
NASA AT HOME
SPACEPORT SERIES
NASA
ARTEMIS

1
00:01:10,480 --> 00:00:21,970
[Music]

2
00:01:14,320 --> 00:01:12,700
hey welcome once again to NASA at home

3
00:01:16,539 --> 00:01:14,330
spaceport series I'm the host Joshua

4
00:01:18,280 --> 00:01:16,549
Santora and we are continuing our

5
00:01:21,010 --> 00:01:18,290
artemis week I'm joined by a very

6
00:01:24,190 --> 00:01:21,020
special guest Christy and Sheila Chris

7
00:01:25,990 --> 00:01:24,200
thanks so much for joining me today well

8
00:01:29,350 --> 00:01:26,000
I sure appreciate you having this Joshua

9
00:01:31,210 --> 00:01:29,360
I can't like to share what we're doing

10
00:01:33,160 --> 00:01:31,220
with that cell s and the Artemis program

11
00:01:34,960 --> 00:01:33,170
and about the good things that are

12
00:01:36,130 --> 00:01:34,970
coming your way hey before we jump into

13
00:01:37,840 --> 00:01:36,140

it I want to give you guys a quick look

14
00:01:44,440 --> 00:01:37,850
at some of the excitement around the

15
00:02:16,530 --> 00:02:03,770
[Music]

16
00:02:21,940 --> 00:02:19,150
all right super exciting stuff you'll

17
00:02:23,950 --> 00:02:21,950
have to forgive me a challenge like my

18
00:02:26,140 --> 00:02:23,960
audio I'm gonna let Christie most of the

19
00:02:28,600 --> 00:02:26,150
talking today so Chris as the deputy

20
00:02:29,920 --> 00:02:28,610
program manager for SLS tell us about

21
00:02:31,180 --> 00:02:29,930
what you do and kind of what your role

22
00:02:35,320 --> 00:02:31,190
looks like these days getting ready for

23
00:02:37,330 --> 00:02:35,330
artemis 1 well today I'll we're still in

24
00:02:40,840 --> 00:02:37,340
the throes of completing the build of

25
00:02:42,730 --> 00:02:40,850
this system hardware is coming off the

26
00:02:45,790 --> 00:02:42,740
lines and from across the country from

27
00:02:47,650 --> 00:02:45,800
our different contractor teams we're

28
00:02:49,600 --> 00:02:47,660
still finishing up the last pieces of

29
00:02:51,520 --> 00:02:49,610
our design verification and

30
00:02:53,080 --> 00:02:51,530
certification and the theme is just

31
00:02:55,750 --> 00:02:53,090
really excited it's all coming together

32
00:02:58,690 --> 00:02:55,760
we worked really really hard over the

33
00:03:01,330 --> 00:02:58,700
over the last year so I spend a lot of

34
00:03:04,840 --> 00:03:01,340
time with the team building our core

35
00:03:07,120 --> 00:03:04,850
stage she assembly facility and

36
00:03:10,150 --> 00:03:07,130
finishing that and getting it ready to

37
00:03:12,850 --> 00:03:10,160
go and how to deliver as we move on to

38
00:03:16,449 --> 00:03:12,860

our next step over its Dennis but it's

39
00:03:18,400 --> 00:03:16,459
been really exciting times and coming

40
00:03:20,530 --> 00:03:18,410
together yes we talked about this is the

41
00:03:22,690 --> 00:03:20,540
I've heard it's called the most powerful

42
00:03:26,310 --> 00:03:22,700
rocket are we talking about the most

43
00:03:29,560 --> 00:03:26,320
powerful rocket on earth in history

44
00:03:31,390 --> 00:03:29,570
what does that mean the most powerful so

45
00:03:35,110 --> 00:03:31,400
when you talk about that we measure

46
00:03:37,090 --> 00:03:35,120
thrust in in pounds force off the launch

47
00:03:38,860 --> 00:03:37,100
pads and we're at eight point eight

48
00:03:41,770 --> 00:03:38,870
million pounds of thrust as we leave the

49
00:03:44,500 --> 00:03:41,780
pad and just to give you a kind of a

50
00:03:47,020 --> 00:03:44,510
sense of the magnitude it's in the class

51
00:03:50,470 --> 00:03:47,030
of the Saturn 5 and actually it's 15%

52
00:03:52,199 --> 00:03:50,480
more thrust then Saturn 5 had off the

53
00:03:54,009 --> 00:03:52,209
pad when you compare it to the other

54
00:03:56,170 --> 00:03:54,019
Rockets out there today

55
00:03:58,390 --> 00:03:56,180
this is the only rocket that will give

56
00:04:00,640 --> 00:03:58,400
us the capability to to take the Orion

57
00:04:03,400 --> 00:04:00,650
spacecraft in the crew

58
00:04:06,940 --> 00:04:03,410
it leaves Earth orbit so that's quite

59
00:04:08,860 --> 00:04:06,950
exciting and and how do we get to that

60
00:04:10,840 --> 00:04:08,870
much power because obviously like we had

61
00:04:13,270 --> 00:04:10,850
an enormous rocket with the Saturn 5 the

62
00:04:15,280 --> 00:04:13,280
Space Shuttle was a beast to deploy what

63
00:04:16,599 --> 00:04:15,290

it did into low-earth orbit so how are

64
00:04:20,289 --> 00:04:16,609
we getting that much more energy out of

65
00:04:23,469 --> 00:04:20,299
this guy so it's all about the

66
00:04:27,460 --> 00:04:23,479
propulsion systems we have we start you

67
00:04:32,230 --> 00:04:30,430
cutaway view of the rocket itself and

68
00:04:33,910 --> 00:04:32,240
you see the spacecraft on top when we

69
00:04:36,190 --> 00:04:33,920
start with our solid rocket boosters

70
00:04:38,500 --> 00:04:36,200
they burn for the first two and a half

71
00:04:40,210 --> 00:04:38,510
two minutes or so right off the pad and

72
00:04:42,490 --> 00:04:40,220
in the center you see what we call is

73
00:04:46,450 --> 00:04:42,500
our core stage it's powered by four

74
00:04:49,720 --> 00:04:46,460
rs.25 engines that will take us that

75
00:04:51,520 --> 00:04:49,730
will take us all the way to Earth orbit

76
00:04:53,410 --> 00:04:51,530
and on top of that

77
00:04:56,740 --> 00:04:53,420
powering the spacecraft will separate

78
00:04:59,110 --> 00:04:56,750
from the core stage and we have the ICPs

79
00:05:01,360 --> 00:04:59,120
is what we call it an interim progenitor

80
00:05:05,980 --> 00:05:01,370
avulsion stage that will give the final

81
00:05:07,780 --> 00:05:05,990
kick for Orion to leave Earth orbit and

82
00:05:09,490 --> 00:05:07,790
head to the moon so that's where we are

83
00:05:12,010 --> 00:05:09,500
and if you look at the top you'll see

84
00:05:13,570 --> 00:05:12,020
the popular systems of the Ron

85
00:05:15,070 --> 00:05:13,580
spacecraft I think they're coming on

86
00:05:18,090 --> 00:05:15,080
later this week and they'll talk more

87
00:05:20,260 --> 00:05:18,100
about their activity yes so Chris

88
00:05:22,500 --> 00:05:20,270

forgive me I think you're shaking your

89
00:05:25,510 --> 00:05:22,510
laptop a little bit if you can just be

90
00:05:26,740 --> 00:05:25,520
your wiggle in the camera that's quite

91
00:05:28,690 --> 00:05:26,750
all right no big deal

92
00:05:30,940 --> 00:05:28,700
but I did want to ask you it sounds like

93
00:05:33,220 --> 00:05:30,950
that core stage the the lower end of

94
00:05:35,080 --> 00:05:33,230
that rocket is getting us into low-earth

95
00:05:36,880 --> 00:05:35,090
orbit and it seems like you alluded to

96
00:05:38,470 --> 00:05:36,890
that upper part of the rocket as getting

97
00:05:40,330 --> 00:05:38,480
us to the moon can you explain more

98
00:05:42,070 --> 00:05:40,340
about the process of kind of after we

99
00:05:47,680 --> 00:05:42,080
launch what's happening with that rocket

100
00:05:49,810 --> 00:05:47,690
as we stage through the pieces so let's

101
00:05:56,470 --> 00:05:49,820
just start at t0 like you go from the

102
00:05:59,290 --> 00:05:56,480
launch I'm sorry we start the four rs.25

103
00:06:02,370 --> 00:05:59,300
engines all right and we get them up to

104
00:06:05,470 --> 00:06:02,380
full thrust and then at that point well

105
00:06:08,140 --> 00:06:05,480
kick the Boosters on the t0 and we'll be

106
00:06:11,260 --> 00:06:08,150
going so it at the start of the mission

107
00:06:14,170 --> 00:06:11,270
will have four rs.25 s going and that's

108
00:06:16,930 --> 00:06:14,180
our B's SR B's will separate about two

109
00:06:19,270 --> 00:06:16,940
minutes in into the fly and the core

110
00:06:23,440 --> 00:06:19,280
stage will propel us on up to that point

111
00:06:27,190 --> 00:06:23,450
with the four rs.25 at that point we're

112
00:06:30,820 --> 00:06:27,200
basically in low-earth orbit and we'll

113
00:06:32,470 --> 00:06:30,830

separate from the fourth stage in this

114
00:06:34,780 --> 00:06:32,480
everything above what you see here is

115
00:06:37,870 --> 00:06:34,790
the launch vehicle stage adapter the

116
00:06:39,570 --> 00:06:37,880
ICPs will kick in and take over there's

117
00:06:41,619 --> 00:06:39,580
an initial burn and then there

118
00:06:44,350 --> 00:06:41,629
circularize the orbit and then there's a

119
00:06:48,609 --> 00:06:44,360
final burn that will it will send us out

120
00:06:52,689 --> 00:06:48,619
to the moon so then and the ICPs is

121
00:06:54,850 --> 00:06:52,699
powered by a single rl10 engine from air

122
00:06:57,100 --> 00:06:54,860
jet Rocketdyne awesome cool

123
00:07:00,040 --> 00:06:57,110
can you explain obviously we're talking

124
00:07:02,320 --> 00:07:00,050
about a 2021 launch for Artemis one

125
00:07:04,059 --> 00:07:02,330
which is incredibly exciting but as we

126
00:07:06,399 --> 00:07:04,069
look towards that there are a lot of

127
00:07:09,279 --> 00:07:06,409
pieces coming together quickly so can

128
00:07:10,809 --> 00:07:09,289
you help us understand where is

129
00:07:11,979 --> 00:07:10,819
everything today because my

130
00:07:14,649 --> 00:07:11,989
understanding is that most of these

131
00:07:16,929 --> 00:07:14,659
pieces exist and they're built it's just

132
00:07:18,999 --> 00:07:16,939
a matter of getting everything finalized

133
00:07:20,319 --> 00:07:19,009
finished tested and together and I have

134
00:07:22,059 --> 00:07:20,329
a video here I'm going to roll if you

135
00:07:24,189 --> 00:07:22,069
can just kind of walk through the pieces

136
00:07:26,350 --> 00:07:24,199
there's so many pieces but what are we

137
00:07:28,389 --> 00:07:26,360
looking at here and and again where

138
00:07:31,239 --> 00:07:28,399

where are they at and and how far they

139
00:07:34,359 --> 00:07:31,249
from KSC alright so we'll talk about

140
00:07:36,489 --> 00:07:34,369
that as we go through obviously the

141
00:07:38,529 --> 00:07:36,499
first part of this is Iran and we're

142
00:07:42,639 --> 00:07:38,539
I'll be talking about the thesis and

143
00:07:44,350 --> 00:07:42,649
Space Launch System love so this is

144
00:07:47,230 --> 00:07:44,360
these are some of the pieces of Iran you

145
00:07:50,499 --> 00:07:47,240
say that the launch abort system is

146
00:07:53,889 --> 00:07:50,509
complete this is a crew and service

147
00:07:55,299 --> 00:07:53,899
module that recently completed testing

148
00:08:03,420 --> 00:07:55,309
that plum Brook and it's now back at the

149
00:08:09,480 --> 00:08:07,560
so we start seeing pieces of the SLS

150
00:08:11,159 --> 00:08:09,490
vehicle this is a Ryan stage adapter

151
00:08:19,800 --> 00:08:11,169
it's at KSC

152
00:08:22,740 --> 00:08:19,810
launch vehicle stage adapter it's

153
00:08:25,560 --> 00:08:22,750
completing outfitted here at Marshall

154
00:08:26,189 --> 00:08:25,570
and will be headed your way in a couple

155
00:08:28,529 --> 00:08:26,199
of months

156
00:08:30,300 --> 00:08:28,539
the rs.25 SR completed tested and now

157
00:08:33,360 --> 00:08:30,310
installed on the core stage as you see

158
00:08:35,640 --> 00:08:33,370
here in the core stage this was

159
00:08:37,680 --> 00:08:35,650
completing the math and it's now extend

160
00:08:41,430 --> 00:08:37,690
as you see it loaded into the b2 test

161
00:08:43,350 --> 00:08:41,440
and the solid rocket motor segments are

162
00:08:45,240 --> 00:08:43,360
complete and we're actually in the

163
00:08:48,630 --> 00:08:45,250

process of loading those on rail cars

164
00:08:51,180 --> 00:08:48,640
for shipment next month - in the Space

165
00:08:53,340 --> 00:08:51,190
Center so that's kind of a quick

166
00:08:56,250 --> 00:08:53,350
overview and you see all the pieces of

167
00:08:58,490 --> 00:08:56,260
hardware as they are completed and as

168
00:09:00,750 --> 00:08:58,500
they're coming together yeah that's

169
00:09:02,100 --> 00:09:00,760
Yukino a couple really important things

170
00:09:04,290 --> 00:09:02,110
there at KSC

171
00:09:06,480 --> 00:09:04,300
we love being a major part of the

172
00:09:07,800 --> 00:09:06,490
Artemis program I like to say all roads

173
00:09:10,019 --> 00:09:07,810
lead to us before we get to the moon

174
00:09:11,730 --> 00:09:10,029
just because that's how we launched from

175
00:09:12,900 --> 00:09:11,740
so all those pieces like Chris was

176
00:09:15,449 --> 00:09:12,910
saying are headed this way we're excited

177
00:09:17,519 --> 00:09:15,459
for that you you mentioned this the math

178
00:09:19,860 --> 00:09:17,529
the Michoud assembly facility I believe

179
00:09:22,290 --> 00:09:19,870
and that core stage headed to Stennis

180
00:09:24,120 --> 00:09:22,300
it's there now and I hearing this term

181
00:09:26,430 --> 00:09:24,130
the green run and hopefully our viewers

182
00:09:27,690 --> 00:09:26,440
have heard of the green run what is that

183
00:09:30,960 --> 00:09:27,700
and why is it so important

184
00:09:32,910 --> 00:09:30,970
oh absolutely so this would be this

185
00:09:38,490 --> 00:09:32,920
would be the first time this stage has

186
00:09:42,480 --> 00:09:38,500
been tested together from the core stage

187
00:09:47,640 --> 00:09:42,490
itself top to bottom with the cryogenic

188
00:09:49,380 --> 00:09:47,650

fuel or the hydrogen and the oxygen will

189
00:09:51,300 --> 00:09:49,390
test avionics systems the flight

190
00:09:53,970 --> 00:09:51,310
computers and the timing and the

191
00:09:55,860 --> 00:09:53,980
integration with the flight software to

192
00:09:58,980 --> 00:09:55,870
see how all that comes together we we

193
00:10:02,160 --> 00:09:58,990
have a philosophy we we go by test lucky

194
00:10:04,199 --> 00:10:02,170
fly so we want to demonstrate everything

195
00:10:06,750 --> 00:10:04,209
that this this rocket is going to see

196
00:10:08,550 --> 00:10:06,760
for the first launch it's to demonstrate

197
00:10:10,110 --> 00:10:08,560
it on the ground so for the core stage

198
00:10:12,660 --> 00:10:10,120
this is the first time we'll do it so

199
00:10:15,930 --> 00:10:12,670
well we've got will kind of slowly walk

200
00:10:17,220 --> 00:10:15,940
our way into it well the system power up

201
00:10:19,890 --> 00:10:17,230
with all the electronics

202
00:10:21,780 --> 00:10:19,900
and verify that all works then we'll

203
00:10:24,030 --> 00:10:21,790
move into what we call a wet dress

204
00:10:28,020 --> 00:10:24,040
rehearsal where basically it's a tanking

205
00:10:30,630 --> 00:10:28,030
tests where we take the vehicle test for

206
00:10:33,060 --> 00:10:30,640
leaks and see how all that works and

207
00:10:34,830 --> 00:10:33,070
then after that we complete that we'll

208
00:10:37,410 --> 00:10:34,840
go into the green run test which is a

209
00:10:40,980 --> 00:10:37,420
basically it's a full firing little

210
00:10:43,560 --> 00:10:40,990
duration firing of the rocket it's a

211
00:10:45,630 --> 00:10:43,570
shakedown and with that test we're going

212
00:10:47,880 --> 00:10:45,640
to learn things about the doll our

213
00:10:50,690 --> 00:10:47,890

predictions relative to the propulsion

214
00:10:53,520 --> 00:10:50,700
system and the timing the dental work is

215
00:10:54,750 --> 00:10:53,530
projected and if something is off we

216
00:10:56,610 --> 00:10:54,760
want to be able to catch it here on the

217
00:10:59,310 --> 00:10:56,620
ground and fix it and adjust before

218
00:11:02,520 --> 00:10:59,320
flight so testing the vehicle the valve

219
00:11:04,920 --> 00:11:02,530
the facility software the controllers

220
00:11:06,900 --> 00:11:04,930
avionics everything together for the

221
00:11:08,730 --> 00:11:06,910
first time it's really exciting and

222
00:11:11,730 --> 00:11:08,740
that's that's going to be a big deal so

223
00:11:13,500 --> 00:11:11,740
the core stages at Stennis now and the

224
00:11:16,800 --> 00:11:13,510
team is preparing for that test and

225
00:11:19,440 --> 00:11:16,810
we'll be working awesome

226
00:11:20,940 --> 00:11:19,450
yeah I don't want to miss or be missing

227
00:11:21,990 --> 00:11:20,950
the fact that I didn't mention that you

228
00:11:23,190 --> 00:11:22,000
actually I believe you work at the

229
00:11:25,980 --> 00:11:23,200
Marshall Space Flight Center is that

230
00:11:27,120 --> 00:11:25,990
correct I do

231
00:11:28,500 --> 00:11:27,130
that's right didn't want it didn't want

232
00:11:30,540 --> 00:11:28,510
to leave you guys out obviously you guys

233
00:11:32,040 --> 00:11:30,550
are a huge part of the artist program so

234
00:11:34,350 --> 00:11:32,050
big thanks to Marshall we did have a

235
00:11:37,440 --> 00:11:34,360
question come in from social what do we

236
00:11:39,870 --> 00:11:37,450
hope to gain from the moon to get to

237
00:11:41,160 --> 00:11:39,880
Mars so kind of as we look as we head to

238
00:11:42,420 --> 00:11:41,170

the moon with our eyes on Mars

239
00:11:46,170 --> 00:11:42,430
what are we gaining in that in that

240
00:11:50,790 --> 00:11:46,180
process oh that's a very good question

241
00:11:53,480 --> 00:11:50,800
right we we need to we're going to make

242
00:11:56,610 --> 00:11:53,490
this sustainable we need to learn how to

243
00:12:00,300 --> 00:11:56,620
live on the moon right not just to visit

244
00:12:01,800 --> 00:12:00,310
so we want to work to work through that

245
00:12:03,480 --> 00:12:01,810
and we're testing out from our

246
00:12:05,190 --> 00:12:03,490
standpoint we're having will turn the

247
00:12:07,800 --> 00:12:05,200
launch vehicle and we'll be working that

248
00:12:10,380 --> 00:12:07,810
but it's all the systems involved from

249
00:12:13,140 --> 00:12:10,390
the crew systems from the spacecraft the

250
00:12:15,120 --> 00:12:13,150
landing systems to eventually the

251
00:12:18,960 --> 00:12:15,130
systems that will demonstrate on the

252
00:12:20,880 --> 00:12:18,970
moon where we can take advantage of in

253
00:12:24,630 --> 00:12:20,890
situ resources and things like that

254
00:12:26,640 --> 00:12:24,640
so it's the whole logistics system that

255
00:12:28,490 --> 00:12:26,650
will support the team that's working the

256
00:12:30,180 --> 00:12:28,500
mission who's living on the moon etc

257
00:12:33,090 --> 00:12:30,190
awesome

258
00:12:34,499 --> 00:12:33,100
we're still here yep and uh like Chris

259
00:12:37,019 --> 00:12:34,509
said earlier in the show Thursday we'll

260
00:12:38,280 --> 00:12:37,029
talk about the Orion program on Friday

261
00:12:40,319 --> 00:12:38,290
we'll talk a little bit about that in

262
00:12:42,629 --> 00:12:40,329
situ resource utilization on our Friday

263
00:12:45,600 --> 00:12:42,639

show last question for you Chris

264
00:12:48,179 --> 00:12:45,610
obviously as a as a leader in this

265
00:12:49,350 --> 00:12:48,189
program I'm sure that you were just just

266
00:12:51,150 --> 00:12:49,360
the excitement is just almost

267
00:12:53,189 --> 00:12:51,160
uncontrollable at this point when we get

268
00:12:54,809 --> 00:12:53,199
to launch day where are you gonna be and

269
00:12:59,749 --> 00:12:54,819
and what are you going to be looking for

270
00:13:05,759 --> 00:12:59,759
the most oh I will I will be with the

271
00:13:08,309 --> 00:13:05,769
launch team on the day of launch and I'm

272
00:13:11,910 --> 00:13:08,319
just super excited to be part of this I

273
00:13:15,240 --> 00:13:11,920
go back in and as a as a child I was

274
00:13:19,679 --> 00:13:15,250
fortunate I had parents who were all

275
00:13:21,780 --> 00:13:19,689
excited about space things that were

276
00:13:23,819 --> 00:13:21,790
going on in part of their generation and

277
00:13:26,040 --> 00:13:23,829
and they took me to actually see the

278
00:13:29,009 --> 00:13:26,050
launch of Apollo 11 and that's been

279
00:13:31,259 --> 00:13:29,019
imprinted in my mind and my career and

280
00:13:33,780 --> 00:13:31,269
through my life there's just one of the

281
00:13:35,699 --> 00:13:33,790
exciting times and just now to be part

282
00:13:38,129 --> 00:13:35,709
of that it's part of the Artemus

283
00:13:40,710 --> 00:13:38,139
generation I'm so excited to see us

284
00:13:43,460 --> 00:13:40,720
going back to the moon the first woman

285
00:13:44,730 --> 00:13:43,470
in the next man it's just 13 times

286
00:13:46,170 --> 00:13:44,740
awesome

287
00:13:48,540 --> 00:13:46,180
yeah and obviously the Space Launch

288
00:13:51,179 --> 00:13:48,550

System is the ride that will get us

289
00:13:52,499 --> 00:13:51,189
there so Chris appreciate you joining us

290
00:13:55,379 --> 00:13:52,509
and that's gonna do it for us today

291
00:13:57,749 --> 00:13:55,389
thanks for being with me thanks for your

292
00:13:59,040 --> 00:13:57,759
time we appreciate it absolutely and I

293
00:14:00,360 --> 00:13:59,050
want to sign off reminding you to tune

294
00:14:02,400 --> 00:14:00,370
in tomorrow at one o'clock we're gonna

295
00:14:04,139 --> 00:14:02,410
talk about Casey and how we've prepared

296
00:14:06,689 --> 00:14:04,149
as a Space Center to be ready for the