



1  
00:00:00,490 --> 00:00:34,479

[Music]

2  
00:00:38,260 --> 00:00:36,549

hey how are you so sorry about that

3  
00:00:40,689 --> 00:00:38,270

little technical glitch there I am

4  
00:00:42,790 --> 00:00:40,699

Joshua Santora and I am would normally

5  
00:00:45,100 --> 00:00:42,800

be coming to you live from the Kennedy

6  
00:00:47,170 --> 00:00:45,110

Space Center but today I'm actually

7  
00:00:49,600 --> 00:00:47,180

coming to you live from my house so as

8  
00:00:51,579 --> 00:00:49,610

most of America and as most of the

9  
00:00:52,990 --> 00:00:51,589

agency is experiencing when we're

10  
00:00:54,430 --> 00:00:53,000

getting from home but still trying to

11  
00:00:57,610 --> 00:00:54,440

bring you great content talking about

12  
00:00:59,500 --> 00:00:57,620

things that are ongoing were making life

13  
00:01:01,990 --> 00:00:59,510

work as best as we can it's kind of a

14

00:01:04,810 --> 00:01:02,000

crazy time but today specifically we're

15

00:01:07,570 --> 00:01:04,820

talking about Mars and the Martian

16

00:01:11,370 --> 00:01:07,580

surface specifically we want to be

17

00:01:14,380 --> 00:01:11,380

talking about the Mars rover Mars 2020

18

00:01:16,419 --> 00:01:14,390

recently given the title perseverance

19

00:01:18,639 --> 00:01:16,429

the named by a school at a Lake Braddock

20

00:01:21,760 --> 00:01:18,649

like Braddock secondary school in Burke

21

00:01:23,499 --> 00:01:21,770

Virginia gave it this beautiful name so

22

00:01:25,719 --> 00:01:23,509

this is part of the NASA at home series

23

00:01:27,340 --> 00:01:25,729

we're bringing you and it's not just me

24

00:01:29,109 --> 00:01:27,350

today I have a couple friends I have a

25

00:01:31,779 --> 00:01:29,119

few friends joining me actually so I

26

00:01:35,859 --> 00:01:31,789

want to check in with them so first up

27

00:01:37,300 --> 00:01:35,869

we've got Kenna Pell and Kenna is with

28

00:01:38,649 --> 00:01:37,310

NASA public affairs she's up there on

29

00:01:40,450 --> 00:01:38,659

the top right hand corner of your screen

30

00:01:44,980 --> 00:01:40,460

so thanks Kenna for being here how are

31

00:01:49,300 --> 00:01:44,990

you woops sorry about that try that one

32

00:01:51,130 --> 00:01:49,310

more time for McKenna yes we can yeah

33

00:01:54,550 --> 00:01:51,140

sorry about that we're good to go next

34

00:01:57,420 --> 00:01:54,560

up we've got David Stafford David how

35

00:02:04,209 --> 00:02:00,850

good yeah both you and our next guest

36

00:02:09,370 --> 00:02:04,219

it's been Marty and I saying that right

37

00:02:12,940 --> 00:02:09,380

bin awesome so Ben and David both coming

38

00:02:16,509 --> 00:02:12,950

to us live now actually from Florida so

39

00:02:18,099 --> 00:02:16,519

usually they're located over at the Jet

40

00:02:20,229 --> 00:02:18,109

Propulsion Laboratory NASA's Jet

41

00:02:22,810 --> 00:02:20,239

Propulsion Laboratory in California but

42

00:02:24,819 --> 00:02:22,820

today they're in Florida but before we

43

00:02:26,199 --> 00:02:24,829

dive into their stories kena's gonna

44

00:02:28,509 --> 00:02:26,209

duck out here she's keeping an eye on

45

00:02:30,910 --> 00:02:28,519

the questions that we've got going you

46

00:02:33,550 --> 00:02:30,920

can use hashtag NASA at home you can

47

00:02:35,590 --> 00:02:33,560

also use the the stream here of the

48

00:02:37,300 --> 00:02:35,600

comment stream to come in as well and

49

00:02:38,979 --> 00:02:37,310

she'll jump in here in a little bit if

50

00:02:40,690 --> 00:02:38,989

we have those questions so I'm gonna

51  
00:02:43,240 --> 00:02:40,700  
just jump in here David with you tell me

52  
00:02:44,920 --> 00:02:43,250  
a little bit about your role and what

53  
00:02:48,010 --> 00:02:44,930  
brings you guys all the way to Florida

54  
00:02:50,950 --> 00:02:48,020  
with this amazing rover

55  
00:02:52,540 --> 00:02:50,960  
well for the project from 2020 I'm the

56  
00:02:55,480 --> 00:02:52,550  
mechanical ground systems engineering

57  
00:02:57,940 --> 00:02:55,490  
lead for the a blue team and so my role

58  
00:02:59,800 --> 00:02:57,950  
essentially is sort of the lead of all

59  
00:03:01,090 --> 00:02:59,810  
of these sort of large tooling or all

60  
00:03:03,460 --> 00:03:01,100  
the tooling that helps with all the

61  
00:03:05,050 --> 00:03:03,470  
integration activities that support the

62  
00:03:08,770 --> 00:03:05,060  
rover and the spacecraft all the way up

63  
00:03:10,810 --> 00:03:08,780

to launch and so whereas Bob's already

64

00:03:14,410 --> 00:03:10,820

from small hardware depth a large large

65

00:03:15,610 --> 00:03:14,420

hardwork and then along with that I also

66

00:03:17,470 --> 00:03:15,620

have the responsibility of leastly

67

00:03:20,590 --> 00:03:17,480

shipping the program so I was sort of

68

00:03:23,080 --> 00:03:20,600

the lead person in charge to have the

69

00:03:25,270 --> 00:03:23,090

responsibility to basically take our

70

00:03:27,430 --> 00:03:25,280

high bay at JPL and move it all the way

71

00:03:28,900 --> 00:03:27,440

across country to Kennedy so we can

72

00:03:32,770 --> 00:03:28,910

continue the laughs of our integration

73

00:03:34,630 --> 00:03:32,780

activities that's fantastic so and I

74

00:03:36,190 --> 00:03:34,640

want to make sure that people appreciate

75

00:03:38,680 --> 00:03:36,200

kind of what that means you say pack up

76  
00:03:40,660 --> 00:03:38,690  
a high bay we're not talking about a few

77  
00:03:42,310 --> 00:03:40,670  
pieces of gear here and earlier you

78  
00:03:44,830 --> 00:03:42,320  
mentioned to me specifically how many

79  
00:03:48,100 --> 00:03:44,840  
how many vehicles you had to use and

80  
00:03:49,630 --> 00:03:48,110  
what were those numbers again yeah so in

81  
00:03:52,060 --> 00:03:49,640  
order to move the program it took about

82  
00:03:55,450 --> 00:03:52,070  
three sort of development move campaigns

83  
00:03:58,870 --> 00:03:55,460  
and so I'm all told it took about 18

84  
00:04:00,730 --> 00:03:58,880  
semi trucks 3e c---seventeens

85  
00:04:03,190 --> 00:04:00,740  
and a whole Corps of people and

86  
00:04:05,260 --> 00:04:03,200  
individuals from us the civilian side

87  
00:04:07,450 --> 00:04:05,270  
all the way to the military in order to

88  
00:04:09,910 --> 00:04:07,460

safely move all the hardware we need for

89

00:04:11,350 --> 00:04:09,920

integration all of the flight key

90

00:04:13,210 --> 00:04:11,360

aspects and the flight vehicles

91

00:04:16,720 --> 00:04:13,220

themselves and then also with that

92

00:04:18,370 --> 00:04:16,730

moving all the personnel so it was a

93

00:04:20,500 --> 00:04:18,380

pretty large activity that's spanning

94

00:04:22,900 --> 00:04:20,510

over quite a few months and very key

95

00:04:24,100 --> 00:04:22,910

shipments yeah that's it's good you

96

00:04:26,260 --> 00:04:24,110

mentioned the personnel because I think

97

00:04:27,790 --> 00:04:26,270

it's easy to remember that we're talking

98

00:04:29,440 --> 00:04:27,800

about a rover and all the things to get

99

00:04:31,270 --> 00:04:29,450

it into space but there's a lot of

100

00:04:32,410 --> 00:04:31,280

people that have to do that and the

101  
00:04:35,410 --> 00:04:32,420  
people with the expertise coming from

102  
00:04:37,120 --> 00:04:35,420  
California they're JPL so so glad

103  
00:04:39,280 --> 00:04:37,130  
everybody is still making great progress

104  
00:04:41,260 --> 00:04:39,290  
Ben want to hear from you too I know

105  
00:04:42,490 --> 00:04:41,270  
that you support david and you also have

106  
00:04:47,920 --> 00:04:42,500  
some other roles so what did you do for

107  
00:04:50,590 --> 00:04:47,930  
JPL i'm in which means I handle sort of

108  
00:04:53,770 --> 00:04:50,600  
our assembly operations on the floor I

109  
00:04:55,870 --> 00:04:53,780  
backed up David helping him ship all of

110  
00:04:58,300 --> 00:04:55,880  
that GSE ground support equipment across

111  
00:05:00,100 --> 00:04:58,310  
the country I've also helped transport

112  
00:05:00,730 --> 00:05:00,110  
our robot around for some of our quick

113  
00:05:03,879 --> 00:05:00,740

tests

114

00:05:05,860 --> 00:05:03,889

champagnes at JPL I leave lifts when we

115

00:05:09,219 --> 00:05:05,870

have to pick up spacecraft or components

116

00:05:11,290 --> 00:05:09,229

and put our spacecraft together and in

117

00:05:12,790 --> 00:05:11,300

general I'm on the high base floor

118

00:05:14,650 --> 00:05:12,800

working with our large team of

119

00:05:17,170 --> 00:05:14,660

technicians to get that beautiful

120

00:05:20,680 --> 00:05:17,180

spacecraft assembled and ready to go to

121

00:05:23,499 --> 00:05:20,690

the last man yeah so here I'm throw up

122

00:05:25,270 --> 00:05:23,509

an image here of that Rover there so

123

00:05:27,999 --> 00:05:25,280

talking about the technicians on the

124

00:05:29,409 --> 00:05:28,009

floor there you can see actually above

125

00:05:32,230 --> 00:05:29,419

your image there's a few of those guys

126

00:05:33,430 --> 00:05:32,240

there so what is it that you guys do in

127

00:05:35,379 --> 00:05:33,440

that space and I want to kind of comment

128

00:05:37,300 --> 00:05:35,389

on that the cleanroom environment as you

129

00:05:39,490 --> 00:05:37,310

see there that's something that is very

130

00:05:41,589 --> 00:05:39,500

standard for spacecraft that's something

131

00:05:43,210 --> 00:05:41,599

that all of our spacecraft have varying

132

00:05:45,010 --> 00:05:43,220

levels of cleanliness requirements I

133

00:05:47,320 --> 00:05:45,020

know that's not yours but your specialty

134

00:05:48,700 --> 00:05:47,330

and expertise but are you guys the ones

135

00:05:50,020 --> 00:05:48,710

there and those bunny suits working on

136

00:05:56,499 --> 00:05:50,030

the rover or is it really just a matter

137

00:05:58,930 --> 00:05:56,509

of that transportation aspect every day

138

00:06:01,719 --> 00:05:58,940

doing what are the activities assigned

139

00:06:03,999 --> 00:06:01,729

us didn't mention we also work on the

140

00:06:05,080 --> 00:06:04,009

floor we do different tasks we can get

141

00:06:06,490 --> 00:06:05,090

tasked a lot of procedures and

142

00:06:08,680 --> 00:06:06,500

development mostly integration

143

00:06:11,320 --> 00:06:08,690

activities and so any one of us can be

144

00:06:12,430 --> 00:06:11,330

on the floor one or two shifts or even

145

00:06:14,620 --> 00:06:12,440

three shifts when things really round

146

00:06:16,450 --> 00:06:14,630

the clock the picture you just saw there

147

00:06:18,670 --> 00:06:16,460

that was the driving test so that was

148

00:06:21,490 --> 00:06:18,680

the driving ramps at the GOC team

149

00:06:23,430 --> 00:06:21,500

provided to simulate actuation across

150

00:06:25,450 --> 00:06:23,440

the mobility system

151  
00:06:28,719 --> 00:06:25,460  
yeah and Ben I know that you mentioned

152  
00:06:30,520 --> 00:06:28,729  
earlier to me that you guys have kind of

153  
00:06:32,830 --> 00:06:30,530  
a primary role but everybody does a lot

154  
00:06:34,149 --> 00:06:32,840  
of things it ends up kind of keeping the

155  
00:06:35,920 --> 00:06:34,159  
team lean so what does that look like

156  
00:06:38,379 --> 00:06:35,930  
practically do you guys kind of just get

157  
00:06:39,760 --> 00:06:38,389  
tasked a day today to just hey jump in

158  
00:06:41,589 --> 00:06:39,770  
and help out with this or is it kind of

159  
00:06:44,740 --> 00:06:41,599  
every just has lots of assigned roles

160  
00:06:46,990 --> 00:06:44,750  
that they work on you're exactly right

161  
00:06:48,999 --> 00:06:47,000  
it's every day early in the morning at

162  
00:06:50,950 --> 00:06:49,009  
7:30 we get together and have a tactical

163  
00:06:52,959 --> 00:06:50,960

meeting talking about the activities

164

00:06:55,390 --> 00:06:52,969

that are happening for the day we have

165

00:06:57,700 --> 00:06:55,400

the rover we've talked about a lot we

166

00:06:59,740 --> 00:06:57,710

also have essentially four more pieces

167

00:07:02,140 --> 00:06:59,750

of our spacecraft that help us get to

168

00:07:04,600 --> 00:07:02,150

Mars through stage two scent stage and

169

00:07:06,790 --> 00:07:04,610

aeroshell so in that tactical meeting we

170

00:07:08,620 --> 00:07:06,800

sort of divide and conquer who is

171

00:07:10,959 --> 00:07:08,630

working on what who's directing what

172

00:07:11,770 --> 00:07:10,969

team who needs I need four technicians

173

00:07:15,880 --> 00:07:11,780

to do this on

174

00:07:17,740 --> 00:07:15,890

two technicians to do this and engineers

175

00:07:20,110 --> 00:07:17,750

white procedures to handle those

176

00:07:22,780 --> 00:07:20,120

specific operations but it not you may

177

00:07:24,730 --> 00:07:22,790

not be running a procedure you wrote my

178

00:07:26,680 --> 00:07:24,740

buddy Ryan may give me a procedure that

179

00:07:29,680 --> 00:07:26,690

says here you go grab these text and

180

00:07:32,590 --> 00:07:29,690

install this electric box so we do have

181

00:07:34,960 --> 00:07:32,600

a very dynamic role on the floor that's

182

00:07:37,000 --> 00:07:34,970

awesome so thinking about kind of

183

00:07:39,940 --> 00:07:37,010

transporting across the country you're

184

00:07:41,890 --> 00:07:39,950

talking about these these giant aircraft

185

00:07:43,630 --> 00:07:41,900

and these giant tractor trailers that

186

00:07:44,890 --> 00:07:43,640

are moving so there we've got you guys

187

00:07:47,020 --> 00:07:44,900

on screen showing us some of the actual

188

00:07:49,690 --> 00:07:47,030

operations so what's it like once you've

189

00:07:51,250 --> 00:07:49,700

been on the ground how difficult is it

190

00:07:53,909 --> 00:07:51,260

even to just go a few miles from an

191

00:07:57,130 --> 00:07:53,919

airplane to the cleanroom environment

192

00:07:58,510 --> 00:07:57,140

well it's pretty challenging these boxes

193

00:08:02,050 --> 00:07:58,520

you see in front of you here are no

194

00:08:03,940 --> 00:08:02,060

small task every key system will sort of

195

00:08:05,890 --> 00:08:03,950

put any special containment box or

196

00:08:08,320 --> 00:08:05,900

container fixture that was designed

197

00:08:10,210 --> 00:08:08,330

specifically for on the road transport

198

00:08:13,270 --> 00:08:10,220

and then also you see here on a c-17

199

00:08:14,590 --> 00:08:13,280

each box each sort of containment vessel

200

00:08:16,630 --> 00:08:14,600

has cleanliness requirements of

201  
00:08:19,000 --> 00:08:16,640  
protection requirements they are tested

202  
00:08:23,469 --> 00:08:19,010  
they are proof tested they are even Road

203  
00:08:25,810 --> 00:08:23,479  
characterization both side of its

204  
00:08:28,120 --> 00:08:25,820  
containment box and then we do extra due

205  
00:08:33,579 --> 00:08:28,130  
diligence to make sure that we handle

206  
00:08:35,680 --> 00:08:33,589  
with care ya know certainly a handle

207  
00:08:36,880 --> 00:08:35,690  
with care' things so I know you both

208  
00:08:39,130 --> 00:08:36,890  
mentioned to me earlier that this is

209  
00:08:40,180 --> 00:08:39,140  
your first major mission that you're

210  
00:08:42,159 --> 00:08:40,190  
working in supporting which is

211  
00:08:43,690 --> 00:08:42,169  
phenomenal had you said four and five

212  
00:08:45,700 --> 00:08:43,700  
years you guys have been around with JPL

213  
00:08:47,440 --> 00:08:45,710

which is great we're targeting a July

214

00:08:49,210 --> 00:08:47,450

launch with a planetary window of only a

215

00:08:50,770 --> 00:08:49,220

few weeks long but I want to ask you

216

00:08:53,590 --> 00:08:50,780

guys what's it like how do you feel like

217

00:08:55,630 --> 00:08:53,600

you're getting ready to help put a small

218

00:08:57,070 --> 00:08:55,640

car essentially on the surface of Mars

219

00:08:59,950 --> 00:08:57,080

what's that like for you Ben and then

220

00:09:01,990 --> 00:08:59,960

David all you from both you it's it's

221

00:09:05,320 --> 00:09:02,000

very exciting time we've been working

222

00:09:07,150 --> 00:09:05,330

very hard working long hours there's a

223

00:09:09,790 --> 00:09:07,160

lot of personal sacrifice that happens

224

00:09:13,570 --> 00:09:09,800

to get a spacecraft like this to the

225

00:09:15,640 --> 00:09:13,580

launch pad it's exciting it's tiring but

226

00:09:17,170 --> 00:09:15,650

we are looking forward to the end of

227

00:09:19,540 --> 00:09:17,180

this great adventure it's going to be a

228

00:09:21,820 --> 00:09:19,550

very exciting day one that rocket leads

229

00:09:24,639 --> 00:09:21,830

the Kennedy Space Center and they are on

230

00:09:31,100 --> 00:09:29,420

yeah david has yes so so as the at low

231

00:09:32,630 --> 00:09:31,110

engineer we're kind of the last we're

232

00:09:34,790 --> 00:09:32,640

the last integrators or the last people

233

00:09:36,500 --> 00:09:34,800

that touch it and basically we have a

234

00:09:38,269 --> 00:09:36,510

whole lab in companies that people

235

00:09:40,100 --> 00:09:38,279

that's entrusting the final sort of

236

00:09:41,870 --> 00:09:40,110

delivery of the product to us in our

237

00:09:43,490 --> 00:09:41,880

hands and then so we're we have the

238

00:09:45,650 --> 00:09:43,500

weight of the shoulders of everyone who

239

00:09:47,090 --> 00:09:45,660

has worked on this program and then

240

00:09:48,650 --> 00:09:47,100

making sure we do our due diligence and

241

00:09:50,180 --> 00:09:48,660

everything to sort of get this thing to

242

00:09:53,420 --> 00:09:50,190

the finish line and get this attached on

243

00:09:54,980 --> 00:09:53,430

top of its rocket so it's a huge a sense

244

00:09:56,840 --> 00:09:54,990

of pride and sense of relief that we

245

00:09:58,250 --> 00:09:56,850

know we're doing our best and we're on

246

00:10:00,380 --> 00:09:58,260

schedule and we're meeting all the

247

00:10:01,570 --> 00:10:00,390

requirements and the milestones as put

248

00:10:04,130 --> 00:10:01,580

forth on us

249

00:10:05,360 --> 00:10:04,140

awesome well David Ben I don't want to

250

00:10:07,190 --> 00:10:05,370

keep you any longer I know there's a lot

251

00:10:08,420 --> 00:10:07,200

of work to do again targeting in July

252

00:10:10,460 --> 00:10:08,430

window there's still a couple months a

253

00:10:14,570 --> 00:10:10,470

few months to go but lots to be done so

254

00:10:17,420 --> 00:10:14,580

thanks guys for joining me today thanks

255

00:10:19,220 --> 00:10:17,430

for having us and as you saw just a

256

00:10:20,810 --> 00:10:19,230

minute ago I did throw up this URL

257

00:10:21,920 --> 00:10:20,820

please be sure to check this out if you

258

00:10:26,420 --> 00:10:21,930

want to get more information on this

259

00:10:29,870 --> 00:10:26,430

mission its Mars dot nasa.gov slash Mars

260

00:10:32,870 --> 00:10:29,880

2020 a phenomenal mission really excited

261

00:10:34,070 --> 00:10:32,880

for this cannot wait but I do want to

262

00:10:36,199 --> 00:10:34,080

actually plug a couple other things

263

00:10:39,650 --> 00:10:36,209

today I mentioned earlier the NASA at

264

00:10:41,269 --> 00:10:39,660

home is a huge undertaking that NASA is

265

00:10:42,769 --> 00:10:41,279

doing right now understanding that

266

00:10:44,720 --> 00:10:42,779

there's a lot of people out there with

267

00:10:46,100 --> 00:10:44,730

opportunity to work on some things at

268

00:10:47,170 --> 00:10:46,110

home whether it be with your kids or

269

00:10:49,730 --> 00:10:47,180

just for fun and entertainment

270

00:10:51,980 --> 00:10:49,740

specifically I wanted to highlight one

271

00:10:53,390 --> 00:10:51,990

thing today I'm gonna do this every

272

00:10:57,260 --> 00:10:53,400

episode pull something else out of here

273

00:10:59,690 --> 00:10:57,270

this is actually a this is a sample of a

274

00:11:01,519 --> 00:10:59,700

a book on Cassini another mission that

275

00:11:02,990 --> 00:11:01,529

was championed kind of headed up made

276  
00:11:05,030 --> 00:11:03,000  
happen by the Jet Propulsion Laboratory

277  
00:11:07,449 --> 00:11:05,040  
a phenomenal story here phenomenal

278  
00:11:10,790 --> 00:11:07,459  
imagery just learning so much about

279  
00:11:12,440 --> 00:11:10,800  
Saturn so super cool they're also want

280  
00:11:14,150 --> 00:11:12,450  
to bring up a few highlights in social

281  
00:11:16,579 --> 00:11:14,160  
media this week hopefully you saw these

282  
00:11:20,389 --> 00:11:16,589  
things we're getting ready to have the

283  
00:11:22,579 --> 00:11:20,399  
first crewed launch of you from American

284  
00:11:24,319 --> 00:11:22,589  
soil in in nine years so we're launching

285  
00:11:25,699 --> 00:11:24,329  
American astronauts on American

286  
00:11:27,230 --> 00:11:25,709  
spacecraft on American Rockets from

287  
00:11:29,240 --> 00:11:27,240  
American soil and we're super excited

288  
00:11:32,660 --> 00:11:29,250

and actually thinking forward a little

289

00:11:34,370 --> 00:11:32,670

bit this is for SpaceX's second crew

290

00:11:35,980 --> 00:11:34,380

flight we assigned a couple new

291

00:11:38,680 --> 00:11:35,990

astronauts this week Chang Walker

292

00:11:41,050 --> 00:11:38,690

Congrats to her and then we also had the

293

00:11:43,630 --> 00:11:41,060

announcement of the Japanese astronaut

294

00:11:45,160 --> 00:11:43,640

seviche Noguchi will be joining them as

295

00:11:46,690 --> 00:11:45,170

well so making up a floor person crew

296

00:11:49,210 --> 00:11:46,700

they'll be joining Mike Hopkins and

297

00:11:51,850 --> 00:11:49,220

Victor Glover again so much so much

298

00:11:55,449 --> 00:11:51,860

excitement going on and then we also had

299

00:11:56,920 --> 00:11:55,459

happen this week let me see what we got

300

00:12:00,100 --> 00:11:56,930

we had the announcement of the Gateway

301  
00:12:01,900 --> 00:12:00,110  
logistics element award the first part

302  
00:12:03,519 --> 00:12:01,910  
of it anyway is to SpaceX there you see

303  
00:12:05,829 --> 00:12:03,529  
the dragon excel which is yet to be

304  
00:12:07,180 --> 00:12:05,839  
built so excited for for that progress

305  
00:12:09,190 --> 00:12:07,190  
as we get back to the moon with the

306  
00:12:12,550 --> 00:12:09,200  
Artemis program first woman and next man

307  
00:12:14,590 --> 00:12:12,560  
on the moon by 2024 and then all you

308  
00:12:17,110 --> 00:12:14,600  
NASA fans out there will love this the

309  
00:12:19,150 --> 00:12:17,120  
meatball has excuse me the worm has

310  
00:12:21,820 --> 00:12:19,160  
reappeared so the worm has been found

311  
00:12:24,370 --> 00:12:21,830  
our classic NASA icon there in red

312  
00:12:26,199 --> 00:12:24,380  
pictured on the side of that dragon that

313  
00:12:28,840 --> 00:12:26,209

Falcon rocket 5 and 9 rocket excuse me

314

00:12:30,519 --> 00:12:28,850

today whoo we will be flying this that

315

00:12:33,519 --> 00:12:30,529

is part of that first crewed mission so

316

00:12:36,340 --> 00:12:33,529

excited for that cannot wait again lots

317

00:12:38,170 --> 00:12:36,350

ahead lots more to come but that is

318

00:12:39,880 --> 00:12:38,180

gonna do it from me here today

319

00:12:43,569 --> 00:12:39,890

so again want to encourage you guys to

320

00:12:47,079 --> 00:12:43,579

check out everything that is NASA at

321

00:12:49,389 --> 00:12:47,089

home that URL there [nasa.gov](https://www.nasa.gov) slash NASA

322

00:12:53,800 --> 00:12:49,399

at home and also be sure to check out

323

00:12:55,569 --> 00:12:53,810

the hashtag NASA at home and use that as

324

00:12:56,949 --> 00:12:55,579

well as you do these activities as you

325

00:12:58,449 --> 00:12:56,959

read and you understand and learn more

326

00:12:58,870 --> 00:12:58,459

we'd love to hear from you and see what

327

00:13:00,940 --> 00:12:58,880

you're up to

328

00:13:03,069 --> 00:13:00,950

so from the Kennedy Space Center sort of