1
00:00:07,550 --> 00:00:05,210
good afternoon and welcome to NASA's

2
00:00:10,100 --> 00:00:07,560
Kennedy Space Center in Florida we're

3
00:00:12,320 --> 00:00:10,110
just a few hours away from the expected

4
00:00:14,240 --> 00:00:12,330
move of the Orion spacecraft to its

5
00:00:16,039 --> 00:00:14,250
launch pad for the December flight test

6
00:00:18,620 --> 00:00:16,049
and here to talk about the move I'm

7
00:00:22,720 --> 00:00:18,630
pleased to be joined today by NASA

8
00:00:31,370 --> 00:00:25,400
Johnson Space Center Director Ellen

9
00:00:36,290 --> 00:00:31,380
Ochoa NASA Orion program manager Mark

10
00:00:40,010 --> 00:00:36,300
Guyer and Lockheed Martin Orion program

11
00:00:41,630 --> 00:00:40,020
manager Mike Hawes will begin with some

12
00:00:44,420 --> 00:00:41,640
opening remarks and then we'll be happy

13
00:00:46,790 --> 00:00:44,430

to take your questions mr. Cabana thanks

14
00:00:48,500 --> 00:00:46,800
Mike well I'm sorry the weather didn't

15
00:00:51,860 --> 00:00:48,510
cooperate and we're not sitting out at

16
00:00:53,389 --> 00:00:51,870
the LA SF with the Orion in the

17
00:00:54,799 --> 00:00:53,399
background but let me tell you it really

18
00:00:56,840 --> 00:00:54,809
looks great and hopefully the weather

19
00:00:59,869 --> 00:00:56,850
will cooperate and we'll roll over to

20
00:01:02,270 --> 00:00:59,879
the pad later this evening I got to tell

21
00:01:05,090 --> 00:01:02,280
you this is this is special this is our

22
00:01:08,510 --> 00:01:05,100
first step on that journey to Mars in to

23
00:01:10,219 --> 00:01:08,520
see the vehicle on top of the service

24
00:01:13,190 --> 00:01:10,229
module with the launch abort system

25
00:01:14,600 --> 00:01:13,200
attached it's quite a stack and it's

26
00:01:17,600 --> 00:01:14,610
going to look really good on top of that

27
00:01:20,660 --> 00:01:17,610
the Delta 4 is we go for that test

28
00:01:23,510 --> 00:01:20,670
flight on December forth you know when

29
00:01:27,170 --> 00:01:23,520
it rolled out of the or own see high bay

30
00:01:28,730 --> 00:01:27,180
in the neil armstrong building there you

31
00:01:30,890 --> 00:01:28,740
know that was really special that was

32
00:01:33,289 --> 00:01:30,900
the first time that a crude vehicle has

33
00:01:37,190 --> 00:01:33,299
rolled out that high base since Paulo

34
00:01:40,819 --> 00:01:37,200
Soyuz test project back in 1975 and to

35
00:01:42,859 --> 00:01:40,829
see history being made that was it was a

36
00:01:44,539 --> 00:01:42,869
special day and that was an awesome

37
00:01:46,880 --> 00:01:44,549
partnership with the state of Florida

38
00:01:49,910 --> 00:01:46,890

and Lockheed Martin to make that

39
00:01:51,920 --> 00:01:49,920
facility a high bay of processing

40
00:01:54,770 --> 00:01:51,930
facility a manufacturing facility for

41
00:01:57,889 --> 00:01:54,780
the Orion spacecraft and after all that

42
00:02:00,350 --> 00:01:57,899
hard work you know now we're seeing the

43
00:02:02,690 --> 00:02:00,360
results of it and I can't be more

44
00:02:04,249 --> 00:02:02,700
excited about the transformation that

45
00:02:06,020 --> 00:02:04,259
we've made here at the Kennedy Space

46
00:02:08,839 --> 00:02:06,030
Center supporting the Space Launch

47
00:02:11,180 --> 00:02:08,849
System out of the pads over in the VA be

48
00:02:13,460 --> 00:02:11,190
the crawler transporter everything is

49
00:02:15,590 --> 00:02:13,470
tracking along to that fy8

50
00:02:17,720 --> 00:02:15,600
test flight with the big rocket on it

51
00:02:20,180 --> 00:02:17,730
and this is a huge first step to be able

52
00:02:22,700 --> 00:02:20,190
to check out the vehicle on the Delta 4

53
00:02:25,790 --> 00:02:22,710
and get some data back and let mark talk

54
00:02:28,340 --> 00:02:25,800
about that but you know between the

55
00:02:30,920 --> 00:02:28,350
transformation launch pad 39a support

56
00:02:32,330 --> 00:02:30,930
the SLS the commercial operations that

57
00:02:34,460 --> 00:02:32,340
we have going on turning over the

58
00:02:37,220 --> 00:02:34,470
facilities to enable commercial space

59
00:02:39,860 --> 00:02:37,230
operations awarding the contract for

60
00:02:42,140 --> 00:02:39,870
commercial crew and then the great

61
00:02:44,240 --> 00:02:42,150
science missions that we have going on

62
00:02:46,850 --> 00:02:44,250
supported by LSP to procure those

63
00:02:48,199 --> 00:02:46,860

expendable rockets I think our future

64
00:02:51,350 --> 00:02:48,209
here at the Kennedy Space Center is

65
00:02:53,540 --> 00:02:51,360
really being solidified and it's a real

66
00:02:56,150 --> 00:02:53,550
pleasure to be here tonight to be able

67
00:02:58,190 --> 00:02:56,160
to see Orion roll for its first test

68
00:03:03,410 --> 00:02:58,200
flight so thank you all for coming out

69
00:03:05,630 --> 00:03:03,420
today Ryan represents the latest

70
00:03:07,370 --> 00:03:05,640
human-rated spacecraft that Johnson

71
00:03:09,620 --> 00:03:07,380
Space Center has had the privilege of

72
00:03:11,690 --> 00:03:09,630
developing also including the

73
00:03:13,310 --> 00:03:11,700
International Space Station the Shuttle

74
00:03:15,470 --> 00:03:13,320
Orbiter and of course going back to

75
00:03:17,030 --> 00:03:15,480
Apollo and we're the center that are

76
00:03:19,009 --> 00:03:17,040
eventually going to put our astronauts

77
00:03:20,540 --> 00:03:19,019
onboard so this initial test flight

78
00:03:23,210 --> 00:03:20,550
which focuses on some of the highest

79
00:03:25,520 --> 00:03:23,220
risks to bringing the crew back safely

80
00:03:28,130 --> 00:03:25,530
from exploration missions is really

81
00:03:30,650 --> 00:03:28,140
important to us we work closely with our

82
00:03:32,180 --> 00:03:30,660
contractor partner Lockheed Martin not

83
00:03:34,790 --> 00:03:32,190
only through the program office at

84
00:03:37,250 --> 00:03:34,800
Johnson that Mark Guyer leads but also

85
00:03:40,130 --> 00:03:37,260
in providing expertise and hardware and

86
00:03:42,320 --> 00:03:40,140
software our engineering organization

87
00:03:44,750 --> 00:03:42,330
provided the entire parachute system for

88
00:03:46,520 --> 00:03:44,760

Orion and our engineers have also worked

89
00:03:48,620 --> 00:03:46,530
alongside Lockheed engineers on

90
00:03:51,410 --> 00:03:48,630
developing the guidance navigation and

91
00:03:53,420 --> 00:03:51,420
control systems and Lockheed is making

92
00:03:55,789 --> 00:03:53,430
use of our experience flight operations

93
00:03:57,920 --> 00:03:55,799
team for this test flight so it's really

94
00:03:59,810 --> 00:03:57,930
a team effort and that's also true

95
00:04:01,670 --> 00:03:59,820
across NASA you've already heard from

96
00:04:04,729 --> 00:04:01,680
Bob about some of the work that's gone

97
00:04:06,440 --> 00:04:04,739
on here at Kennedy Space Center there

98
00:04:08,150 --> 00:04:06,450
are several other NASA centers that are

99
00:04:10,640 --> 00:04:08,160
either supporting the flight directly

100
00:04:13,190 --> 00:04:10,650
such as the spacecraft adapter provided

101
00:04:15,440 --> 00:04:13,200
by Marshall Space Flight Center or that

102
00:04:17,659 --> 00:04:15,450
support the Orion program in other ways

103
00:04:20,570 --> 00:04:17,669
as we move toward future test flights

104
00:04:23,270 --> 00:04:20,580
and exploration missions so people

105
00:04:25,850 --> 00:04:23,280
across NASA are involved in this first

106
00:04:27,170 --> 00:04:25,860
step toward pioneering space and we're

107
00:04:29,480 --> 00:04:27,180
excited to have completed the

108
00:04:31,790 --> 00:04:29,490
test article for that mission to see it

109
00:04:33,620 --> 00:04:31,800
roll out to the pad later tonight and to

110
00:04:38,150 --> 00:04:33,630
finish preparations for the December

111
00:04:39,980 --> 00:04:38,160
fourth flight well let's see great a

112
00:04:42,860 --> 00:04:39,990
great picture I wish it weren't quite so

113
00:04:45,200 --> 00:04:42,870

wet but the main thing is we're looking

114
00:04:48,379 --> 00:04:45,210
forward to hopefully clear up by about 8

115
00:04:49,909 --> 00:04:48,389
830 when we move out of there and it's a

116
00:04:52,370 --> 00:04:49,919
great you know just to have been in the

117
00:04:53,600 --> 00:04:52,380
last if last Thursday it's very

118
00:04:56,749 --> 00:04:53,610
impressive to be right up next it's

119
00:04:58,850 --> 00:04:56,759
about 72 feet tall and it shows really

120
00:05:01,879 --> 00:04:58,860
the three key pieces of Orion the launch

121
00:05:03,710 --> 00:05:01,889
abort system on top with its aerodynamic

122
00:05:05,870 --> 00:05:03,720
shape then the crew module which it

123
00:05:07,640 --> 00:05:05,880
covers and then the service module below

124
00:05:10,460 --> 00:05:07,650
with the fairings now cover it too so

125
00:05:12,800 --> 00:05:10,470
great great hardware a great example of

126
00:05:16,460 --> 00:05:12,810
the hard work of about 3,000 people that

127
00:05:19,219 --> 00:05:16,470
support the Orion program I talked a

128
00:05:21,050 --> 00:05:19,229
little bit last Thursday about Orion of

129
00:05:23,270 --> 00:05:21,060
course I Ryan is the the exploration

130
00:05:26,120 --> 00:05:23,280
spacecraft for NASA and paired with SLS

131
00:05:28,610 --> 00:05:26,130
we'll go explore the solar system this

132
00:05:31,820 --> 00:05:28,620
particular test is unmanned eft-1 and

133
00:05:33,560 --> 00:05:31,830
we're going to test really I would say

134
00:05:36,110 --> 00:05:33,570
the riskiest parts of the mission in

135
00:05:39,080 --> 00:05:36,120
asset and entry things like the fairing

136
00:05:40,460 --> 00:05:39,090
separations heat shield parachutes entry

137
00:05:42,439 --> 00:05:40,470
navigation and guidance those kind of

138
00:05:44,050 --> 00:05:42,449

things will test all those business

139
00:05:47,210 --> 00:05:44,060
flight as well as flying into deep space

140
00:05:50,000 --> 00:05:47,220
and examining the radiation effects on

141
00:05:52,219 --> 00:05:50,010
the avionics so all those are happening

142
00:05:53,719 --> 00:05:52,229
is part of the flight and tonight is

143
00:05:55,580 --> 00:05:53,729
just the next big milestone as we roll

144
00:06:00,080 --> 00:05:55,590
out and get stacked on the launch

145
00:06:05,060 --> 00:06:00,090
vehicle tomorrow it's always tough to be

146
00:06:06,320 --> 00:06:05,070
last so you know Mark alluded to to the

147
00:06:08,870 --> 00:06:06,330
teams have been working on this for a

148
00:06:11,180 --> 00:06:08,880
long time both NASA Lockheed and all of

149
00:06:13,999 --> 00:06:11,190
our teammates on the industry side this

150
00:06:16,550 --> 00:06:14,009
is a really proud moment to be ready to

151
00:06:18,379 --> 00:06:16,560
actually roll the spacecraft out and to

152
00:06:22,189 --> 00:06:18,389
made it on top of the Delta for heavy

153
00:06:25,730 --> 00:06:22,199
which is really a big moment for us we

154
00:06:28,399 --> 00:06:25,740
talked a little bit about this team and

155
00:06:31,399 --> 00:06:28,409
it is a different type of operation

156
00:06:33,230 --> 00:06:31,409
people get kind of clouded in this

157
00:06:36,290 --> 00:06:33,240
debate of old space new space

158
00:06:38,240 --> 00:06:36,300
traditional entrepreneurial this team is

159
00:06:39,860 --> 00:06:38,250
actually an interesting mix of many of

160
00:06:40,040 --> 00:06:39,870
those things and you've heard it alluded

161
00:06:43,159 --> 00:06:40,050
to

162
00:06:44,869 --> 00:06:43,169
in a number of ways even though Lockheed

163
00:06:46,939 --> 00:06:44,879

was charged with the task of pulling

164
00:06:50,059 --> 00:06:46,949
together all the pieces for this test

165
00:06:51,890 --> 00:06:50,069
mission Bob's team is doing the recovery

166
00:06:53,869 --> 00:06:51,900
and all the interface with the Navy in

167
00:06:57,230 --> 00:06:53,879
addition to their normal ground

168
00:07:00,050 --> 00:06:57,240
processing job ellen has talked about

169
00:07:03,350 --> 00:07:00,060
all the work that JSC did in line with

170
00:07:06,770 --> 00:07:03,360
the development not just an oversight of

171
00:07:11,330 --> 00:07:06,780
the Lockheed and industry workforce and

172
00:07:13,309 --> 00:07:11,340
then we have done not just all the

173
00:07:16,580 --> 00:07:13,319
design and manufacturing of the

174
00:07:17,899 --> 00:07:16,590
spacecraft itself but Bob also mentioned

175
00:07:19,939 --> 00:07:17,909
the fact that you know we made a

176
00:07:22,939 --> 00:07:19,949
commitment several years ago to turn the

177
00:07:24,589 --> 00:07:22,949
ONC into a factory and we have

178
00:07:27,379 --> 00:07:24,599
successfully done that to build the

179
00:07:31,580 --> 00:07:27,389
spacecraft and that was I think that was

180
00:07:34,279 --> 00:07:31,590
a big leap that lots of us saw back in

181
00:07:37,670 --> 00:07:34,289
that time and it has worked and we have

182
00:07:40,309 --> 00:07:37,680
a ryan completed in front of us now so i

183
00:07:42,680 --> 00:07:40,319
would add my hope to those that you've

184
00:07:45,019 --> 00:07:42,690
heard from already you know those of you

185
00:07:47,120 --> 00:07:45,029
that have seen interstellar you know we

186
00:07:50,540 --> 00:07:47,130
have folks actually talking about moving

187
00:07:53,059 --> 00:07:50,550
humans off of our home planet and when

188
00:07:55,070 --> 00:07:53,069

we have those footprints on Mars I I

189
00:07:57,050 --> 00:07:55,080
certainly will believe and I hope many

190
00:08:00,969 --> 00:07:57,060
of you believe that this was that first

191
00:08:03,950 --> 00:08:00,979
step that got us started on that path

192
00:08:05,749 --> 00:08:03,960
all right thank you we'll be happy to

193
00:08:07,820 --> 00:08:05,759
take your questions now please wait for

194
00:08:09,170 --> 00:08:07,830
the microphone state your name and

195
00:08:10,850 --> 00:08:09,180
affiliation and to whom you're

196
00:08:17,330 --> 00:08:10,860
addressing your question and we'll start

197
00:08:19,070 --> 00:08:17,340
with Jason Jason Ryan for spaceflight

198
00:08:21,589 --> 00:08:19,080
insider.com I guess this

199
00:08:23,149 --> 00:08:21,599
questions either from mark or Mike you

200
00:08:26,450 --> 00:08:23,159
mentioned the factory over the needle a

201
00:08:27,920 --> 00:08:26,460
Armstrong O&C building when these test

202
00:08:29,240 --> 00:08:27,930
flights start taking place you guys will

203
00:08:32,050 --> 00:08:29,250
be learning a lot of lessons about the

204
00:08:34,100 --> 00:08:32,060
heat shield about the avionics on Orion

205
00:08:35,779 --> 00:08:34,110
how soon do you think we could see

206
00:08:37,459 --> 00:08:35,789
changes that are learned from those

207
00:08:39,709 --> 00:08:37,469
lessons when you conduct these missions

208
00:08:42,050 --> 00:08:39,719
implement it into the next craft thank

209
00:08:45,110 --> 00:08:42,060
you yes great yeah great question yeah

210
00:08:47,360 --> 00:08:45,120
already so the for example the barrel on

211
00:08:50,060 --> 00:08:47,370
em1 the very next flight the barrel

212
00:08:52,069 --> 00:08:50,070
which is the barrel section for the

213
00:08:53,800 --> 00:08:52,079

pressurized element for em1 is in

214
00:08:56,170 --> 00:08:53,810
manufacturing in southern california

215
00:08:57,790 --> 00:08:56,180
today and that barrel is twenty-five

216
00:09:00,640 --> 00:08:57,800
percent lighter than the one I'm going

217
00:09:03,070 --> 00:09:00,650
to fly on eft-1 so the flight itself

218
00:09:04,690 --> 00:09:03,080
into space is huge because we'll see how

219
00:09:06,550 --> 00:09:04,700
the systems operate in the environment

220
00:09:09,070 --> 00:09:06,560
but actually building the first one is

221
00:09:11,050 --> 00:09:09,080
as big right how did it come together

222
00:09:12,790 --> 00:09:11,060
when we got all the drawings and the

223
00:09:14,470 --> 00:09:12,800
cables laid out how much did way what

224
00:09:16,960 --> 00:09:14,480
did we find out about when we did the

225
00:09:18,550 --> 00:09:16,970
loads testing where we had Marge and all

226
00:09:20,680 --> 00:09:18,560
those kind of things are huge even

227
00:09:22,060 --> 00:09:20,690
before you do the first flight so we've

228
00:09:24,519 --> 00:09:22,070
already taken those lessons and rolled

229
00:09:26,110 --> 00:09:24,529
them into em1 already and then of course

230
00:09:27,790 --> 00:09:26,120
we get eft-1 will fly it and we'll learn

231
00:09:29,410 --> 00:09:27,800
some more things and we'll tweak some

232
00:09:30,519 --> 00:09:29,420
other things on the design that's a

233
00:09:31,990 --> 00:09:30,529
really good question because it's more

234
00:09:33,700 --> 00:09:32,000
than just the flight itself and we

235
00:09:35,680 --> 00:09:33,710
certainly learned a lot about the ONC as

236
00:09:37,780 --> 00:09:35,690
a factory you know where the types of

237
00:09:39,970 --> 00:09:37,790
things that were problematic first flow

238
00:09:42,519 --> 00:09:39,980

through that we have an opportunity now

239
00:09:46,240 --> 00:09:42,529
to correct and and do better on the next

240
00:09:50,829 --> 00:09:46,250
flows so it's really just getting here

241
00:09:51,970 --> 00:09:50,839
has been a huge learning experience some

242
00:09:54,010 --> 00:09:51,980
of the changes you had to make to the

243
00:09:56,200 --> 00:09:54,020
ONC building to make it you know work

244
00:09:58,510 --> 00:09:56,210
with Orion it wasn't to the building per

245
00:10:00,190 --> 00:09:58,520
se but to the layouts that we had in the

246
00:10:03,070 --> 00:10:00,200
building and how we were working in

247
00:10:05,800 --> 00:10:03,080
those work cells using this port a HEPA

248
00:10:07,770 --> 00:10:05,810
filter walls to keep down debris and

249
00:10:09,520 --> 00:10:07,780
stuff we learned quite a bit about

250
00:10:13,720 --> 00:10:09,530
particularly when we're doing welding

251
00:10:15,220 --> 00:10:13,730
inside the facility so you know we will

252
00:10:17,110 --> 00:10:15,230
certainly be looking at making changes

253
00:10:20,800 --> 00:10:17,120
to that physical layout as we do the

254
00:10:22,060 --> 00:10:20,810
next build neat about the way the ONC is

255
00:10:25,180 --> 00:10:22,070
laid out it's none of that is a

256
00:10:27,430 --> 00:10:25,190
permanent fixture in the high bay all of

257
00:10:29,829 --> 00:10:27,440
it is easily reconfigurable so they can

258
00:10:31,870 --> 00:10:29,839
get the best way the optimum way to

259
00:10:38,350 --> 00:10:31,880
actually do the manufacturing and

260
00:10:40,570 --> 00:10:38,360
processing of the vehicle Rob hi Robert

261
00:10:45,520 --> 00:10:40,580
Pearlman with collectspace.com a

262
00:10:48,390 --> 00:10:45,530
question for for mark can you step us

263
00:10:51,160 --> 00:10:48,400

through once Orion reaches the pad

264
00:10:53,680 --> 00:10:51,170
through launch what what else has to be

265
00:10:55,780 --> 00:10:53,690
done with Orion as you prepare it for

266
00:10:58,210 --> 00:10:55,790
for the temp the December 4th liftoff

267
00:11:00,670 --> 00:10:58,220
yeah so that there's a few things left

268
00:11:02,140 --> 00:11:00,680
to go around by itself is done but we're

269
00:11:03,910 --> 00:11:02,150
going to go stack it on the rocket and

270
00:11:05,560 --> 00:11:03,920
so will test the kind of things you'd

271
00:11:06,879 --> 00:11:05,570
want to do on the rocket so we'll test

272
00:11:09,220 --> 00:11:06,889
the interfaces

273
00:11:11,280 --> 00:11:09,230
that they talk to one another okay and

274
00:11:13,269 --> 00:11:11,290
then we'll actually do a test where we

275
00:11:15,460 --> 00:11:13,279
communicate with the teacher satellites

276
00:11:17,019 --> 00:11:15,470
at the pad just to make sure that

277
00:11:19,150 --> 00:11:17,029
everything is still connected and

278
00:11:20,799 --> 00:11:19,160
everything still works we'll do one more

279
00:11:22,269 --> 00:11:20,809
software upgrade so we'll run that

280
00:11:24,309 --> 00:11:22,279
software in the flight element as well

281
00:11:26,169 --> 00:11:24,319
and then we'll do a last pressure check

282
00:11:27,549 --> 00:11:26,179
after we put that the hatch on for the

283
00:11:29,590 --> 00:11:27,559
final time we'll make sure it's holding

284
00:11:32,769 --> 00:11:29,600
pressure those kind of things those are

285
00:11:34,269 --> 00:11:32,779
the big tests we've got left to go all

286
00:11:35,590 --> 00:11:34,279
those things we've done in the unc but

287
00:11:40,989 --> 00:11:35,600
we'll do it one more time when we're

288
00:11:43,629 --> 00:11:40,999

actually on the rocket for anyone who

289
00:11:46,989 --> 00:11:43,639
wants to take it just by coincidence

290
00:11:49,439 --> 00:11:46,999
fifty years ago this year another new

291
00:11:52,599 --> 00:11:49,449
capsule was rolling out to the same pad

292
00:11:55,150 --> 00:11:52,609
the first Apollo it was a ball it was a

293
00:11:57,069 --> 00:11:55,160
boiler plate but it still went out of 37

294
00:11:59,289 --> 00:11:57,079
be when we look back at that flight we

295
00:12:01,329 --> 00:11:59,299
see that as the the beginning of that

296
00:12:04,780 --> 00:12:01,339
adventure to the moon if you can look

297
00:12:08,739 --> 00:12:04,790
ahead maybe the 50 years ahead how do

298
00:12:11,079 --> 00:12:08,749
you think will consider eft-1 will it be

299
00:12:15,579 --> 00:12:11,089
the same type of legacy or will it would

300
00:12:17,710 --> 00:12:15,589
be something bigger a little bit because

301
00:12:20,679 --> 00:12:17,720
we've talked some what we've kind of

302
00:12:22,780 --> 00:12:20,689
drawn the analogy before where as people

303
00:12:24,159 --> 00:12:22,790
were preparing for Apollo the Gemini

304
00:12:26,530 --> 00:12:24,169
missions were really important to

305
00:12:28,929 --> 00:12:26,540
understand how you do spacewalks and how

306
00:12:33,100 --> 00:12:28,939
you do rendezvous between two vehicles

307
00:12:35,289 --> 00:12:33,110
and we see using Orion going forward in

308
00:12:39,100 --> 00:12:35,299
the what we call the exploration mission

309
00:12:41,799 --> 00:12:39,110
am one and two and beyond as sort of

310
00:12:43,379 --> 00:12:41,809
that same roll toward eventually getting

311
00:12:46,030 --> 00:12:43,389
to Mars where you're going to have to

312
00:12:49,030 --> 00:12:46,040
demonstrate various different kinds of

313
00:12:51,489 --> 00:12:49,040

capabilities like doing deep space ebas

314
00:12:53,769 --> 00:12:51,499
or doing automated rendezvous and

315
00:12:56,259 --> 00:12:53,779
docking you know in the lunar vicinity

316
00:12:59,229 --> 00:12:56,269
and so this is this is the first step

317
00:13:01,119 --> 00:12:59,239
toward toward doing that and so that's

318
00:13:03,340 --> 00:13:01,129
that's part of our excitement is we can

319
00:13:06,970 --> 00:13:03,350
see it building toward toward those

320
00:13:08,829 --> 00:13:06,980
kinds of missions and as Mark mentioned

321
00:13:10,359 --> 00:13:08,839
even though you know we talk a lot about

322
00:13:11,739 --> 00:13:10,369
the heat shield on this mission we're

323
00:13:12,960 --> 00:13:11,749
actually exercising a lot of the

324
00:13:14,759 --> 00:13:12,970
spacecraft on this mission

325
00:13:17,610 --> 00:13:14,769
you know the guidance software the

326
00:13:19,740 --> 00:13:17,620
thrusters the whole all the separation

327
00:13:23,610 --> 00:13:19,750
events the reentry systems the recovery

328
00:13:31,199 --> 00:13:23,620
system so it's actually a very large

329
00:13:32,699 --> 00:13:31,209
test of the system hi Eric burger with

330
00:13:34,769 --> 00:13:32,709
the Houston Chronicle and this question

331
00:13:38,850 --> 00:13:34,779
for Bob Eleanor mark whoever wants to

332
00:13:42,410 --> 00:13:38,860
attempt to take it I so we're almost

333
00:13:44,699 --> 00:13:42,420
five years now from februari of 2010

334
00:13:47,519 --> 00:13:44,709
when the President's budget came out and

335
00:13:50,249 --> 00:13:47,529
cancelled the constellation program and

336
00:13:52,769 --> 00:13:50,259
I'm just wondering what it feels like to

337
00:13:56,689 --> 00:13:52,779
have sort of come from that low in terms

338
00:13:59,009 --> 00:13:56,699

of Orion and different pieces of

339
00:14:00,689 --> 00:13:59,019
consolation to sort of be here to

340
00:14:02,879 --> 00:14:00,699
actually be launching hardware in space

341
00:14:07,259 --> 00:14:02,889
and does it make it sweeter or just kind

342
00:14:09,540 --> 00:14:07,269
of what's your sense from a que se point

343
00:14:11,999 --> 00:14:09,550
of view the team is motivated they are

344
00:14:14,519 --> 00:14:12,009
really enthused about everything that's

345
00:14:17,879 --> 00:14:14,529
going on and this flights it's a big

346
00:14:20,069 --> 00:14:17,889
deal it's good to be flying it's good to

347
00:14:25,019 --> 00:14:20,079
have a path forward but it you know it's

348
00:14:26,220 --> 00:14:25,029
not just oh ryan in sls i mean it you

349
00:14:28,199 --> 00:14:26,230
got to tie it all together it's

350
00:14:31,079 --> 00:14:28,209
Commercial Crew it's everything you know

351
00:14:32,369 --> 00:14:31,089
in 2017 we're going to have US

352
00:14:35,879 --> 00:14:32,379
astronauts flying to the space station

353
00:14:38,730 --> 00:14:35,889
on a u.s. rocket and that's huge to have

354
00:14:40,559 --> 00:14:38,740
a path forward from an exploration point

355
00:14:42,900 --> 00:14:40,569
of view you know to be able to even

356
00:14:46,049 --> 00:14:42,910
think about the asteroid retrieval

357
00:14:47,280 --> 00:14:46,059
mission in flying in vicinity of the

358
00:14:50,939 --> 00:14:47,290
moon in this lunar distant retrograde

359
00:14:53,309 --> 00:14:50,949
orbit on Orion to go visit an asteroid I

360
00:14:55,049 --> 00:14:53,319
mean that's pretty darn neat that's

361
00:14:57,720 --> 00:14:55,059
exciting and we're doing some really

362
00:15:00,689 --> 00:14:57,730
cool stuff and I think the whole team is

363
00:15:02,400 --> 00:15:00,699

on board with it they're enthused to to

364
00:15:04,470 --> 00:15:02,410
help make it happen and I think there's

365
00:15:06,150 --> 00:15:04,480
a genuine positive atmosphere and I

366
00:15:07,769 --> 00:15:06,160
don't think it's confined just to KSC I

367
00:15:09,150 --> 00:15:07,779
mean you go across to all the NASA

368
00:15:11,129 --> 00:15:09,160
centers that are involved in this i

369
00:15:14,210 --> 00:15:11,139
think the team is really looking forward

370
00:15:17,009 --> 00:15:14,220
to the future yeah i think there's a

371
00:15:18,150 --> 00:15:17,019
these political questions are going to

372
00:15:20,910 --> 00:15:18,160
come up there going to come up about

373
00:15:22,889 --> 00:15:20,920
every change of President as people have

374
00:15:25,169 --> 00:15:22,899
are going to step back and ask what is

375
00:15:26,790 --> 00:15:25,179
the policy what is our new plan I don't

376
00:15:28,410 --> 00:15:26,800
expect that to change its been that

377
00:15:31,829 --> 00:15:28,420
way it was that way for Space Station

378
00:15:34,650 --> 00:15:31,839
it's happened to us I think the the key

379
00:15:36,690 --> 00:15:34,660
lesson for us is to is to persevere

380
00:15:39,329 --> 00:15:36,700
continue to show the value of the

381
00:15:41,639 --> 00:15:39,339
program in any of these strategies that

382
00:15:43,259 --> 00:15:41,649
are discussed and I think that's the

383
00:15:45,960 --> 00:15:43,269
that's the thing I get out of that is

384
00:15:48,560 --> 00:15:45,970
that this Orien this orion design this

385
00:15:51,300 --> 00:15:48,570
concept of a deep space exploration

386
00:15:53,519 --> 00:15:51,310
vehicle has survived those discussions

387
00:15:55,199 --> 00:15:53,529
which were difficult right and very much

388
00:15:56,759 --> 00:15:55,209

pressing what what is the mission we

389
00:15:59,040 --> 00:15:56,769
have for this vehicle and it survived

390
00:16:00,960 --> 00:15:59,050
that and now we are here about to fly so

391
00:16:04,050 --> 00:16:00,970
I think that says a lot about it's a

392
00:16:06,300 --> 00:16:04,060
good design it's a good team it's a good

393
00:16:08,009 --> 00:16:06,310
mission and now it's time to fly it so

394
00:16:11,990 --> 00:16:08,019
it is very exciting it is a very

395
00:16:12,000 --> 00:16:17,829
James Dean

396
00:16:22,819 --> 00:16:20,030
James day in florida today and i was

397
00:16:25,249 --> 00:16:22,829
just curious about some of the logistics

398
00:16:26,960 --> 00:16:25,259
of the rollout and and your weather

399
00:16:29,090 --> 00:16:26,970
constraints are there any significant

400
00:16:33,230 --> 00:16:29,100
constraints to getting out hopefully

401
00:16:35,329 --> 00:16:33,240
close to on time and and pretty long

402
00:16:37,340 --> 00:16:35,339
maybe a little bit circuitous route oh

403
00:16:40,189 --> 00:16:37,350
just curious with the reason for that

404
00:16:42,230 --> 00:16:40,199
and but given that you're going by pat

405
00:16:43,699 --> 00:16:42,240
be i guess is in appearance is this

406
00:16:49,460 --> 00:16:43,709
exactly how it will look when you're

407
00:16:50,780 --> 00:16:49,470
rolling out to an sls i'll take a couple

408
00:16:52,999 --> 00:16:50,790
of it first off the reason we're going

409
00:16:54,530 --> 00:16:53,009
by pad be and not more directly by paddy

410
00:16:56,269 --> 00:16:54,540
as we got an issue with the road out

411
00:16:58,340 --> 00:16:56,279
there and it wouldn't support the

412
00:17:02,059 --> 00:16:58,350
vehicle and we're doing some repairs on

413
00:17:03,740 --> 00:17:02,069

the bypass road around pad a so that

414
00:17:05,630 --> 00:17:03,750
would have been a more direct route so

415
00:17:09,110 --> 00:17:05,640
we have to go around and use the road by

416
00:17:11,240 --> 00:17:09,120
pad be in order to get out to 37 so that

417
00:17:13,100 --> 00:17:11,250
that's one of the reasons we're going by

418
00:17:15,230 --> 00:17:13,110
pad be well it look exactly like this

419
00:17:16,970 --> 00:17:15,240
when it rolls out no James we're going

420
00:17:19,270 --> 00:17:16,980
to be on top of the SLS on a little

421
00:17:21,620 --> 00:17:19,280
launcher and it's going to be awesome

422
00:17:24,620 --> 00:17:21,630
but as far as what gets stacked on top

423
00:17:28,010 --> 00:17:24,630
of the SLS yeah this is when it goes by

424
00:17:29,750 --> 00:17:28,020
pad pad be this is what is going to be

425
00:17:31,399 --> 00:17:29,760
on top of the SLS this is what it will

426
00:17:32,690 --> 00:17:31,409
look like and so that's pretty cool so

427
00:17:34,399 --> 00:17:32,700
hope maybe we'll get a few pictures of

428
00:17:36,080 --> 00:17:34,409
it you know weather permitting and

429
00:17:40,159 --> 00:17:36,090
lighting and everything else is that the

430
00:17:41,899 --> 00:17:40,169
rolls past its future launch site on its

431
00:17:46,460 --> 00:17:41,909
next mission so that's going to be

432
00:17:48,200 --> 00:17:46,470
pretty cool but you know it's a as far

433
00:17:50,690 --> 00:17:48,210
as whether we talked about that right

434
00:17:54,020 --> 00:17:50,700
before we came out here too we're going

435
00:17:55,820 --> 00:17:54,030
to get a further weather forecast here

436
00:17:57,500 --> 00:17:55,830
in about 40 minutes and then we'll know

437
00:18:01,270 --> 00:17:57,510
whether we are within the constraints or

438
00:18:04,549 --> 00:18:01,280

not but it's primarily you can't have

439
00:18:06,710 --> 00:18:04,559
wind gusts over 25 knots we're going to

440
00:18:08,360 --> 00:18:06,720
you know twenty not win restraint and

441
00:18:11,149 --> 00:18:08,370
you can't have it be in a phase one

442
00:18:12,169 --> 00:18:11,159
lightning hold both were the vehicle and

443
00:18:15,860 --> 00:18:12,179
the people that are going to be going

444
00:18:17,899 --> 00:18:15,870
with it so you know I think we're

445
00:18:19,640 --> 00:18:17,909
looking at maybe not rolling out quite

446
00:18:21,110 --> 00:18:19,650
on time but we'll have to see we'll see

447
00:18:22,730 --> 00:18:21,120
what the weather forecast is and

448
00:18:25,120 --> 00:18:22,740
hopefully we'll get out there it's about

449
00:18:27,100 --> 00:18:25,130
a you what do we got about a six-hour

450
00:18:29,440 --> 00:18:27,110
roll to the pad

451
00:18:31,510 --> 00:18:29,450
yep so we got we got some time to get

452
00:18:33,760 --> 00:18:31,520
there tonight initial reports were that

453
00:18:35,380 --> 00:18:33,770
it may take a couple hours for the

454
00:18:37,900 --> 00:18:35,390
system to move through and we'll we'll

455
00:18:40,419 --> 00:18:37,910
see that the teams meeting here like Bob

456
00:18:42,130 --> 00:18:40,429
said in half an hour 40 minutes or so to

457
00:18:47,440 --> 00:18:42,140
make that determination of what the

458
00:18:49,810 --> 00:18:47,450
timing will be Amy Greene of WM Fe

459
00:18:52,240 --> 00:18:49,820
public radio we know that the ultimate

460
00:18:54,820 --> 00:18:52,250
mission of this spacecraft is to go to

461
00:18:57,340 --> 00:18:54,830
Mars what is the timeframe what is the

462
00:18:59,860 --> 00:18:57,350
time frame at this point for the first

463
00:19:02,200 --> 00:18:59,870

manned mission with this spacecraft and

464
00:19:04,510 --> 00:19:02,210
what would be the nature of that first

465
00:19:07,990 --> 00:19:04,520
manned mission first manned mission

466
00:19:10,000 --> 00:19:08,000
would be 20 21 before that so we'll fly

467
00:19:11,590 --> 00:19:10,010
eft-1 then we have the next flight is

468
00:19:14,799 --> 00:19:11,600
called e-m1 which would be another

469
00:19:16,600 --> 00:19:14,809
unmanned flight that flight would be on

470
00:19:19,169 --> 00:19:16,610
a full service module and on the big

471
00:19:23,789 --> 00:19:19,179
rocket on sls so that's that's about

472
00:19:25,840 --> 00:19:23,799
2017 2018 2021 will be the man launch

473
00:19:27,789 --> 00:19:25,850
right now we're looking at the specific

474
00:19:31,210 --> 00:19:27,799
objectives of that it depends on how

475
00:19:33,940 --> 00:19:31,220
e-m1 goes e-m1 today we're going to send

476
00:19:35,799 --> 00:19:33,950
around the moon and do some complex

477
00:19:38,740 --> 00:19:35,809
orbital maneuvers to kind of test out

478
00:19:41,289 --> 00:19:38,750
those plans if that goes well we could

479
00:19:43,299 --> 00:19:41,299
either send leave em2 around the earth

480
00:19:46,000 --> 00:19:43,309
or we could send it out past the moon so

481
00:19:48,310 --> 00:19:46,010
it really be the fundamental test for m2

482
00:19:50,020 --> 00:19:48,320
is to put people in the vehicle and make

483
00:19:51,430 --> 00:19:50,030
sure all the life support and all the

484
00:19:53,620 --> 00:19:51,440
things that interact with the crew are

485
00:19:55,930 --> 00:19:53,630
working correctly and then push the

486
00:19:57,880 --> 00:19:55,940
other systems as as much as we can

487
00:19:59,860 --> 00:19:57,890
debate depending on how em1 went and

488
00:20:02,200 --> 00:19:59,870

then after that we're looking at this

489
00:20:05,260 --> 00:20:02,210
asteroid retrieval mission when the next

490
00:20:07,419 --> 00:20:05,270
flight is for that once we do e m2

491
00:20:10,060 --> 00:20:07,429
fundamentally we've already got the

492
00:20:11,680 --> 00:20:10,070
fundamental systems for us to on the on

493
00:20:15,070 --> 00:20:11,690
the man's side to do the mission we've

494
00:20:17,590 --> 00:20:15,080
got the airlock with the cabin of Orion

495
00:20:19,240 --> 00:20:17,600
we've got suits we've got guides

496
00:20:22,510 --> 00:20:19,250
navigation we've got all those kind of

497
00:20:24,130 --> 00:20:22,520
things so that that after am too in that

498
00:20:30,220 --> 00:20:24,140
range a flight or two is when we'll do

499
00:20:31,690 --> 00:20:30,230
the asteroid visit mission okay if

500
00:20:33,250 --> 00:20:31,700
you're on the phone bridge and you have

501
00:20:35,110 --> 00:20:33,260
a question please make sure to unmute

502
00:20:37,450 --> 00:20:35,120
yourself and we'll take a question here

503
00:20:39,310 --> 00:20:37,460
from Jason Jason Oien spaceflight

504
00:20:40,570 --> 00:20:39,320
insiders kind of follow-up to the last

505
00:20:42,070 --> 00:20:40,580
question

506
00:20:44,019 --> 00:20:42,080
I if memory serves as capable of

507
00:20:46,779 --> 00:20:44,029
supporting a crew of 4 to 6 for 21 days

508
00:20:49,600 --> 00:20:46,789
and it's been positive dat a spacecraft

509
00:20:53,259 --> 00:20:49,610
for a Mars mission would be equal to or

510
00:20:56,289 --> 00:20:53,269
larger than the space station so my

511
00:20:58,090 --> 00:20:56,299
question is where is nasan its

512
00:20:59,200 --> 00:20:58,100
development of the spacecraft and is it

513
00:21:01,750 --> 00:20:59,210

possible we're looking at another

514
00:21:07,509 --> 00:21:01,760
international collaborative effort on

515
00:21:08,799 --> 00:21:07,519
the road to Mars I guess there's a

516
00:21:11,950 --> 00:21:08,809
number of things you can say their first

517
00:21:15,340 --> 00:21:11,960
of all Ryan already is an international

518
00:21:17,889 --> 00:21:15,350
effort because on m1e so we'll be

519
00:21:19,990 --> 00:21:17,899
providing the service modules so you

520
00:21:21,789 --> 00:21:20,000
know the program has already taken that

521
00:21:23,649 --> 00:21:21,799
first step to bring in international

522
00:21:25,779 --> 00:21:23,659
partners and yes we absolutely that

523
00:21:27,100 --> 00:21:25,789
would that would continue not only with

524
00:21:30,909 --> 00:21:27,110
ISA but we hope with other international

525
00:21:33,310 --> 00:21:30,919
partners as well and on the on the way

526
00:21:34,840 --> 00:21:33,320
to Mars what we would assume is that we

527
00:21:36,850 --> 00:21:34,850
have some sort of habitation module

528
00:21:40,419 --> 00:21:36,860
which will be the module that would keep

529
00:21:42,580 --> 00:21:40,429
crew alive for the long transit back and

530
00:21:44,560 --> 00:21:42,590
the Orion is really what gets you into

531
00:21:47,470 --> 00:21:44,570
space and really importantly get you

532
00:21:48,909 --> 00:21:47,480
back at the end of the mission from the

533
00:21:51,460 --> 00:21:48,919
high speeds that you would be coming

534
00:21:55,240 --> 00:21:51,470
back one of the reasons the asteroid

535
00:21:57,789 --> 00:21:55,250
retrieval mission is a good step toward

536
00:22:01,090 --> 00:21:57,799
that is because we can carry out that

537
00:22:02,740 --> 00:22:01,100
mission with Orion and with SLS in their

538
00:22:06,279 --> 00:22:02,750

initial configuration without developing

539
00:22:07,899 --> 00:22:06,289
a hab module or any other major module

540
00:22:12,250 --> 00:22:07,909
we can't we can do it with their initial

541
00:22:13,419 --> 00:22:12,260
configurations okay let's go to the

542
00:22:16,180 --> 00:22:13,429
phone bridge and take a question from

543
00:22:20,680 --> 00:22:16,190
mike wall space calm and then we'll come

544
00:22:23,919 --> 00:22:20,690
back here to Kennedy Mike okay thanks

545
00:22:25,930 --> 00:22:23,929
guys oh yeah this was just for for the

546
00:22:28,810 --> 00:22:25,940
entire panel I suppose Weber wants to

547
00:22:31,960 --> 00:22:28,820
actually take it um this it's been 42

548
00:22:34,720 --> 00:22:31,970
years since people have been in deep

549
00:22:37,419 --> 00:22:34,730
space and so I guess yeah what were the

550
00:22:39,610 --> 00:22:37,429
major challenges toward developing a

551
00:22:41,470 --> 00:22:39,620
brand new spacecraft that can take

552
00:22:43,629 --> 00:22:41,480
people to deep space and you know what

553
00:22:46,299 --> 00:22:43,639
are some of the major things you guys

554
00:22:48,370 --> 00:22:46,309
are actually looking to find out during

555
00:22:49,930 --> 00:22:48,380
this first this first test flight I know

556
00:22:50,950 --> 00:22:49,940
you guys talked about all the systems

557
00:22:52,539 --> 00:22:50,960
that are going to be checking but but

558
00:22:54,130 --> 00:22:52,549
either one or two in particular things

559
00:22:57,270 --> 00:22:54,140
that you're really curious to see

560
00:22:59,350 --> 00:22:57,280
on this first flight and yet and

561
00:23:01,360 --> 00:22:59,360
thinking just briefly talk about how

562
00:23:03,730 --> 00:23:01,370
that relates to actually building the

563
00:23:09,670 --> 00:23:03,740

first deep-space spaceship for people

564
00:23:11,500 --> 00:23:09,680
about for that cage yeah there's a lot

565
00:23:13,960 --> 00:23:11,510
of things excellent question there's a

566
00:23:15,910 --> 00:23:13,970
lot of things about a vehicle that goes

567
00:23:18,700 --> 00:23:15,920
to deep space that are different than a

568
00:23:20,110 --> 00:23:18,710
vehicle that that orbits at low low

569
00:23:23,160 --> 00:23:20,120
altitudes like at Space Station

570
00:23:27,280 --> 00:23:23,170
altitudes some of the big things are

571
00:23:30,310 --> 00:23:27,290
consumables you know you go 21 days you

572
00:23:32,380 --> 00:23:30,320
got to take a lot of oxygen water food

573
00:23:33,790 --> 00:23:32,390
those kind of things co2 removal those

574
00:23:36,990 --> 00:23:33,800
kind of things so that drives that can

575
00:23:39,700 --> 00:23:37,000
drive the size it also drove for us a

576
00:23:41,890 --> 00:23:39,710
technology for removing co2 that did not

577
00:23:43,150 --> 00:23:41,900
require these liyo cans remember the

578
00:23:44,350 --> 00:23:43,160
shuttle used to take bunch of those and

579
00:23:46,750 --> 00:23:44,360
when you're when you're out for 21 days

580
00:23:49,510 --> 00:23:46,760
that's a big mass it so we developed a

581
00:23:50,920 --> 00:23:49,520
new technology to do that another thing

582
00:23:52,150 --> 00:23:50,930
about a deep space vehicle is you're a

583
00:23:55,210 --> 00:23:52,160
long way from home as something happens

584
00:23:56,950 --> 00:23:55,220
if you're if you're in low-earth orbit

585
00:23:58,510 --> 00:23:56,960
you can get to the ground about 45

586
00:24:00,220 --> 00:23:58,520
minutes if you're out past the moon your

587
00:24:01,990 --> 00:24:00,230
five to twelve days away from home

588
00:24:03,820 --> 00:24:02,000

depending on the the mission we're

589
00:24:06,250 --> 00:24:03,830
looking at that's a long way so you've

590
00:24:08,050 --> 00:24:06,260
got to have highly reliable systems and

591
00:24:09,430 --> 00:24:08,060
you've got to have capabilities to

592
00:24:11,860 --> 00:24:09,440
protect the crew in case of a

593
00:24:14,760 --> 00:24:11,870
contingency so one of the examples that

594
00:24:20,410 --> 00:24:14,770
we talk about is we can support the crew

595
00:24:22,900 --> 00:24:20,420
in their suits for up to six days so if

596
00:24:24,130 --> 00:24:22,910
we have a totally depressed cabin they

597
00:24:26,380 --> 00:24:24,140
can be in their suits and we can get

598
00:24:28,330 --> 00:24:26,390
them home that's an example of a

599
00:24:30,700 --> 00:24:28,340
deep-space spacecraft and the kind of

600
00:24:32,320 --> 00:24:30,710
complexity you have to add to make that

601
00:24:34,540 --> 00:24:32,330
work Ellen also mentioned the speeds

602
00:24:36,160 --> 00:24:34,550
coming back from the moon or higher so

603
00:24:38,320 --> 00:24:36,170
the heat shield has to be different

604
00:24:40,090 --> 00:24:38,330
different materials different different

605
00:24:41,440 --> 00:24:40,100
thicknesses other things you have to

606
00:24:43,120 --> 00:24:41,450
consider and actually the physics of

607
00:24:45,850 --> 00:24:43,130
entry changes when you come back at

608
00:24:46,780 --> 00:24:45,860
those higher speeds so those are all the

609
00:24:48,490 --> 00:24:46,790
kind of things you have to think about

610
00:24:50,080 --> 00:24:48,500
on this particular flight on also

611
00:24:52,270 --> 00:24:50,090
radiation radiation once you get past

612
00:24:55,000 --> 00:24:52,280
low-earth orbit is significantly higher

613
00:24:56,830 --> 00:24:55,010

and so for the crew with the missions of

614
00:24:59,290 --> 00:24:56,840
21 days it's not a big driver for the

615
00:25:01,780 --> 00:24:59,300
crew but it can affect your computer's

616
00:25:03,520 --> 00:25:01,790
you know our computers now the circuits

617
00:25:05,080 --> 00:25:03,530
are so small they're actually affected

618
00:25:06,520 --> 00:25:05,090
much more by radiation and so you have

619
00:25:07,660 --> 00:25:06,530
to be able to handle things we call like

620
00:25:09,340 --> 00:25:07,670
upsets where the compete

621
00:25:11,710 --> 00:25:09,350
decides to glitch and you have to reset

622
00:25:14,260 --> 00:25:11,720
it you have to handle in your redundancy

623
00:25:16,150 --> 00:25:14,270
and backup systems available to restart

624
00:25:17,650 --> 00:25:16,160
and not lose your state state of the

625
00:25:19,510 --> 00:25:17,660
vehicle the nav state those kind of

626
00:25:21,430 --> 00:25:19,520
things so all those have to be accounted

627
00:25:23,770 --> 00:25:21,440
for in your design on this particular

628
00:25:25,450 --> 00:25:23,780
flight we're going to test things like

629
00:25:26,770 --> 00:25:25,460
the heat shield that's the big one of

630
00:25:28,180 --> 00:25:26,780
the big things about the test so that's

631
00:25:30,670 --> 00:25:28,190
why we're going using the Delta for

632
00:25:32,350 --> 00:25:30,680
heavy gets us you know 15 times higher

633
00:25:34,090 --> 00:25:32,360
than Space Station's about eighty four

634
00:25:36,130 --> 00:25:34,100
percent of a lunar entry velocity so we

635
00:25:37,320 --> 00:25:36,140
start seeing that different physics we

636
00:25:39,820 --> 00:25:37,330
start seeing those very high

637
00:25:41,800 --> 00:25:39,830
temperatures high velocity so that's one

638
00:25:43,030 --> 00:25:41,810

of the big things will test and as we go

639
00:25:45,100 --> 00:25:43,040
through the Van Allen belts we're going

640
00:25:47,230 --> 00:25:45,110
to see this radiation effect on the

641
00:25:48,520 --> 00:25:47,240
computer so we're going to we're both

642
00:25:49,750 --> 00:25:48,530
going to measure what those similars

643
00:25:51,130 --> 00:25:49,760
we're going to measure the environment

644
00:25:52,570 --> 00:25:51,140
we're also going to see how the avionics

645
00:25:56,530 --> 00:25:52,580
behave which is actually more important

646
00:25:58,420 --> 00:25:56,540
and how does how do our mitigations work

647
00:25:59,770 --> 00:25:58,430
how did it work with the resets that we

648
00:26:02,350 --> 00:25:59,780
put in the point so those are the kind

649
00:26:04,480 --> 00:26:02,360
of things I would say all the things

650
00:26:08,410 --> 00:26:04,490
that are normally tricky about entry

651
00:26:10,000 --> 00:26:08,420
like the parachutes deploying we have a

652
00:26:11,440 --> 00:26:10,010
lot of parachutes because you need to

653
00:26:13,720 --> 00:26:11,450
slow the vehicle down from about 300

654
00:26:16,570 --> 00:26:13,730
miles an hour to 20 miles an hour and so

655
00:26:19,480 --> 00:26:16,580
we do that in stages parachutes or one

656
00:26:21,550 --> 00:26:19,490
the only system that actually assembles

657
00:26:23,440 --> 00:26:21,560
itself in operation you know they come

658
00:26:24,610 --> 00:26:23,450
out and they have the invitation you

659
00:26:25,720 --> 00:26:24,620
know the parachutes interact with one

660
00:26:27,160 --> 00:26:25,730
another you might see they almost like

661
00:26:28,420 --> 00:26:27,170
they're breathing so you need to know

662
00:26:30,040 --> 00:26:28,430
how that work because that affects the

663
00:26:32,230 --> 00:26:30,050

loads on the crew affects the loads on

664
00:26:34,390 --> 00:26:32,240
the spacecraft we've done a lot of drop

665
00:26:36,130 --> 00:26:34,400
tests out in Yuma and looked at failure

666
00:26:38,740 --> 00:26:36,140
cases but until you actually drop it in

667
00:26:40,300 --> 00:26:38,750
the exact air density and speeds that

668
00:26:41,800 --> 00:26:40,310
you're going to see you're certainly

669
00:26:43,570 --> 00:26:41,810
going to learn some stuff from that so

670
00:26:44,950 --> 00:26:43,580
I'd say those are the biggies and I

671
00:26:47,110 --> 00:26:44,960
would say just from technology

672
00:26:49,960 --> 00:26:47,120
standpoint you know people make a lot of

673
00:26:51,940 --> 00:26:49,970
comparisons to Orion or to Apollo

674
00:26:53,920 --> 00:26:51,950
because it looks somewhere and and in

675
00:26:56,350 --> 00:26:53,930
fact the shape is the best shape for

676
00:26:58,690 --> 00:26:56,360
coming in from that high speed type

677
00:27:02,350 --> 00:26:58,700
reentry and the afco material which we

678
00:27:04,180 --> 00:27:02,360
use a nun heat shield is similar to the

679
00:27:05,890 --> 00:27:04,190
apco use for apollo although we have had

680
00:27:08,350 --> 00:27:05,900
to make some changes due to materials

681
00:27:10,840 --> 00:27:08,360
changes but the technology of just about

682
00:27:13,630 --> 00:27:10,850
everything else that we use to put in

683
00:27:15,269 --> 00:27:13,640
Orion and to build Orion have changed

684
00:27:18,190 --> 00:27:15,279
dramatically in that time

685
00:27:20,649 --> 00:27:18,200
you think of 50 years of manufacturing

686
00:27:22,750 --> 00:27:20,659
changes and it's it's a totally

687
00:27:24,669 --> 00:27:22,760
different world and in fact we do have

688
00:27:28,539 --> 00:27:24,679

additive manufactured parts on a ride

689
00:27:30,940 --> 00:27:28,549
today okay we're back here at Kennedy

690
00:27:32,350 --> 00:27:30,950
and time for one last question Jared

691
00:27:35,080 --> 00:27:32,360
haworth with Space Flight insider

692
00:27:36,879 --> 00:27:35,090
question for Bob Orion's leaving your

693
00:27:38,470 --> 00:27:36,889
property for the first time in over two

694
00:27:40,360 --> 00:27:38,480
years today can you tell us a little bit

695
00:27:41,950 --> 00:27:40,370
more about what Kennedy's role is going

696
00:27:43,149 --> 00:27:41,960
to be once it's out there at the

697
00:27:44,560 --> 00:27:43,159
Canaveral side what's going to happen

698
00:27:47,190 --> 00:27:44,570
here with facilities and people to

699
00:27:50,139 --> 00:27:47,200
support the mission sure well this is a

700
00:27:52,450 --> 00:27:50,149
Lockheed Martin test flight the program

701
00:27:54,909 --> 00:27:52,460
is getting all the data from Lockheed

702
00:27:56,649 --> 00:27:54,919
Martin we will do flight following our

703
00:27:59,950 --> 00:27:56,659
launch services program will have folks

704
00:28:02,740 --> 00:27:59,960
over in hangar AE watching the the data

705
00:28:05,200 --> 00:28:02,750
just as any expendable launch vehicle

706
00:28:08,470 --> 00:28:05,210
that we launch we're in an advisory role

707
00:28:12,090 --> 00:28:08,480
we're not actually responsible will have

708
00:28:14,889 --> 00:28:12,100
folks in the LCC also following the data

709
00:28:16,629 --> 00:28:14,899
ellen's folks and Mission Control and

710
00:28:19,570 --> 00:28:16,639
Houston are going to be following it and

711
00:28:21,639 --> 00:28:19,580
then the next really big role that we

712
00:28:24,310 --> 00:28:21,649
play is going to be the recovery of the

713
00:28:26,289 --> 00:28:24,320

vehicle off of Baja when it lands off

714
00:28:28,419 --> 00:28:26,299
the coast of California and then working

715
00:28:29,649 --> 00:28:28,429
with the Navy to bring it back here and

716
00:28:31,269 --> 00:28:29,659
we're looking forward to getting it back

717
00:28:34,360 --> 00:28:31,279
so we can process it for that aboard

718
00:28:35,799 --> 00:28:34,370
flight there's a lot of work to be done

719
00:28:38,409 --> 00:28:35,809
you know Bob's team is doing the

720
00:28:40,960 --> 00:28:38,419
transport cross-country from the port to

721
00:28:46,330 --> 00:28:40,970
get it back here you know we hope to be

722
00:28:47,980 --> 00:28:46,340
back in the ONC Christmas weakish but

723
00:28:49,990 --> 00:28:47,990
there's there's a lot of work to be done

724
00:28:52,269 --> 00:28:50,000
because really gather not just the data

725
00:28:53,830 --> 00:28:52,279
but really starting to pull the back

726
00:28:56,440 --> 00:28:53,840
shells off look at the systems

727
00:28:58,240 --> 00:28:56,450
understand how they really weathered the

728
00:29:02,500 --> 00:28:58,250
flight there's a huge amount of work to

729
00:29:04,570 --> 00:29:02,510
be done with that all right thank you

730
00:29:06,340 --> 00:29:04,580
all very much for coming we look forward

731
00:29:08,560 --> 00:29:06,350
to tonight's move you can keep track of

732
00:29:14,110 --> 00:29:08,570
the status of the move on the NASA

733
00:29:16,810 --> 00:29:14,120
website at WWDC gov / Orion and on