1
00:00:06,309 --> 00:00:04,309
artemis has been woven into our culture

2
00:00:08,870 --> 00:00:06,319
it has fostered collaboration across the

3
00:00:11,350 --> 00:00:08,880
aisles and across the ponds it has grown

4
00:00:13,190 --> 00:00:11,360
beyond plans and preparations to include

5
00:00:14,470 --> 00:00:13,200
hardware and software

6
00:00:22,550 --> 00:00:14,480
and now

7
00:00:28,950 --> 00:00:24,790
you can feel the momentum it is

8
00:00:30,390 --> 00:00:28,960
undeniable we are going and together

9
00:00:32,470 --> 00:00:30,400
we will see artemis

10
00:00:33,990 --> 00:00:32,480
light the way

11
00:00:36,870 --> 00:00:34,000
our mission to the moon is no longer

12
00:00:39,110 --> 00:00:36,880
some far-fetched dream this is reality

13
00:00:40,950 --> 00:00:39,120

we are going this is the next step in

14
00:00:43,030 --> 00:00:40,960
evolution they're not just powerpoint

15
00:00:45,510 --> 00:00:43,040
slides they're actually metals being

16
00:00:47,110 --> 00:00:45,520
bent shaped formed to build the things

17
00:00:50,150 --> 00:00:47,120
that we're going to use this is real

18
00:00:52,549 --> 00:00:50,160
it's going to happen we're going

19
00:00:54,950 --> 00:00:52,559
we are going to the moon to learn how to

20
00:00:56,790 --> 00:00:54,960
live on other planets for the benefit of

21
00:01:04,789 --> 00:00:56,800
all

22
00:01:10,469 --> 00:01:08,070
hello and welcome we are here at nasa

23
00:01:13,990 --> 00:01:10,479
langley research center in hampton

24
00:01:17,990 --> 00:01:14,000
virginia we're about to drop this 14 000

25
00:01:20,950 --> 00:01:18,000
pound orion crew module into our hydro

26
00:01:24,390 --> 00:01:20,960
into our hydro impact basin i'm ally

27
00:01:27,429 --> 00:01:24,400
olney and i'm here with debbie korth the

28
00:01:30,550 --> 00:01:27,439
orion crew and service module manager

29
00:01:32,870 --> 00:01:30,560
and jacob putman a data analyst here at

30
00:01:35,590 --> 00:01:32,880
langley

31
00:01:38,069 --> 00:01:35,600
we're here to talk about orion and

32
00:01:40,390 --> 00:01:38,079
everything that's going on with it

33
00:01:43,429 --> 00:01:40,400
we want you all to join us in this

34
00:01:47,350 --> 00:01:43,439
conversation by asking questions in the

35
00:01:51,429 --> 00:01:47,360
comments below so make sure to put

36
00:01:52,389 --> 00:01:51,439
ask nasa so let's get started

37
00:01:55,270 --> 00:01:52,399
debbie

38
00:01:57,590 --> 00:01:55,280

can you tell me a little bit about orion

39
00:01:59,590 --> 00:01:57,600
and what we're testing today yeah sure

40
00:02:01,270 --> 00:01:59,600
um hi ali hi jacob it's great to be here

41
00:02:03,109 --> 00:02:01,280
today and really excited for the test

42
00:02:05,910 --> 00:02:03,119
that's going to be starting up behind us

43
00:02:08,309 --> 00:02:05,920
and not too too long from now um so so

44
00:02:10,309 --> 00:02:08,319
artemis is charged with taking the first

45
00:02:13,350 --> 00:02:10,319
woman and the next man to the to the

46
00:02:15,270 --> 00:02:13,360
lunar vicinity um and orion is a big

47
00:02:17,270 --> 00:02:15,280
part of making that architecture happen

48
00:02:19,350 --> 00:02:17,280
so orion is the spacecraft that's

49
00:02:21,990 --> 00:02:19,360
designed for deep space in fact it's the

50
00:02:23,750 --> 00:02:22,000
only spacecraft we have that's um

51
00:02:25,190 --> 00:02:23,760
specifically capable of bringing crew

52
00:02:26,710 --> 00:02:25,200
members back from the vicinity of the

53
00:02:29,030 --> 00:02:26,720
moon back to earth

54
00:02:31,990 --> 00:02:29,040
so a little bit about orion orion is

55
00:02:34,390 --> 00:02:32,000
comprised of about three modules uh the

56
00:02:36,470 --> 00:02:34,400
launch abort system the uh service

57
00:02:38,630 --> 00:02:36,480
module and the crew module so the launch

58
00:02:41,030 --> 00:02:38,640
abort system is designed to take the

59
00:02:43,430 --> 00:02:41,040
crew module away from the launch site or

60
00:02:45,830 --> 00:02:43,440
the rocket in case there's an emergency

61
00:02:47,270 --> 00:02:45,840
otherwise it detaches from the the

62
00:02:49,430 --> 00:02:47,280
spacecraft and the crew module and

63
00:02:50,630 --> 00:02:49,440

service module continue on their journey

64
00:02:52,710 --> 00:02:50,640
to space

65
00:02:54,790 --> 00:02:52,720
once in space um the service module

66
00:02:57,270 --> 00:02:54,800
provides all of our propulsion and our

67
00:02:58,869 --> 00:02:57,280
power for the entire spacecraft it also

68
00:03:01,110 --> 00:02:58,879
provides what we call services like our

69
00:03:03,350 --> 00:03:01,120
fuels our oxidizers all the commodities

70
00:03:04,710 --> 00:03:03,360
our gases our water all of that stored

71
00:03:06,309 --> 00:03:04,720
in the service module and it stays

72
00:03:08,309 --> 00:03:06,319
connected to the crew module for for

73
00:03:09,910 --> 00:03:08,319
most of the duration of the mission

74
00:03:11,750 --> 00:03:09,920
and then the crew module itself is the

75
00:03:13,830 --> 00:03:11,760
habitable volume where the crew actually

76
00:03:16,550 --> 00:03:13,840
lives and so it's designed to house four

77
00:03:18,149 --> 00:03:16,560
crew members for up to 21 days and it

78
00:03:20,229 --> 00:03:18,159
provides everything that they need to

79
00:03:21,910 --> 00:03:20,239
live and work in space so you got

80
00:03:24,070 --> 00:03:21,920
environmental control systems life

81
00:03:27,589 --> 00:03:24,080
support systems all your guidance to

82
00:03:28,789 --> 00:03:27,599
navigation and control your displays um

83
00:03:30,470 --> 00:03:28,799
and then the things the crew needs to

84
00:03:33,110 --> 00:03:30,480
just actually live you've got a galley

85
00:03:35,190 --> 00:03:33,120
and an exercise device in a bathroom

86
00:03:37,670 --> 00:03:35,200
and on the outside of the crew module we

87
00:03:39,190 --> 00:03:37,680
have thermal protection systems that

88
00:03:40,710 --> 00:03:39,200

protect the crew and the vehicle upon

89
00:03:41,750 --> 00:03:40,720
re-entry at the high temperatures that

90
00:03:43,190 --> 00:03:41,760
they see

91
00:03:44,949 --> 00:03:43,200
and finally a parachute system that

92
00:03:46,390 --> 00:03:44,959
deploys and slows that crew module down

93
00:03:48,229 --> 00:03:46,400
as it enters the water for its

94
00:03:49,589 --> 00:03:48,239
splashdown so that's basically what

95
00:03:51,589 --> 00:03:49,599
we're testing here today the water

96
00:03:53,509 --> 00:03:51,599
impact tests are looking at dropping the

97
00:03:55,190 --> 00:03:53,519
crew module in a variety of conditions

98
00:03:57,270 --> 00:03:55,200
i'm looking at how the structure

99
00:03:58,710 --> 00:03:57,280
responds to that water landing which is

100
00:04:00,630 --> 00:03:58,720
a pretty significant event for the crew

101
00:04:03,350 --> 00:04:00,640
module

102
00:04:06,309 --> 00:04:03,360
that's awesome thank you debbie so we're

103
00:04:08,309 --> 00:04:06,319
standing here at our gantry jacob can

104
00:04:11,030 --> 00:04:08,319
you tell us a little bit about this

105
00:04:13,030 --> 00:04:11,040
facility sure aly so today we're going

106
00:04:15,350 --> 00:04:13,040
to be dropping the irvine test article

107
00:04:18,310 --> 00:04:15,360
into the hydro impact basin here at nasa

108
00:04:21,590 --> 00:04:18,320
langley the hydro impact basin first

109
00:04:24,390 --> 00:04:21,600
began construction on it in 2010

110
00:04:26,790 --> 00:04:24,400
the orion program invested 1.7 million

111
00:04:29,350 --> 00:04:26,800
dollars in this facility so that we

112
00:04:31,590 --> 00:04:29,360
could ensure future spacecraft are able

113
00:04:35,270 --> 00:04:31,600

to return our astronaut crew back to

114
00:04:37,990 --> 00:04:35,280
earth safely in water-based landings

115
00:04:41,510 --> 00:04:38,000
now the hydro impact basin measures over

116
00:04:42,390 --> 00:04:41,520
100 feet long 90 foot wide and 20 foot

117
00:04:45,270 --> 00:04:42,400
deep

118
00:04:48,230 --> 00:04:45,280
and at its completion in 2011 it was

119
00:04:49,909 --> 00:04:48,240
filled with 1 million gallons of water

120
00:04:52,550 --> 00:04:49,919
since the completion of the hydro impact

121
00:04:54,469 --> 00:04:52,560
basin we've tested the orion spacecraft

122
00:04:56,870 --> 00:04:54,479
in a variety of impact conditions as

123
00:04:58,870 --> 00:04:56,880
debbie mentioned which has allowed us to

124
00:05:01,110 --> 00:04:58,880
ensure that no matter how the vehicle

125
00:05:02,790 --> 00:05:01,120
lands in the water it will do so safely

126
00:05:04,710 --> 00:05:02,800
for our crew

127
00:05:06,469 --> 00:05:04,720
in addition to testing orion we've also

128
00:05:07,830 --> 00:05:06,479
been able to test some of the commercial

129
00:05:10,390 --> 00:05:07,840
crew program

130
00:05:11,990 --> 00:05:10,400
vehicles out here at the facility um

131
00:05:15,270 --> 00:05:12,000
really ensuring that no matter what

132
00:05:17,350 --> 00:05:15,280
spacecraft or astronauts are in uh they

133
00:05:19,110 --> 00:05:17,360
are able to return to

134
00:05:20,790 --> 00:05:19,120
earth safely

135
00:05:22,550 --> 00:05:20,800
um one other thing i have to mention

136
00:05:25,670 --> 00:05:22,560
about this facility because it's very

137
00:05:28,070 --> 00:05:25,680
interesting and unique about it is that

138
00:05:30,150 --> 00:05:28,080

the hydro impact basin is actually

139
00:05:32,230 --> 00:05:30,160
located at the west end of the lander

140
00:05:34,310 --> 00:05:32,240
test facility here at langley otherwise

141
00:05:37,590 --> 00:05:34,320
known as the gantry the gantry was

142
00:05:40,230 --> 00:05:37,600
actually built in the 1950s or 60s

143
00:05:41,830 --> 00:05:40,240
for the apollo program and used as a

144
00:05:43,670 --> 00:05:41,840
lunar simulator

145
00:05:46,790 --> 00:05:43,680
so the first astronauts actually learned

146
00:05:48,230 --> 00:05:46,800
how to land the lunar module as well as

147
00:05:50,070 --> 00:05:48,240
first learned how to walk on the moon

148
00:05:51,749 --> 00:05:50,080
here at this test facility

149
00:05:54,310 --> 00:05:51,759
so super interesting a unique touch

150
00:05:56,309 --> 00:05:54,320
facility and really uh excited to see

151
00:05:57,350 --> 00:05:56,319
another historic test be performed here

152
00:05:59,909 --> 00:05:57,360
today

153
00:06:03,110 --> 00:05:59,919
thanks jacob that is so exciting and as

154
00:06:05,909 --> 00:06:03,120
you said we have had had many orion

155
00:06:07,830 --> 00:06:05,919
tests already happen here and debbie

156
00:06:10,230 --> 00:06:07,840
orion the orion crew module is already

157
00:06:12,390 --> 00:06:10,240
down at kennedy space center uh ready

158
00:06:14,629 --> 00:06:12,400
for artemis one can you tell us why

159
00:06:16,070 --> 00:06:14,639
we're testing again today yeah sure

160
00:06:18,070 --> 00:06:16,080
that's a great question so yeah we have

161
00:06:20,070 --> 00:06:18,080
done a series of test campaigns in this

162
00:06:22,469 --> 00:06:20,080
facility with a series of different

163
00:06:23,590 --> 00:06:22,479

modules for the crew module the article

164
00:06:25,510 --> 00:06:23,600
we have here today is called our

165
00:06:27,749 --> 00:06:25,520
structural test article and what makes

166
00:06:28,870 --> 00:06:27,759
it different is exactly identical to the

167
00:06:30,070 --> 00:06:28,880
actual flight structures that we've

168
00:06:32,070 --> 00:06:30,080
delivered to kennedy and we're in the

169
00:06:34,309 --> 00:06:32,080
process of building up there so it has

170
00:06:35,670 --> 00:06:34,319
all of the flight like pressure vessel

171
00:06:36,870 --> 00:06:35,680
the back shells the heat shield

172
00:06:38,390 --> 00:06:36,880
structure

173
00:06:40,390 --> 00:06:38,400
also contains a lot of secondary

174
00:06:41,510 --> 00:06:40,400
structure and mass simulators for

175
00:06:43,510 --> 00:06:41,520
different components that would be

176
00:06:45,110 --> 00:06:43,520
installed inside the crew module so it's

177
00:06:46,629 --> 00:06:45,120
a much higher fidelity

178
00:06:48,629 --> 00:06:46,639
fidelity model that we'll be using for

179
00:06:50,309 --> 00:06:48,639
this test what it allows us to do is

180
00:06:52,629 --> 00:06:50,319
look at how the loads are transmitted

181
00:06:54,309 --> 00:06:52,639
into the vehicle and ensure that our our

182
00:06:56,629 --> 00:06:54,319
load predictions and our margins for the

183
00:06:59,189 --> 00:06:56,639
vehicle are are sufficient and and good

184
00:07:00,629 --> 00:06:59,199
for our flight vehicles um so that's the

185
00:07:01,830 --> 00:07:00,639
difference with the vehicle we have

186
00:07:04,790 --> 00:07:01,840
today

187
00:07:06,710 --> 00:07:04,800
and so what's next for orion

188
00:07:08,230 --> 00:07:06,720

there is a lot going on on orion right

189
00:07:10,230 --> 00:07:08,240
now it's very exciting time to be in the

190
00:07:11,990 --> 00:07:10,240
program so for artemis one as you

191
00:07:13,029 --> 00:07:12,000
mentioned our crew and service module

192
00:07:14,870 --> 00:07:13,039
have already been delivered at the

193
00:07:16,150 --> 00:07:14,880
kennedy space center they're in the

194
00:07:17,909 --> 00:07:16,160
process of getting all of their

195
00:07:19,830 --> 00:07:17,919
commodities loaded so the fuels and

196
00:07:21,749 --> 00:07:19,840
oxidizers and all the gases needed for

197
00:07:23,589 --> 00:07:21,759
flight um our

198
00:07:25,589 --> 00:07:23,599
after that it'll move on to a launch

199
00:07:27,749 --> 00:07:25,599
abort facility where we actually

200
00:07:29,350 --> 00:07:27,759
installed the last um

201
00:07:30,390 --> 00:07:29,360
artemis one last on top of the current

202
00:07:32,230 --> 00:07:30,400
service module

203
00:07:33,990 --> 00:07:32,240
and interestingly enough the the actual

204
00:07:35,909 --> 00:07:34,000
launch abort system was designed and

205
00:07:37,990 --> 00:07:35,919
built and managed out of here at langley

206
00:07:40,230 --> 00:07:38,000
research center so it was the first

207
00:07:41,749 --> 00:07:40,240
module that we delivered for artemis one

208
00:07:43,110 --> 00:07:41,759
and it's been at kennedy space center

209
00:07:45,110 --> 00:07:43,120
awaiting the crew and service module

210
00:07:47,029 --> 00:07:45,120
which is now ready for integration

211
00:07:48,550 --> 00:07:47,039
so after that it goes to the vertical

212
00:07:50,150 --> 00:07:48,560
assembly building gets installed on the

213
00:07:51,909 --> 00:07:50,160

sls rocket that'll be showing up later

214
00:07:53,270 --> 00:07:51,919
this year and all headed towards our

215
00:07:54,869 --> 00:07:53,280
uncrewed launch by the end of the year

216
00:07:58,150 --> 00:07:54,879
so really excited to see that artemis

217
00:07:59,350 --> 00:07:58,160
one vehicle go into a long trip around

218
00:08:01,589 --> 00:07:59,360
the moon

219
00:08:03,909 --> 00:08:01,599
artemis ii is also well into fabrication

220
00:08:05,350 --> 00:08:03,919
so the crew module is being outfitted

221
00:08:06,950 --> 00:08:05,360
with all of its environmental control

222
00:08:08,469 --> 00:08:06,960
and life support systems the prop

223
00:08:11,189 --> 00:08:08,479
systems are being welded into that

224
00:08:13,029 --> 00:08:11,199
vehicle the tps is thermal protection

225
00:08:14,390 --> 00:08:13,039
system is being installed so that

226
00:08:17,029 --> 00:08:14,400
vehicle is well on its way to coming

227
00:08:18,710 --> 00:08:17,039
together and the um parts of the service

228
00:08:20,230 --> 00:08:18,720
module come we have parts of our service

229
00:08:21,589 --> 00:08:20,240
module that actually come from europe

230
00:08:23,270 --> 00:08:21,599
it's the european service module it's

231
00:08:24,950 --> 00:08:23,280
kind of guts of our service module the

232
00:08:27,029 --> 00:08:24,960
prop system and that'll be delivered

233
00:08:29,830 --> 00:08:27,039
later this year all of that follows the

234
00:08:31,350 --> 00:08:29,840
very similar path gets integrated and um

235
00:08:32,790 --> 00:08:31,360
similar path is artemis one goes to

236
00:08:34,230 --> 00:08:32,800
rocket and it's targeted for launch in

237
00:08:35,670 --> 00:08:34,240
2023.

238
00:08:37,509 --> 00:08:35,680

and finally we've already started

239
00:08:39,750 --> 00:08:37,519
fabrication and buildup of the artemis

240
00:08:41,190 --> 00:08:39,760
iii unit um so just really exciting time

241
00:08:42,709 --> 00:08:41,200
to be in the program lots of vehicles

242
00:08:44,470 --> 00:08:42,719
being built lots of testing being done

243
00:08:47,110 --> 00:08:44,480
and really great

244
00:08:49,110 --> 00:08:47,120
absolutely no we are so excited for all

245
00:08:52,310 --> 00:08:49,120
of this testing and all that is to come

246
00:08:55,509 --> 00:08:52,320
for artemis um so back to our artemis

247
00:08:57,509 --> 00:08:55,519
test today or our orion test today uh

248
00:08:59,190 --> 00:08:57,519
jacob can you

249
00:09:01,829 --> 00:08:59,200
tell us what we're going to learn from

250
00:09:04,230 --> 00:09:01,839
this test today sure so we actually have

251
00:09:06,070 --> 00:09:04,240
over 500 sensors integrated into this

252
00:09:07,829 --> 00:09:06,080
test article

253
00:09:09,910 --> 00:09:07,839
we really split those sensors into two

254
00:09:12,389 --> 00:09:09,920
categories we have sensors which are

255
00:09:15,030 --> 00:09:12,399
intended to measure the forces that are

256
00:09:16,230 --> 00:09:15,040
acting on the test article during the

257
00:09:18,630 --> 00:09:16,240
impact event

258
00:09:20,230 --> 00:09:18,640
and we're also measuring the motion of

259
00:09:22,470 --> 00:09:20,240
the test article as it moves through the

260
00:09:24,230 --> 00:09:22,480
water during the landing so these are

261
00:09:26,470 --> 00:09:24,240
really going to tell us two things those

262
00:09:28,230 --> 00:09:26,480
forces are going to tell us a lot about

263
00:09:31,030 --> 00:09:28,240

any risk to the structure of the test

264
00:09:32,389 --> 00:09:31,040
article or any components inside of it

265
00:09:33,990 --> 00:09:32,399
and the motion of the capsule through

266
00:09:36,389 --> 00:09:34,000
the water is going to tell us a lot

267
00:09:37,990 --> 00:09:36,399
about what the occupants inside might be

268
00:09:38,949 --> 00:09:38,000
experiencing

269
00:09:40,310 --> 00:09:38,959
so

270
00:09:42,949 --> 00:09:40,320
really with this test we're ensuring

271
00:09:44,790 --> 00:09:42,959
that both the test vehicle or future

272
00:09:46,790 --> 00:09:44,800
orion vehicle or

273
00:09:49,670 --> 00:09:46,800
as well the occupants inside

274
00:09:52,150 --> 00:09:49,680
are safe during any future landings

275
00:09:54,470 --> 00:09:52,160
that's so great and so there's there's

276
00:09:57,509 --> 00:09:54,480
obviously a lot of preparation behind us

277
00:10:01,110 --> 00:09:57,519
going on can you tell us all that went

278
00:10:03,030 --> 00:10:01,120
into getting orion ready for today sure

279
00:10:04,470 --> 00:10:03,040
yeah so the test today is going to be

280
00:10:05,750 --> 00:10:04,480
really short

281
00:10:07,430 --> 00:10:05,760
dropping under the water doesn't take a

282
00:10:09,110 --> 00:10:07,440
lot of time but there's a lot of work

283
00:10:10,389 --> 00:10:09,120
that goes into preparing this test

284
00:10:11,990 --> 00:10:10,399
article

285
00:10:13,350 --> 00:10:12,000
before it gets to what you guys are

286
00:10:15,910 --> 00:10:13,360
going to see today

287
00:10:19,030 --> 00:10:15,920
so the test article itself was developed

288
00:10:20,550 --> 00:10:19,040

built and assembled by lockheed martin

289
00:10:22,310 --> 00:10:20,560
at its completion it was shipped out

290
00:10:24,710 --> 00:10:22,320
here to nasa langley

291
00:10:26,949 --> 00:10:24,720
where we integrated all the sensors we

292
00:10:29,670 --> 00:10:26,959
attached them into our data acquisition

293
00:10:31,350 --> 00:10:29,680
systems put them onto power

294
00:10:33,590 --> 00:10:31,360
sealed up the capsule

295
00:10:36,389 --> 00:10:33,600
and then prepared it for testing

296
00:10:38,550 --> 00:10:36,399
actually prior to this test we performed

297
00:10:39,750 --> 00:10:38,560
a checkout test a couple weeks ago just

298
00:10:41,590 --> 00:10:39,760
to make sure we were getting all the

299
00:10:43,509 --> 00:10:41,600
readings that we expected

300
00:10:45,030 --> 00:10:43,519
everything checked out fine so we are

301
00:10:46,630 --> 00:10:45,040
ready to

302
00:10:47,509 --> 00:10:46,640
begin our test today so looking forward

303
00:10:49,750 --> 00:10:47,519
to it

304
00:10:54,150 --> 00:10:49,760
yeah and we're so excited uh i think the

305
00:10:56,150 --> 00:10:54,160
test is is gonna start uh soon um we

306
00:10:58,470 --> 00:10:56,160
might have to take some questions from

307
00:10:59,509 --> 00:10:58,480
social media uh

308
00:11:01,350 --> 00:10:59,519
so

309
00:11:05,110 --> 00:11:01,360
i hope you all have been commenting and

310
00:11:06,949 --> 00:11:05,120
using the hashtag ask nasa um

311
00:11:08,630 --> 00:11:06,959
let's go to

312
00:11:10,870 --> 00:11:08,640
some questions

313
00:11:11,829 --> 00:11:10,880

debbie

314
00:11:12,790 --> 00:11:11,839
sure

315
00:11:16,069 --> 00:11:12,800
um

316
00:11:18,870 --> 00:11:16,079
what will be the the splashdown velocity

317
00:11:20,710 --> 00:11:18,880
of the orion spacecraft

318
00:11:22,470 --> 00:11:20,720
um in in nominal conditions when we're

319
00:11:24,630 --> 00:11:22,480
outshining a mission i think the nominal

320
00:11:25,910 --> 00:11:24,640
speed is about 10 miles per hour so it's

321
00:11:28,550 --> 00:11:25,920
pretty slow

322
00:11:30,470 --> 00:11:28,560
it can get up to around 20 25 and so

323
00:11:31,670 --> 00:11:30,480
it's the parachute system does a really

324
00:11:33,750 --> 00:11:31,680
good job as it comes through the

325
00:11:35,430 --> 00:11:33,760
atmosphere there's shoots that deploy a

326
00:11:36,870 --> 00:11:35,440
forward bed cover and then drove shoots

327
00:11:39,110 --> 00:11:36,880
that deploy and the main shoots deploy

328
00:11:40,550 --> 00:11:39,120
so there's a series of parachute deploys

329
00:11:43,509 --> 00:11:40,560
that slow the vehicle down to a very

330
00:11:46,790 --> 00:11:43,519
safe landing landing speed um as far as

331
00:11:49,750 --> 00:11:46,800
the test today i think it's about um

332
00:11:50,949 --> 00:11:49,760
20 16 miles per hour

333
00:11:52,389 --> 00:11:50,959
yeah i will have to get back on the

334
00:11:54,310 --> 00:11:52,399
exact number but yeah somewhere in that

335
00:11:56,150 --> 00:11:54,320
ballpark looking at um

336
00:11:58,389 --> 00:11:56,160
the specific landing speeds we actually

337
00:12:00,389 --> 00:11:58,399
vary the velocity and vary the angle of

338
00:12:02,389 --> 00:12:00,399

impact of the vehicle in the water to

339
00:12:05,030 --> 00:12:02,399
try and capture all of the envelope that

340
00:12:07,430 --> 00:12:05,040
we need to design towards

341
00:12:10,230 --> 00:12:07,440
that's that's amazing and so

342
00:12:15,990 --> 00:12:10,240
what's the difference between a hydro

343
00:12:20,949 --> 00:12:18,310
well the hydro impact basin is flat at

344
00:12:22,470 --> 00:12:20,959
the bottom for one and it's also much

345
00:12:23,829 --> 00:12:22,480
larger so

346
00:12:26,310 --> 00:12:23,839
be following the water that goes into it

347
00:12:28,949 --> 00:12:26,320
which again a million gallons of water

348
00:12:31,430 --> 00:12:28,959
is needed to ensure that we can test uh

349
00:12:33,110 --> 00:12:31,440
high velocity impacts into the water and

350
00:12:36,150 --> 00:12:33,120
basically make sure the capsule is not

351
00:12:37,509 --> 00:12:36,160
hitting the edges of the pool so those

352
00:12:38,389 --> 00:12:37,519
are kind of the primary differences

353
00:12:41,590 --> 00:12:38,399
there

354
00:12:43,750 --> 00:12:41,600
and do you know is is the base in salt

355
00:12:47,190 --> 00:12:43,760
water and how deep is it

356
00:12:49,509 --> 00:12:47,200
so it is 20 foot deep and it is not salt

357
00:12:51,990 --> 00:12:49,519
water it's a mix of light bit of

358
00:12:53,750 --> 00:12:52,000
chlorine but uh mostly just normal tap

359
00:12:54,470 --> 00:12:53,760
water with some flooring in it to make

360
00:12:57,190 --> 00:12:54,480
sure

361
00:12:58,949 --> 00:12:57,200
it's clear for underwater cameras

362
00:13:01,269 --> 00:12:58,959
not made for swimming though no not made

363
00:13:02,069 --> 00:13:01,279

for swimming

364
00:13:05,030 --> 00:13:02,079
so

365
00:13:07,590 --> 00:13:05,040
uh jacob what is the team looking for

366
00:13:08,870 --> 00:13:07,600
for to qualify as today's test as a

367
00:13:14,069 --> 00:13:08,880
success

368
00:13:16,069 --> 00:13:14,079
today uh we want a nominal release from

369
00:13:18,470 --> 00:13:16,079
the hook so we want to actually see it

370
00:13:20,870 --> 00:13:18,480
drop into the water um

371
00:13:22,550 --> 00:13:20,880
after that uh as long as it pops out of

372
00:13:24,790 --> 00:13:22,560
the water afterwards and we get all the

373
00:13:26,550 --> 00:13:24,800
data that uh we intend to get out of the

374
00:13:28,710 --> 00:13:26,560
test it will be

375
00:13:32,310 --> 00:13:28,720
everything we're looking for

376
00:13:34,949 --> 00:13:32,320
that's great so so debbie

377
00:13:36,710 --> 00:13:34,959
oh so we're as you can hear we're about

378
00:13:38,949 --> 00:13:36,720
two minutes away from the splashdown

379
00:13:41,990 --> 00:13:38,959
test so i think we'll keep taking some

380
00:13:44,069 --> 00:13:42,000
some questions from social um so make

381
00:13:46,389 --> 00:13:44,079
sure you're still leaving those comments

382
00:13:48,470 --> 00:13:46,399
down below and using

383
00:13:49,670 --> 00:13:48,480
ask nasa

384
00:13:50,629 --> 00:13:49,680
uh so

385
00:13:52,310 --> 00:13:50,639
debbie

386
00:13:53,269 --> 00:13:52,320
um

387
00:13:57,590 --> 00:13:53,279
when

388
00:14:02,389 --> 00:13:57,600

how fast will it be going

389
00:14:05,189 --> 00:14:02,399
i think i i think the range is about 10

390
00:14:06,550 --> 00:14:05,199
to 20 miles per hour um and like i said

391
00:14:08,310 --> 00:14:06,560
the parachutes do a really good job of

392
00:14:10,389 --> 00:14:08,320
slowing down the vehicle on impact we

393
00:14:11,750 --> 00:14:10,399
also have inside the the vehicle to

394
00:14:13,670 --> 00:14:11,760
protect the crew what's called the crew

395
00:14:15,350 --> 00:14:13,680
impact attenuation system so think of

396
00:14:17,269 --> 00:14:15,360
like shock absorbers on your car or

397
00:14:18,470 --> 00:14:17,279
maybe like your

398
00:14:19,910 --> 00:14:18,480
if you have a mountain bike something

399
00:14:21,990 --> 00:14:19,920
like that so it actually

400
00:14:24,069 --> 00:14:22,000
it softens the impact of the the vehicle

401
00:14:26,790 --> 00:14:24,079
when it lands so so not only very very

402
00:14:28,629 --> 00:14:26,800
smooth and very not very much

403
00:14:30,790 --> 00:14:28,639
dynamics there it's not getting not

404
00:14:32,389 --> 00:14:30,800
getting all jostled around as they're

405
00:14:34,470 --> 00:14:32,399
yeah landing they have they have very

406
00:14:36,470 --> 00:14:34,480
nice crew attenuation and nice cushioned

407
00:14:39,670 --> 00:14:36,480
seats that help attenuate that load into

408
00:14:40,949 --> 00:14:39,680
the crew member yep um great and i i

409
00:14:43,030 --> 00:14:40,959
think we have

410
00:14:44,949 --> 00:14:43,040
maybe time for one more question how

411
00:14:50,069 --> 00:14:44,959
long will it sit in

412
00:14:53,030 --> 00:14:51,750
the nominal recovery is pretty quick i

413
00:14:54,470 --> 00:14:53,040

think the requirement is it could be

414
00:14:56,629 --> 00:14:54,480
there for up to two hours but we

415
00:14:57,829 --> 00:14:56,639
actually have recovery crews on site

416
00:14:58,949 --> 00:14:57,839
that get to the vehicle almost

417
00:15:00,870 --> 00:14:58,959
immediately

418
00:15:02,629 --> 00:15:00,880
extract the crew and get them back on

419
00:15:04,150 --> 00:15:02,639
the the recovery ship and then actually

420
00:15:05,110 --> 00:15:04,160
tow the vehicle back into the recovery

421
00:15:07,590 --> 00:15:05,120
ship for

422
00:15:08,870 --> 00:15:07,600
for um out you know deconfiguration and

423
00:15:11,110 --> 00:15:08,880
actually starting with artemis three

424
00:15:12,949 --> 00:15:11,120
will be reusing those crew capsules so

425
00:15:18,389 --> 00:15:12,959
awesome well thank you we're going to

426
00:15:22,230 --> 00:15:21,350
15 14 13

427
00:15:23,350 --> 00:15:22,240
12

428
00:15:24,470 --> 00:15:23,360
11

429
00:15:25,430 --> 00:15:24,480
10

430
00:15:26,470 --> 00:15:25,440
9

431
00:15:27,509 --> 00:15:26,480
eight

432
00:15:28,470 --> 00:15:27,519
seven

433
00:15:29,509 --> 00:15:28,480
six

434
00:15:30,550 --> 00:15:29,519
five

435
00:15:31,590 --> 00:15:30,560
four

436
00:15:32,550 --> 00:15:31,600
three

437
00:15:57,189 --> 00:15:32,560
two

438
00:15:57,199 --> 00:16:12,150

you can't get better than that

439
00:16:15,590 --> 00:16:13,749
that was amazing

440
00:16:17,509 --> 00:16:15,600
yeah it was really cool what'd you think

441
00:16:19,030 --> 00:16:17,519
how's it look yeah can't get better than

442
00:16:21,189 --> 00:16:19,040
that it looked like a perfect release

443
00:16:24,310 --> 00:16:21,199
and uh yeah it looks like

444
00:16:26,069 --> 00:16:24,320
capsule behaved as expected

445
00:16:29,350 --> 00:16:26,079
that's so great to hear

446
00:16:32,389 --> 00:16:29,360
um so i think we are gonna try and take

447
00:16:34,310 --> 00:16:32,399
a couple more questions from from social

448
00:16:38,230 --> 00:16:34,320
um and then

449
00:16:39,269 --> 00:16:38,240
maybe possibly see a replay of of this

450
00:16:40,710 --> 00:16:39,279
drop

451
00:16:42,710 --> 00:16:40,720
um

452
00:16:44,389 --> 00:16:42,720
let's see

453
00:16:48,310 --> 00:16:44,399
so

454
00:16:51,269 --> 00:16:48,320
coming in

455
00:16:53,509 --> 00:16:51,279
uh jacob uh how high

456
00:16:55,910 --> 00:16:53,519
was orion dropped from today

457
00:16:57,269 --> 00:16:55,920
so ryan was dropped about seven feet in

458
00:16:59,749 --> 00:16:57,279
the air

459
00:17:01,430 --> 00:16:59,759
so not a whole lot of height but plenty

460
00:17:03,910 --> 00:17:01,440
enough to get some good speed into the

461
00:17:05,270 --> 00:17:03,920
water and make a nice flash like we saw

462
00:17:06,470 --> 00:17:05,280
today

463
00:17:08,949 --> 00:17:06,480

awesome

464
00:17:11,590 --> 00:17:08,959
um and debbie

465
00:17:15,189 --> 00:17:11,600
we've got lots of questions for debbie

466
00:17:17,429 --> 00:17:15,199
um so what other tests uh

467
00:17:19,990 --> 00:17:17,439
what other tests are there is this

468
00:17:21,669 --> 00:17:20,000
what's this test particularly used for

469
00:17:23,669 --> 00:17:21,679
okay so yeah this test is very

470
00:17:25,590 --> 00:17:23,679
specifically used for our structural uh

471
00:17:27,350 --> 00:17:25,600
verification and qualifications so as i

472
00:17:29,510 --> 00:17:27,360
mentioned it's an exact duplicate of our

473
00:17:30,870 --> 00:17:29,520
flight design and so that's the primary

474
00:17:32,310 --> 00:17:30,880
uh reason for doing all of these

475
00:17:33,990 --> 00:17:32,320
different water drop dust is to make

476
00:17:35,750 --> 00:17:34,000
sure that we've predicted our loads

477
00:17:37,350 --> 00:17:35,760
accurately and that the margins that we

478
00:17:39,750 --> 00:17:37,360
have in the vehicle are actually in the

479
00:17:40,870 --> 00:17:39,760
flight vehicle that we have built so

480
00:17:42,870 --> 00:17:40,880
there's a whole lot of other testing

481
00:17:44,390 --> 00:17:42,880
that goes into building a spacecraft so

482
00:17:46,070 --> 00:17:44,400
when you talk about the actual flight

483
00:17:47,990 --> 00:17:46,080
vehicles with all of the instrumentation

484
00:17:50,390 --> 00:17:48,000
and equipment that's installed we do

485
00:17:53,110 --> 00:17:50,400
lots of thermal cycle testing thermal

486
00:17:54,549 --> 00:17:53,120
vacuum testing vibration testing every

487
00:17:56,470 --> 00:17:54,559
component that goes in the vehicle goes

488
00:17:57,830 --> 00:17:56,480

through its own test program and then

489
00:17:59,510 --> 00:17:57,840
the vehicle as a whole goes through a

490
00:18:02,710 --> 00:17:59,520
very elaborate test program where we do

491
00:18:05,270 --> 00:18:02,720
a thermal cycle thermal vacuum emi emc

492
00:18:06,390 --> 00:18:05,280
so the the flight units and the flight

493
00:18:08,150 --> 00:18:06,400
vehicles are

494
00:18:09,510 --> 00:18:08,160
very well rung out before we fly to make

495
00:18:11,029 --> 00:18:09,520
sure everything will work properly in

496
00:18:13,190 --> 00:18:11,039
the very harsh environments of space

497
00:18:15,430 --> 00:18:13,200
that it'll be operating in

498
00:18:18,630 --> 00:18:15,440
oh wow that's amazing so we've got a

499
00:18:20,070 --> 00:18:18,640
couple questions about um

500
00:18:20,950 --> 00:18:20,080
parachutes

501
00:18:22,870 --> 00:18:20,960
so

502
00:18:25,590 --> 00:18:22,880
are are there gonna be parachutes on on

503
00:18:27,909 --> 00:18:25,600
orion and how many parachutes will there

504
00:18:29,350 --> 00:18:27,919
be when it lands okay it actually when

505
00:18:31,909 --> 00:18:29,360
it actually lands it lands under three

506
00:18:33,909 --> 00:18:31,919
main parachutes but um it actually could

507
00:18:35,110 --> 00:18:33,919
can land sufficiently under two so it's

508
00:18:36,710 --> 00:18:35,120
one of our systems that has a lot of

509
00:18:38,630 --> 00:18:36,720
redundancy and safety built into it

510
00:18:39,990 --> 00:18:38,640
because it is safety critical system

511
00:18:42,070 --> 00:18:40,000
there are a series of parachutes that

512
00:18:44,070 --> 00:18:42,080
deploy as the crew module enters the

513
00:18:45,750 --> 00:18:44,080

atmosphere and to slow it down

514
00:18:47,350 --> 00:18:45,760
and as far as testing the parachutes

515
00:18:50,070 --> 00:18:47,360
have actually completed their entire

516
00:18:53,110 --> 00:18:50,080
test program so there were dozens and

517
00:18:54,710 --> 00:18:53,120
dozens of drops of test articles and we

518
00:18:56,710 --> 00:18:54,720
called lawn darts and other items out

519
00:18:59,270 --> 00:18:56,720
the back of airplanes looking at every

520
00:19:01,110 --> 00:18:59,280
possible uh permutation of that

521
00:19:02,150 --> 00:19:01,120
parachute system so you want to make

522
00:19:05,029 --> 00:19:02,160
sure if you

523
00:19:06,630 --> 00:19:05,039
had only one two drugs open or only one

524
00:19:08,070 --> 00:19:06,640
or only two main parachutes open that

525
00:19:11,110 --> 00:19:08,080
you can actually the crew would be able

526
00:19:13,750 --> 00:19:11,120
to survive any kind of anomaly event and

527
00:19:14,950 --> 00:19:13,760
testing all sorts of wind speeds and

528
00:19:16,230 --> 00:19:14,960
other parameters you have to test to

529
00:19:17,909 --> 00:19:16,240
make sure your parachute system is

530
00:19:19,990 --> 00:19:17,919
complete so ours is actually finished

531
00:19:21,990 --> 00:19:20,000
certification it's installed in the the

532
00:19:24,710 --> 00:19:22,000
vehicle and ready to go

533
00:19:27,190 --> 00:19:24,720
that's awesome um so

534
00:19:29,190 --> 00:19:27,200
how many uh drops have been done on

535
00:19:32,549 --> 00:19:29,200
orion um

536
00:19:36,310 --> 00:19:33,669
sorry

537
00:19:38,789 --> 00:19:36,320
wrong question um is orion going to

538
00:19:39,990 --> 00:19:38,799

carry astronauts to the moon

539
00:19:43,270 --> 00:19:40,000
or mars

540
00:19:44,789 --> 00:19:43,280
and how many crew can it hold okay

541
00:19:47,190 --> 00:19:44,799
yeah in fact that's exactly what orion

542
00:19:50,470 --> 00:19:47,200
is designed to do it's designed to carry

543
00:19:52,230 --> 00:19:50,480
crew members to the lunar vicinity and

544
00:19:54,070 --> 00:19:52,240
right now the current module will hold

545
00:19:56,230 --> 00:19:54,080
four crew members for up to 21 days of

546
00:19:58,549 --> 00:19:56,240
active use it's about 200 days of

547
00:20:00,390 --> 00:19:58,559
quiescent use so if the crew left the

548
00:20:02,070 --> 00:20:00,400
the art of the orion vehicle and when

549
00:20:04,070 --> 00:20:02,080
it's like a gateway or a space station

550
00:20:06,390 --> 00:20:04,080
orbiting the moon uh the vehicle is fine

551
00:20:08,789 --> 00:20:06,400
in a quiescent mode for up to 200 days

552
00:20:09,990 --> 00:20:08,799
so um yes definitely designed exactly

553
00:20:12,230 --> 00:20:10,000
what it's designed for to take crew

554
00:20:13,590 --> 00:20:12,240
members to and from the lunar vicinity

555
00:20:15,430 --> 00:20:13,600
now to the lunar surface you're talking

556
00:20:17,029 --> 00:20:15,440
about a lander or something else the

557
00:20:18,390 --> 00:20:17,039
orion vehicle itself does not actually

558
00:20:19,510 --> 00:20:18,400
go to the surface of the moon you'd have

559
00:20:21,669 --> 00:20:19,520
a lander that would take your crew

560
00:20:23,669 --> 00:20:21,679
members and i think the the architecture

561
00:20:25,510 --> 00:20:23,679
for mars is still being discussed on

562
00:20:27,510 --> 00:20:25,520
what kind of transport vehicle you would

563
00:20:31,909 --> 00:20:27,520

need certainly some additional support

564
00:20:34,470 --> 00:20:33,029
very cool

565
00:20:38,470 --> 00:20:34,480
um

566
00:20:41,190 --> 00:20:38,480
so will there be future orion tests uh

567
00:20:42,710 --> 00:20:41,200
done at a higher height

568
00:20:43,909 --> 00:20:42,720
um yeah there are more tests planned as

569
00:20:45,270 --> 00:20:43,919
a part of this sequence jacob you want

570
00:20:46,470 --> 00:20:45,280
to talk about the the next few tests

571
00:20:48,549 --> 00:20:46,480
coming up sure

572
00:20:50,870 --> 00:20:48,559
so uh we are going to do one more

573
00:20:53,430 --> 00:20:50,880
straight drop test at this test facility

574
00:20:54,710 --> 00:20:53,440
uh we'll lift it up uh much higher than

575
00:20:56,310 --> 00:20:54,720
this test here

576
00:20:57,750 --> 00:20:56,320
really to exercise the capsule as it

577
00:20:59,510 --> 00:20:57,760
impacts the water

578
00:21:01,830 --> 00:20:59,520
and then we're also going to be doing a

579
00:21:04,870 --> 00:21:01,840
swing test where we'll actually pull the

580
00:21:06,870 --> 00:21:04,880
vehicle back towards the east end of the

581
00:21:08,870 --> 00:21:06,880
test facility and allow it to swing into

582
00:21:12,310 --> 00:21:08,880
the water so we'll have a combination of

583
00:21:13,830 --> 00:21:12,320
both horizontal and vertical velocity

584
00:21:16,630 --> 00:21:13,840
so yeah we i think we have two more

585
00:21:19,190 --> 00:21:16,640
tests planned for this uh test article

586
00:21:21,590 --> 00:21:19,200
here right because this is the second of

587
00:21:24,630 --> 00:21:21,600
four for this for this crew module

588
00:21:27,190 --> 00:21:24,640

um and do you know how many sensors are

589
00:21:29,510 --> 00:21:27,200
on this orion test vehicle so yeah we

590
00:21:32,230 --> 00:21:29,520
have 500 different sensors on this test

591
00:21:34,710 --> 00:21:32,240
vehicle and they are a combination of

592
00:21:36,870 --> 00:21:34,720
strain gauges accelerometers and

593
00:21:40,070 --> 00:21:36,880
rotational rate sensors distributed

594
00:21:42,149 --> 00:21:40,080
throughout the test article

595
00:21:45,110 --> 00:21:42,159
wow that's awesome and we actually have

596
00:21:47,270 --> 00:21:45,120
a special guest with us

597
00:21:49,510 --> 00:21:47,280
um our

598
00:21:51,350 --> 00:21:49,520
our center director

599
00:21:53,990 --> 00:21:51,360
is here and he actually brought us

600
00:21:55,590 --> 00:21:54,000
something to show

601
00:21:59,669 --> 00:21:55,600
if we want to

602
00:22:03,909 --> 00:22:01,750
hi

603
00:22:05,190 --> 00:22:03,919
clayton would you like to explain what

604
00:22:08,390 --> 00:22:05,200
what the

605
00:22:11,430 --> 00:22:09,430
so

606
00:22:13,750 --> 00:22:11,440
this poster represents why we're doing

607
00:22:15,430 --> 00:22:13,760
all this it's not only the artemis

608
00:22:17,669 --> 00:22:15,440
program and using orion capsule to

609
00:22:19,350 --> 00:22:17,679
return to the lunar surface but it's

610
00:22:22,070 --> 00:22:19,360
talking about our future where humans

611
00:22:24,549 --> 00:22:22,080
are on mars and you notice the caption

612
00:22:28,950 --> 00:22:24,559
first day of school so we're projecting

613
00:22:28,960 --> 00:22:31,990

very cool

614
00:22:36,549 --> 00:22:34,230
thank you so much and that was our was

615
00:22:37,590 --> 00:22:36,559
nasa langley center director clayton

616
00:22:39,830 --> 00:22:37,600
turner

617
00:22:41,830 --> 00:22:39,840
so great information so thank you

618
00:22:44,310 --> 00:22:41,840
clayton for coming on

619
00:22:46,310 --> 00:22:44,320
um so we have a couple more questions

620
00:22:47,270 --> 00:22:46,320
here on social

621
00:22:50,390 --> 00:22:47,280
uh

622
00:22:55,430 --> 00:22:54,149
so what other tests um

623
00:23:00,390 --> 00:22:55,440
are

624
00:23:05,029 --> 00:23:02,230
what other tests was this particular

625
00:23:06,710 --> 00:23:05,039
test article used for okay yeah the the

626
00:23:08,549 --> 00:23:06,720
sta the structural test article has been

627
00:23:09,909 --> 00:23:08,559
part of several tests

628
00:23:11,909 --> 00:23:09,919
like i mentioned some of the testing

629
00:23:13,830 --> 00:23:11,919
that we talked about earlier

630
00:23:15,830 --> 00:23:13,840
on all of the environmental testing done

631
00:23:17,669 --> 00:23:15,840
like the thermal vac thermal cycle

632
00:23:19,029 --> 00:23:17,679
vibration so we use this test article

633
00:23:20,630 --> 00:23:19,039
this is sort of the end of the road for

634
00:23:23,110 --> 00:23:20,640
this test article this will be its sort

635
00:23:24,870 --> 00:23:23,120
of last last big test to qualify the

636
00:23:27,110 --> 00:23:24,880
structure but it's been used all along

637
00:23:29,190 --> 00:23:27,120
the way for a variety of tests to verify

638
00:23:30,710 --> 00:23:29,200

the vehicle design

639
00:23:33,510 --> 00:23:30,720
wow awesome

640
00:23:37,270 --> 00:23:33,520
well i think that's a wrap for us today

641
00:23:40,549 --> 00:23:37,280
we thank you guys so much for joining

642
00:23:42,630 --> 00:23:40,559
if you want to know more about the orion

643
00:23:45,830 --> 00:23:42,640
spacecraft you can follow them on