaining

329
00:17:59,510 --> 00:17:57,039
shuttle hardware until it is expended

330
00:18:01,110 --> 00:17:59,520
after that at about the ninth flight

331
00:18:03,190 --> 00:18:01,120
we're going to be bringing shuttle

332
00:18:06,630 --> 00:18:03,200
hardware but it's also an opportunity

333
00:18:08,470 --> 00:18:06,640
for us to add even more uh capacity to

334
00:18:10,710 --> 00:18:08,480
the motors

335
00:18:12,870 --> 00:18:10,720
so in our artemis missions we're going

336
00:18:14,549 --> 00:18:12,880
to be returning to the moon we're going

337
00:18:17,510 --> 00:18:14,559
to be sending the first woman to the

338
00:18:19,110 --> 00:18:17,520

moon and once we have an establishment

339
00:18:21,590 --> 00:18:19,120
on the moon we'll be able to go into

340
00:18:23,830 --> 00:18:21,600
deep space and on to mars and so we're

341
00:18:25,190 --> 00:18:23,840
very excited in order to be a part of

342
00:18:32,710 --> 00:18:25,200
that

343
00:18:34,870 --> 00:18:32,720
really awesome um i'm going to ask

344
00:18:38,390 --> 00:18:34,880
jessica another question here

345
00:18:40,789 --> 00:18:38,400
um last question why do we ta or how hot

346
00:18:42,150 --> 00:18:40,799
does it get at the test stand over there

347
00:18:45,110 --> 00:18:42,160
how does that motor get that's an

348
00:18:47,430 --> 00:18:45,120
excellent question it is extremely hot

349
00:18:48,510 --> 00:18:47,440
we'll just say that so at the exit cone

350
00:18:51,270 --> 00:18:48,520
there's

351
00:18:53,830 --> 00:18:51,280
3700 degrees fahrenheit which is enough

352
00:18:56,310 --> 00:18:53,840
to burn the sand there into glass in the

353
00:18:58,789 --> 00:18:56,320
side the chamber is 5600 degrees

354
00:19:00,549 --> 00:18:58,799
fahrenheit which is enough to boil steel

355
00:19:02,470 --> 00:19:00,559
so to answer your question it gets very

356
00:19:04,470 --> 00:19:02,480
hot

357
00:19:06,470 --> 00:19:04,480
all right i do want to ask just one more

358
00:19:08,710 --> 00:19:06,480
question okay this is just i need to

359
00:19:10,390 --> 00:19:08,720
know how did your careers in aerospace

360
00:19:13,750 --> 00:19:10,400
begin and i'm going to start with julia

361
00:19:14,950 --> 00:19:13,760
okay yeah mine starts way back so

362
00:19:17,029 --> 00:19:14,960
my parents were actually on their

363
00:19:20,390 --> 00:19:17,039

honeymoon and took a break to watch neil

364
00:19:21,190 --> 00:19:20,400
armstrong walk on the moon um that was

365
00:19:27,990 --> 00:19:21,200
in

366
00:19:29,669 --> 00:19:28,000
70s we'll just say and um it's always

367
00:19:31,430 --> 00:19:29,679
been a part of the story of our family's

368
00:19:33,270 --> 00:19:31,440
beginning so when i was a child i was

369
00:19:35,830 --> 00:19:33,280
fascinated with space of course i was

370
00:19:37,350 --> 00:19:35,840
deeply impacted by the challenger

371
00:19:39,590 --> 00:19:37,360
so by the time i was in middle school i

372
00:19:41,350 --> 00:19:39,600
knew i wanted to work for nasa i went to

373
00:19:43,430 --> 00:19:41,360
college and got a degree in engineering

374
00:19:44,789 --> 00:19:43,440
and after that got a job in industry for

375
00:19:46,710 --> 00:19:44,799
a few years

376
00:19:49,270 --> 00:19:46,720
before taking a job at nasa so i've been

377
00:19:51,270 --> 00:19:49,280
with nasa now for 22 years and for the

378
00:19:53,750 --> 00:19:51,280
last 14 of those i've actually been

379
00:19:56,150 --> 00:19:53,760
working on solid rocket boosters and

380
00:19:59,350 --> 00:19:56,160
with artemis one getting ready for

381
00:20:00,710 --> 00:19:59,360
launch um about to roll out to the pad

382
00:20:02,549 --> 00:20:00,720
and then the testing that we're doing

383
00:20:05,590 --> 00:20:02,559
today which is going to support artemis

384
00:20:07,590 --> 00:20:05,600
iii missions and beyond we are in a very

385
00:20:10,070 --> 00:20:07,600
exciting time and it's a great time to

386
00:20:11,830 --> 00:20:10,080
be working on the sls program

387
00:20:14,149 --> 00:20:11,840
well that's a great story julia thank

388
00:20:15,830 --> 00:20:14,159

you and jessica how about you yeah great

389
00:20:17,190 --> 00:20:15,840
question and i loved hearing julia's

390
00:20:19,270 --> 00:20:17,200
story we've actually had the great

391
00:20:21,590 --> 00:20:19,280
opportunity to work with each other on

392
00:20:24,390 --> 00:20:21,600
these missions and building this fsb2

393
00:20:26,630 --> 00:20:24,400
booster so i started out growing up in a

394
00:20:27,990 --> 00:20:26,640
farm farming town in idaho which you

395
00:20:30,310 --> 00:20:28,000
wouldn't really think

396
00:20:32,470 --> 00:20:30,320
i would want to get into space but i had

397
00:20:34,789 --> 00:20:32,480
such a passion for it i just never knew

398
00:20:36,789 --> 00:20:34,799
i would be able to

399
00:20:38,710 --> 00:20:36,799
so later on i started realizing i had a

400
00:20:40,630 --> 00:20:38,720
great love for chemistry and math so i

401
00:20:42,789 --> 00:20:40,640
went on to get a bachelor's of science

402
00:20:44,630 --> 00:20:42,799
in chemical engineering chemistry and

403
00:20:46,549 --> 00:20:44,640
the minor material science engineering

404
00:20:48,070 --> 00:20:46,559
from the university of idaho

405
00:20:51,029 --> 00:20:48,080
from there i tried a couple different

406
00:20:52,950 --> 00:20:51,039
industry paths and then an opening came

407
00:20:55,510 --> 00:20:52,960
up at northrop grumman which i found was

408
00:20:57,190 --> 00:20:55,520
very close by here in utah and i jumped

409
00:20:59,669 --> 00:20:57,200
in as a propellant engineer and since

410
00:21:02,310 --> 00:20:59,679
then i've further furthered my career

411
00:21:04,070 --> 00:21:02,320
and what i what i absolutely love is my

412
00:21:06,789 --> 00:21:04,080
my daughter she's a three-year-old she's

413
00:21:08,630 --> 00:21:06,799

here in the viewing area and she has

414
00:21:10,549 --> 00:21:08,640
that passion for space and i get to

415
00:21:13,110 --> 00:21:10,559
share that with her we do science

416
00:21:15,750 --> 00:21:13,120
experiments almost every single weekend

417
00:21:18,310 --> 00:21:15,760
and like julia mentioned we you know we

418
00:21:20,310 --> 00:21:18,320
get to have the greatest impact and be a

419
00:21:22,630 --> 00:21:20,320
part of setting the first woman on the

420
00:21:24,470 --> 00:21:22,640
moon and so i have a beautiful passion

421
00:21:25,830 --> 00:21:24,480
in my career and i'd love to share that

422
00:21:27,590 --> 00:21:25,840
with anybody

423
00:21:28,549 --> 00:21:27,600
well thank you that's a beautiful story

424
00:21:31,669 --> 00:21:28,559
and

425
00:21:33,350 --> 00:21:31,679
daughter get to share in that you're

426
00:21:35,190 --> 00:21:33,360
gonna see the first woman on the moon in

427
00:21:37,029 --> 00:21:35,200
your lifetime that's amazing well thank

428
00:21:38,870 --> 00:21:37,039
you for sending in those questions thank

429
00:21:39,990 --> 00:21:38,880
you to julia and jessica for joining me

430
00:21:41,270 --> 00:21:40,000
here today

431
00:21:43,350 --> 00:21:41,280
and if you would like to watch a replay

432
00:21:44,870 --> 00:21:43,360
of this test it is available on our sls

433
00:21:46,230 --> 00:21:44,880
facebook page and nasa marshall's

434
00:21:47,590 --> 00:21:46,240
youtube channel

435
00:21:50,230 --> 00:21:47,600
and

436
00:21:52,070 --> 00:21:50,240
until then we'll see you at the first

437
00:21:58,950 --> 00:21:52,080
artemis mission to the moon see you at

438
00:22:02,710 --> 00:22:01,029

the free air temperatures

439
00:22:05,510 --> 00:22:02,720
though still seem to suggest that

440
00:22:07,270 --> 00:22:05,520
there's nothing inside the skirt

441
00:22:11,190 --> 00:22:07,280
but i do still have some very warm

442
00:22:13,350 --> 00:22:11,200
nozzle components back there so

443
00:22:14,789 --> 00:22:13,360
your call on the fire department

444
00:22:16,390 --> 00:22:14,799
let's go ahead and send the fire