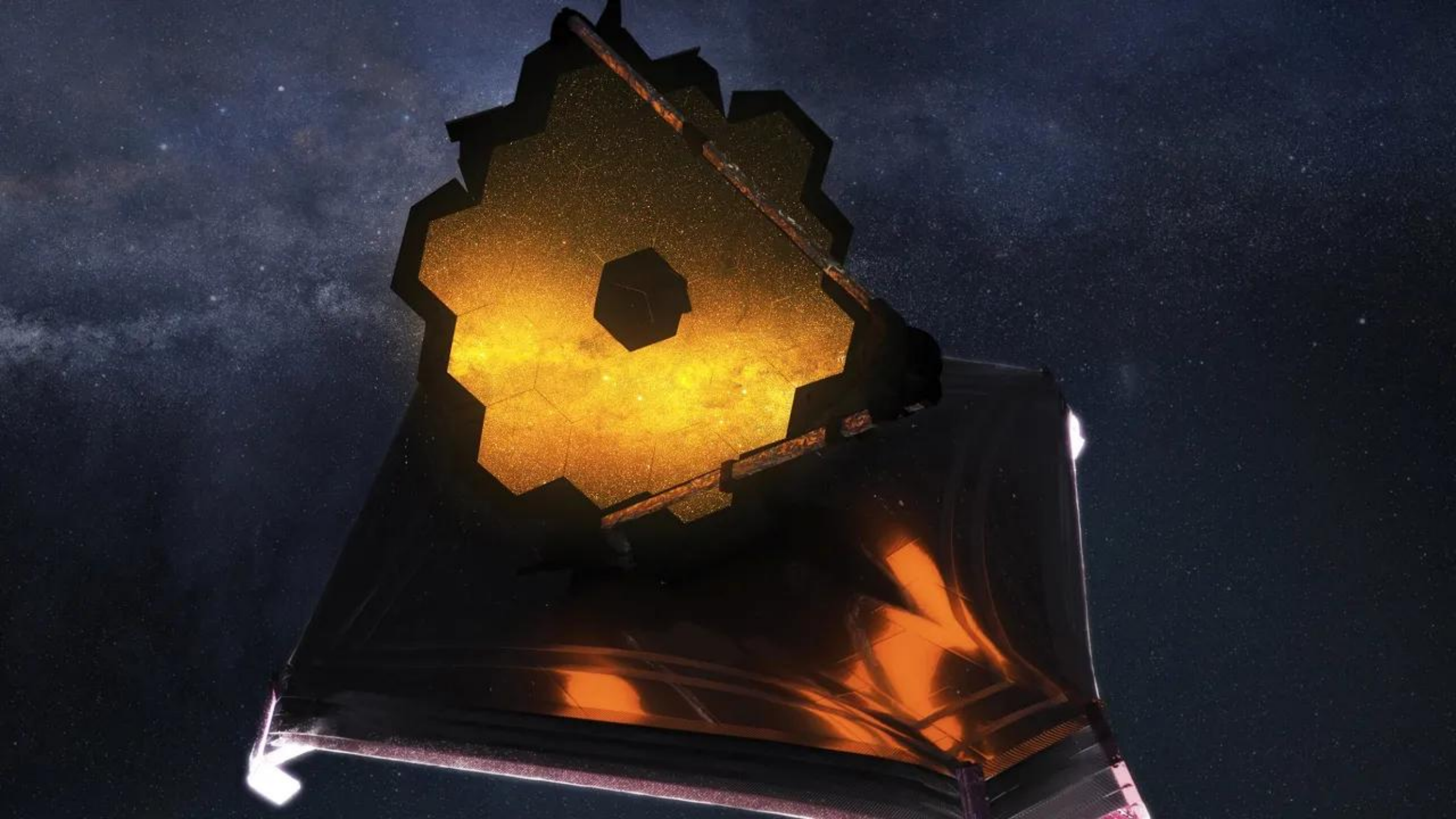

1
00:00:05,510 --> 00:00:02,710
telescope and the fact that we finished

2
00:00:07,670 --> 00:00:05,520
all of the major deployments today

3
00:00:09,669 --> 00:00:07,680
i am karen fox with nasa's office of

4
00:00:12,070 --> 00:00:09,679
communications and we are coming to you

5
00:00:14,549 --> 00:00:12,080
from the space science space telescope

6
00:00:16,390 --> 00:00:14,559
science institute in baltimore maryland

7
00:00:19,029 --> 00:00:16,400
which houses the mission operations

8
00:00:21,269 --> 00:00:19,039
center which you can see behind us

9
00:00:24,710 --> 00:00:21,279
we have one microphone today we have one

10
00:00:27,189 --> 00:00:24,720
camera we are doing this right after the

11
00:00:29,669 --> 00:00:27,199
deployments uh so bear with us as one

12
00:00:32,389 --> 00:00:29,679
person gets up at a time

13
00:00:34,150 --> 00:00:32,399

we are following both cdc and the

14
00:00:36,630 --> 00:00:34,160
institute's coveted rules today so

15
00:00:39,030 --> 00:00:36,640
everyone in the room has been vaccinated

16
00:00:40,950 --> 00:00:39,040
everyone has tested negative recently

17
00:00:43,030 --> 00:00:40,960
and everyone will be wearing a mask for

18
00:00:45,990 --> 00:00:43,040
the entire time

19
00:00:48,150 --> 00:00:46,000
we have two panels for you each one will

20
00:00:49,590 --> 00:00:48,160
last about half an hour the first is

21
00:00:53,189 --> 00:00:49,600
focused on what has been happening for

22
00:00:54,950 --> 00:00:53,199
the last 14 days leading up until now

23
00:00:57,590 --> 00:00:54,960
and the second will be focused on what

24
00:00:58,950 --> 00:00:57,600
is coming up going forward we will be

25
00:01:00,310 --> 00:00:58,960
taking questions from the media that

26
00:01:01,990 --> 00:01:00,320
will be the focus we'll just have a few

27
00:01:04,869 --> 00:01:02,000
remarks at the beginning

28
00:01:06,789 --> 00:01:04,879
and uh for that you press star one to

29
00:01:08,310 --> 00:01:06,799
get into the queue

30
00:01:11,590 --> 00:01:08,320
and let me list our speakers for the

31
00:01:13,990 --> 00:01:11,600
first section we have bill oaks the web

32
00:01:16,550 --> 00:01:14,000
project manager at nasa goddard we have

33
00:01:17,670 --> 00:01:16,560
mike menzel the mission systems engineer

34
00:01:19,590 --> 00:01:17,680
at goddard

35
00:01:21,350 --> 00:01:19,600
scott willoughby vice president and

36
00:01:22,550 --> 00:01:21,360
program manager for web at northrop

37
00:01:25,350 --> 00:01:22,560
grumman

38
00:01:27,990 --> 00:01:25,360

vince heeg deputy program manager for

39
00:01:30,069 --> 00:01:28,000
web at northrop grumman and nancy

40
00:01:32,069 --> 00:01:30,079
schuager deployment operations with

41
00:01:33,270 --> 00:01:32,079
northrop grumman now her voice will be

42
00:01:35,109 --> 00:01:33,280
one that you would have heard today if

43
00:01:37,190 --> 00:01:35,119
you listen to our broadcast on the

44
00:01:38,469 --> 00:01:37,200
operations loop talking through what was

45
00:01:40,390 --> 00:01:38,479
happening so you can always ask her a

46
00:01:43,830 --> 00:01:40,400
little bit about how that went and with

47
00:01:45,830 --> 00:01:43,840
that i will toss it to bill for starters

48
00:01:46,550 --> 00:01:45,840
thank you karen

49
00:01:49,670 --> 00:01:46,560
so

50
00:01:51,749 --> 00:01:49,680
today's been a really remarkable day

51
00:01:53,910 --> 00:01:51,759
we have still have about five and a half

52
00:01:57,030 --> 00:01:53,920
months of commissioning left but these

53
00:01:59,429 --> 00:01:57,040
last two weeks have truly been amazing

54
00:02:02,230 --> 00:01:59,439
today represents the beginning

55
00:02:03,990 --> 00:02:02,240
of a journey for this incredible machine

56
00:02:06,950 --> 00:02:04,000
to to its discoveries that will be

57
00:02:09,669 --> 00:02:06,960
making in the future

58
00:02:11,589 --> 00:02:09,679
jvc itself is an amazing mission and

59
00:02:12,790 --> 00:02:11,599
thousands and thousands of people have

60
00:02:14,630 --> 00:02:12,800
worked on it

61
00:02:16,150 --> 00:02:14,640
and i can never thank them all enough

62
00:02:17,910 --> 00:02:16,160
every individual one for the

63
00:02:20,150 --> 00:02:17,920

contributions that they have made to

64
00:02:22,949 --> 00:02:20,160
getting us to today

65
00:02:25,030 --> 00:02:22,959
this journey has been really remarkable

66
00:02:27,510 --> 00:02:25,040
um the successes over the last two weeks

67
00:02:29,589 --> 00:02:27,520
is truly a tribute to the people of this

68
00:02:32,390 --> 00:02:29,599
of the jwst program

69
00:02:34,070 --> 00:02:32,400
their diligence and passion for jbc is

70
00:02:35,910 --> 00:02:34,080
second to none

71
00:02:38,150 --> 00:02:35,920
and personally if you heard my comments

72
00:02:40,070 --> 00:02:38,160
on the voice loops earlier

73
00:02:42,630 --> 00:02:40,080
i am truly and i have to repeat them

74
00:02:45,110 --> 00:02:42,640
here i am honored and humbled every day

75
00:02:47,350 --> 00:02:45,120
to be working with this team

76
00:03:02,390 --> 00:02:47,360
now with that i'll turn it over to the

77
00:03:06,949 --> 00:03:04,149
it will be questions and we can have our

78
00:03:09,190 --> 00:03:06,959
operator step in and give information

79
00:03:10,309 --> 00:03:09,200
how to get on the queue and uh tell us

80
00:03:11,830 --> 00:03:10,319
where the first

81
00:03:13,910 --> 00:03:11,840
question is from

82
00:03:16,710 --> 00:03:13,920
thanks certainly if you would like to

83
00:03:18,390 --> 00:03:16,720
ask a question please press star one our

84
00:03:29,830 --> 00:03:18,400
first question today is from bill

85
00:03:36,070 --> 00:03:33,509
bill harwood your line is open

86
00:03:37,509 --> 00:03:36,080
hey thank you sorry about that um for

87
00:03:39,350 --> 00:03:37,519
bill ock you know you told us before

88
00:03:41,430 --> 00:03:39,360

launch you were 100 confident all the

89
00:03:43,350 --> 00:03:41,440
deploys would work exactly as planned

90
00:03:45,270 --> 00:03:43,360
and i remember thinking at the time you

91
00:03:47,589 --> 00:03:45,280
might be jinxing it but

92
00:03:49,830 --> 00:03:47,599
that clearly wasn't the case so how big

93
00:03:53,110 --> 00:03:49,840
of an engineering challenge was all this

94
00:03:55,429 --> 00:03:53,120
was it as easy as it looked or was it

95
00:03:57,030 --> 00:03:55,439
really as difficult as we'd all been led

96
00:03:59,190 --> 00:03:57,040
to believe because it sure seemed to go

97
00:04:01,750 --> 00:03:59,200
smoothly thanks

98
00:04:04,229 --> 00:04:01,760
is not as easy as it looks but the

99
00:04:05,910 --> 00:04:04,239
easiness that you saw

100
00:04:08,710 --> 00:04:05,920
again like i mentioned earlier is just a

101
00:04:11,589 --> 00:04:08,720
tribute to the folks um we went through

102
00:04:13,509 --> 00:04:11,599
i what i feel now is the exact right

103
00:04:16,710 --> 00:04:13,519
amount of testing

104
00:04:18,390 --> 00:04:16,720
the exact right of amount of engineering

105
00:04:20,469 --> 00:04:18,400
audits

106
00:04:22,150 --> 00:04:20,479
the exact right amount of tweaks to the

107
00:04:23,830 --> 00:04:22,160
design as we've gone through this

108
00:04:25,670 --> 00:04:23,840
journey of

109
00:04:27,430 --> 00:04:25,680
manufacturing and then launching this

110
00:04:29,909 --> 00:04:27,440
this telescope

111
00:04:31,670 --> 00:04:29,919
the fact that it looked easy just

112
00:04:33,110 --> 00:04:31,680
it just showed just emphasizes that we

113
00:04:39,749 --> 00:04:33,120

did all the right things leading up to

114
00:04:44,710 --> 00:04:41,510
our next question is from elizabeth

115
00:04:47,030 --> 00:04:44,720
howell from space.com

116
00:04:49,110 --> 00:04:47,040
this one is also for bill can you give a

117
00:04:50,550 --> 00:04:49,120
sense of how the teams are feeling how

118
00:04:53,350 --> 00:04:50,560
the teams are doing i know that it's

119
00:04:54,870 --> 00:04:53,360
been a very busy couple of weeks since

120
00:04:57,189 --> 00:04:54,880
the launch and over obviously usually a

121
00:04:59,990 --> 00:04:57,199
very busy time for folks anyway so how's

122
00:05:03,510 --> 00:05:01,510
everyone is doing excellent i think

123
00:05:05,350 --> 00:05:03,520
everyone is extraordinarily excited at

124
00:05:07,670 --> 00:05:05,360
this point

125
00:05:10,390 --> 00:05:07,680
i don't think there was one point during

126
00:05:12,150 --> 00:05:10,400
the entire last two weeks and even the

127
00:05:14,790 --> 00:05:12,160
the period leaving up to launch down to

128
00:05:16,469 --> 00:05:14,800
launch site where anybody felt down

129
00:05:17,749 --> 00:05:16,479
slowed down and we were all we're all a

130
00:05:19,590 --> 00:05:17,759
little tired

131
00:05:27,830 --> 00:05:19,600
but besides that

132
00:05:32,790 --> 00:05:29,670
thank you our next question is from jeff

133
00:05:34,550 --> 00:05:32,800
faust space news

134
00:05:36,390 --> 00:05:34,560
good afternoon and congratulations on

135
00:05:37,990 --> 00:05:36,400
the successful deployment uh i just

136
00:05:40,950 --> 00:05:38,000
wanted to confirm we heard a lot about

137
00:05:43,350 --> 00:05:40,960
leading up to the launch about these 344

138
00:05:45,189 --> 00:05:43,360

single point failures at this point have

139
00:05:46,870 --> 00:05:45,199
all those been retired and if not what

140
00:05:48,629 --> 00:05:46,880
might be left that would be associated

141
00:05:52,469 --> 00:05:48,639
with other aspects of the spacecraft

142
00:05:56,309 --> 00:05:54,469
hi um my name is mike menzel i'm the

143
00:05:58,390 --> 00:05:56,319
mission systems engineer and there are

144
00:06:00,230 --> 00:05:58,400
49 single point failures out of the

145
00:06:02,309 --> 00:06:00,240
original 344

146
00:06:04,150 --> 00:06:02,319
that are not retired and will not be

147
00:06:05,189 --> 00:06:04,160
retired for the uh for the duration of

148
00:06:08,309 --> 00:06:05,199
the mission

149
00:06:10,309 --> 00:06:08,319
these 49 are typical of all missions

150
00:06:14,390 --> 00:06:10,319
things like propulsion tanks things like

151
00:06:16,309 --> 00:06:14,400
that and of those 49 15 are associated

152
00:06:18,629 --> 00:06:16,319
with the instruments which means

153
00:06:20,469 --> 00:06:18,639
if any one of them went such as a filter

154
00:06:22,070 --> 00:06:20,479
wheel failing we would not fail the

155
00:06:28,950 --> 00:06:22,080
mission we would just fail one of the

156
00:06:35,830 --> 00:06:30,710
thank you our next question is from

157
00:06:40,469 --> 00:06:38,230
hi um congratulations on the deployment

158
00:06:42,390 --> 00:06:40,479
i think for mike um

159
00:06:44,469 --> 00:06:42,400
given that there were no cameras to send

160
00:06:47,110 --> 00:06:44,479
back images is there anything for which

161
00:06:49,189 --> 00:06:47,120
you didn't have telemetry to now say the

162
00:06:51,830 --> 00:06:49,199
telescope looks exactly like the artist

163
00:06:53,510 --> 00:06:51,840

renderings or the computer animations or

164
00:07:03,589 --> 00:06:53,520
even the engineering tests we saw here

165
00:07:08,150 --> 00:07:05,670
well there are a couple of minor things

166
00:07:09,670 --> 00:07:08,160
that aren't telemetered but uh whereas

167
00:07:12,469 --> 00:07:09,680
if we don't have what we call primary

168
00:07:14,550 --> 00:07:12,479
telemetry we have secondary telemetry

169
00:07:16,950 --> 00:07:14,560
and that secondary telemetry gives us

170
00:07:20,230 --> 00:07:16,960
verification that what we think is going

171
00:07:21,909 --> 00:07:20,240
on really is going on so in reality

172
00:07:23,909 --> 00:07:21,919
given the secondary and primary

173
00:07:25,749 --> 00:07:23,919
telemetry points that we have the

174
00:07:27,749 --> 00:07:25,759
configuration of the observatory that we

175
00:07:30,070 --> 00:07:27,759
are we're demonstrating or illustrating

176
00:07:31,990 --> 00:07:30,080
is pretty accurate right now so i would

177
00:07:33,990 --> 00:07:32,000
i would say that you know whereas we

178
00:07:36,550 --> 00:07:34,000
might be missing certain primary

179
00:07:38,309 --> 00:07:36,560
telemetry on some certain items the

180
00:07:40,790 --> 00:07:38,319
secondary telemetry that we have really

181
00:07:46,550 --> 00:07:40,800
confirms that our configuration is as

182
00:07:50,150 --> 00:07:47,670
thank you

183
00:07:53,670 --> 00:07:50,160
our next question is from marina coron

184
00:07:59,749 --> 00:07:56,469
hi everyone congratulations uh two

185
00:08:01,830 --> 00:07:59,759
questions for mike and scott are

186
00:08:03,909 --> 00:08:01,840
you almost surprised the deployment

187
00:08:06,070 --> 00:08:03,919
sequence uh went as well as it did were

188
00:08:08,550 --> 00:08:06,080

you bracing for a more difficult diploma

189
00:08:10,790 --> 00:08:08,560
given how risky and complicated you

190
00:08:12,869 --> 00:08:10,800
expected this process to be

191
00:08:14,550 --> 00:08:12,879
uh and the second question were there

192
00:08:15,990 --> 00:08:14,560
any issues that came up during the

193
00:08:18,520 --> 00:08:16,000
deployment that you haven't told us

194
00:08:21,189 --> 00:08:18,530
about yet thanks

195
00:08:22,790 --> 00:08:21,199
[Laughter]

196
00:08:25,510 --> 00:08:22,800
i'm going to let mike answer the second

197
00:08:29,909 --> 00:08:27,510
you actually answered the first question

198
00:08:31,589 --> 00:08:29,919
in your question which is we worried

199
00:08:34,310 --> 00:08:31,599
about it on the ground

200
00:08:36,230 --> 00:08:34,320
what we focused on was you know design

201
00:08:38,430 --> 00:08:36,240
test verification

202
00:08:41,110 --> 00:08:38,440
and if need be redesign and re-test and

203
00:08:43,430 --> 00:08:41,120
re-verification so our entire objective

204
00:08:45,670 --> 00:08:43,440
was ring this out on the ground so that

205
00:08:47,910 --> 00:08:45,680
when we went into space and we followed

206
00:08:49,670 --> 00:08:47,920
that timeline we did expect that it

207
00:08:52,070 --> 00:08:49,680
would go right maybe we see something

208
00:08:54,630 --> 00:08:52,080
new we'd see a behavior of you know sun

209
00:08:56,230 --> 00:08:54,640
angle or how the thermal was or how

210
00:08:57,990 --> 00:08:56,240
certain things call it confessed to us

211
00:08:59,509 --> 00:08:58,000
but the reality was

212
00:09:00,949 --> 00:08:59,519
everything we did to bring our hands on

213
00:09:06,550 --> 00:09:00,959

the ground and have those sleepless

214
00:09:11,269 --> 00:09:08,550
okay so is there anything that we didn't

215
00:09:12,790 --> 00:09:11,279
tell you i doubt that seriously

216
00:09:14,630 --> 00:09:12,800
that there's always a couple of you know

217
00:09:17,030 --> 00:09:14,640
minor alarms that go off that's really

218
00:09:18,550 --> 00:09:17,040
more like uh uh housekeeping than

219
00:09:20,310 --> 00:09:18,560
anything else but other than that i

220
00:09:21,110 --> 00:09:20,320
think you were where you're aware of the

221
00:09:22,949 --> 00:09:21,120
uh

222
00:09:24,710 --> 00:09:22,959
of the incidents of the anomalies that

223
00:09:27,030 --> 00:09:24,720
have occurred and most of them by the

224
00:09:33,990 --> 00:09:27,040
way were very minor compared to the ones

225
00:09:39,910 --> 00:09:36,310
thank you our next question is from jim

226
00:09:45,430 --> 00:09:42,550
uh thank you for taking my question and

227
00:09:46,949 --> 00:09:45,440
congratulations to the entire team

228
00:09:49,509 --> 00:09:46,959
i noticed

229
00:09:51,350 --> 00:09:49,519
in looking at the

230
00:09:53,269 --> 00:09:51,360
photos and pictures

231
00:09:55,910 --> 00:09:53,279
the video that was on the screen that

232
00:09:58,870 --> 00:09:55,920
there were a number of people in the

233
00:10:00,790 --> 00:09:58,880
michigan michigan operation center and i

234
00:10:05,030 --> 00:10:00,800
assumed that there were others and other

235
00:10:07,829 --> 00:10:05,040
buildings or other rooms within the uh

236
00:10:11,110 --> 00:10:07,839
the building and i'm interested in

237
00:10:12,949 --> 00:10:11,120
uh roughly how many people were in the

238
00:10:15,910 --> 00:10:12,959

mission operations

239
00:10:17,910 --> 00:10:15,920
room during that uh that deployment and

240
00:10:19,829 --> 00:10:17,920
how many other people

241
00:10:21,990 --> 00:10:19,839
perhaps around the world were also

242
00:10:28,069 --> 00:10:22,000
involved in the deployment that we saw

243
00:10:32,710 --> 00:10:31,110
so we run in the entire mission ops

244
00:10:34,150 --> 00:10:32,720
center so it's not just the one room but

245
00:10:36,310 --> 00:10:34,160
in this section of the building that we

246
00:10:38,470 --> 00:10:36,320
consider the mission off center we run

247
00:10:39,910 --> 00:10:38,480
95 people for shift for deployment

248
00:10:41,350 --> 00:10:39,920
operations

249
00:10:42,870 --> 00:10:41,360
as far as around the world the other

250
00:10:44,790 --> 00:10:42,880
folks that were involved were actually

251
00:10:46,630 --> 00:10:44,800
out of north of grumman in the factory

252
00:10:48,710 --> 00:10:46,640
and they provided support in particular

253
00:10:49,990 --> 00:10:48,720
during the uh sunshield deployment where

254
00:10:52,230 --> 00:10:50,000
we had a

255
00:10:53,990 --> 00:10:52,240
our independent verification

256
00:10:55,670 --> 00:10:54,000
essentially engineering model full-scale

257
00:10:57,190 --> 00:10:55,680
engineering model all set up and it went

258
00:10:58,150 --> 00:10:57,200
through every step of the deployment

259
00:10:59,430 --> 00:10:58,160
with us

260
00:11:00,550 --> 00:10:59,440
so if we would have had a problem we

261
00:11:02,550 --> 00:11:00,560
would have been able to go back and look

262
00:11:07,750 --> 00:11:02,560
at that this help determine what the

263
00:11:13,030 --> 00:11:09,190

thank you our next question is from

264
00:11:15,590 --> 00:11:13,040
marcia dunn from associated press

265
00:11:17,990 --> 00:11:15,600
hello um question for you bill i'm i'm

266
00:11:19,910 --> 00:11:18,000
wondering if you think it's all downhill

267
00:11:22,630 --> 00:11:19,920
from here the first two weeks were

268
00:11:23,829 --> 00:11:22,640
obviously risky complicated never before

269
00:11:26,550 --> 00:11:23,839
attempted

270
00:11:29,190 --> 00:11:26,560
um if it was summoning mount everest

271
00:11:30,310 --> 00:11:29,200
landing on mars how do you view the rest

272
00:11:33,030 --> 00:11:30,320
of the

273
00:11:34,630 --> 00:11:33,040
mission actually and does the team get

274
00:11:37,030 --> 00:11:34,640
arrested or are you going to be moving

275
00:11:43,750 --> 00:11:37,040
immediately into the

276
00:11:50,470 --> 00:11:46,870
um it's not downhill from here

277
00:11:52,710 --> 00:11:50,480
it's all kind of a level playing field

278
00:11:53,910 --> 00:11:52,720
obviously with the like mike talked

279
00:11:56,150 --> 00:11:53,920
about the single point failures

280
00:11:58,150 --> 00:11:56,160
associated with deployments

281
00:11:59,509 --> 00:11:58,160
that was probably the highest risk part

282
00:12:01,509 --> 00:11:59,519
of the mission

283
00:12:03,269 --> 00:12:01,519
that doesn't mean all our risk goes away

284
00:12:04,949 --> 00:12:03,279
and doesn't mean we lose our intensity

285
00:12:06,710 --> 00:12:04,959
as far as

286
00:12:09,030 --> 00:12:06,720
maintaining our discipline for the

287
00:12:10,470 --> 00:12:09,040
mission

288
00:12:12,310 --> 00:12:10,480

you'll actually get more information

289
00:12:13,829 --> 00:12:12,320
about what comes next

290
00:12:15,750 --> 00:12:13,839
um but

291
00:12:17,430 --> 00:12:15,760
what we do next is we take the each of

292
00:12:19,829 --> 00:12:17,440
the individual mirror segments and we

293
00:12:26,230 --> 00:12:19,839
deploy them off of their

294
00:12:33,590 --> 00:12:27,910
thank you our next question is from

295
00:12:36,949 --> 00:12:35,670
thank you congratulations uh i'm not

296
00:12:40,870 --> 00:12:36,959
going to follow up on an earlier

297
00:12:42,389 --> 00:12:40,880
question um about making it look easy

298
00:12:44,550 --> 00:12:42,399
um you know there's a lot of talk before

299
00:12:45,430 --> 00:12:44,560
the mission about this being perhaps the

300
00:12:47,670 --> 00:12:45,440
most

301
00:12:48,710 --> 00:12:47,680
complicated spacecraft deployment in

302
00:12:51,030 --> 00:12:48,720
history

303
00:12:53,190 --> 00:12:51,040
in space

304
00:12:56,550 --> 00:12:53,200
you know you did make it look easy it

305
00:12:58,550 --> 00:12:56,560
was uh uh nearly perfect and uh just

306
00:13:00,629 --> 00:12:58,560
wondering in retrospect

307
00:13:01,990 --> 00:13:00,639
you know how would you rank this

308
00:13:03,030 --> 00:13:02,000
deployment

309
00:13:04,870 --> 00:13:03,040
process

310
00:13:07,110 --> 00:13:04,880
up against anything else that's been

311
00:13:09,269 --> 00:13:07,120
done in history and um

312
00:13:12,069 --> 00:13:09,279
uh just if you could

313
00:13:13,990 --> 00:13:12,079

take a like an after-action it's back on

314
00:13:20,150 --> 00:13:14,000
was it really as complicated as you said

315
00:13:25,110 --> 00:13:22,710
i'll take apart and let mike go but

316
00:13:26,310 --> 00:13:25,120
there's really two aspects one is the

317
00:13:27,990 --> 00:13:26,320
practice

318
00:13:30,150 --> 00:13:28,000
that we did on the ground but this was

319
00:13:32,949 --> 00:13:30,160
our fourth sunshield deployment so we

320
00:13:34,389 --> 00:13:32,959
did one as we integrated on the vehicle

321
00:13:36,389 --> 00:13:34,399
and then we did one at what's called the

322
00:13:37,910 --> 00:13:36,399
observatory level after the optics were

323
00:13:39,269 --> 00:13:37,920
integrated with the bus and the sun

324
00:13:41,829 --> 00:13:39,279
shield we did one before an

325
00:13:44,230 --> 00:13:41,839
environmental test and one after

326
00:13:46,230 --> 00:13:44,240
so this is our fourth shot at it and we

327
00:13:48,790 --> 00:13:46,240
learned in each of those successive

328
00:13:51,110 --> 00:13:48,800
pretty clean one on number three which

329
00:13:53,189 --> 00:13:51,120
verify that we worked after surviving a

330
00:13:55,189 --> 00:13:53,199
simulated rocket ride

331
00:13:57,430 --> 00:13:55,199
but the other thing is you design for

332
00:14:00,710 --> 00:13:57,440
worse case you design sometimes for

333
00:14:02,710 --> 00:14:00,720
worst worst case so within our design we

334
00:14:04,790 --> 00:14:02,720
always had margin to go to we had more

335
00:14:06,949 --> 00:14:04,800
motor power if we needed to drive it out

336
00:14:08,870 --> 00:14:06,959
we had more strength in something if we

337
00:14:11,670 --> 00:14:08,880
need to pull on it harder or push on it

338
00:14:13,670 --> 00:14:11,680

harder so you build in that because

339
00:14:15,829 --> 00:14:13,680
knowing surviving the first days in the

340
00:14:17,269 --> 00:14:15,839
first weeks often is the most stressing

341
00:14:19,030 --> 00:14:17,279
environment that a satellite goes

342
00:14:20,949 --> 00:14:19,040
through this is why they tend to last

343
00:14:23,110 --> 00:14:20,959
you know well beyond their their initial

344
00:14:25,509 --> 00:14:23,120
you know intended mission life so

345
00:14:27,590 --> 00:14:25,519
so you don't over design but you design

346
00:14:29,350 --> 00:14:27,600
for things that you can't always test so

347
00:14:31,670 --> 00:14:29,360
so analytically you make things worse

348
00:14:34,069 --> 00:14:31,680
case on the ground you push harder you

349
00:14:35,590 --> 00:14:34,079
go colder you go hotter and you do all

350
00:14:37,030 --> 00:14:35,600
that stuff on the ground so that you

351
00:14:38,550 --> 00:14:37,040
swim right in the middle of the lane

352
00:14:42,310 --> 00:14:38,560
after your launch so it's really a

353
00:14:45,030 --> 00:14:43,590
yeah and um

354
00:14:46,230 --> 00:14:45,040
in one of the other press conferences i

355
00:14:47,829 --> 00:14:46,240
pointed out that when it comes to the

356
00:14:48,790 --> 00:14:47,839
deployments of this observatory there

357
00:14:50,310 --> 00:14:48,800
are two

358
00:14:51,750 --> 00:14:50,320
kind of unique things about the

359
00:14:53,910 --> 00:14:51,760
deployments first

360
00:14:56,870 --> 00:14:53,920
was a sunshield and that was deploying

361
00:14:58,790 --> 00:14:56,880
large indeterministic floppity structure

362
00:15:00,790 --> 00:14:58,800
with a lot of cables a lot of you know

363
00:15:02,389 --> 00:15:00,800

tennis court size membranes that could

364
00:15:04,150 --> 00:15:02,399
float to places you don't want them to

365
00:15:05,509 --> 00:15:04,160
float to in zero g

366
00:15:07,189 --> 00:15:05,519
and you know through our testing and

367
00:15:09,189 --> 00:15:07,199
through our design we controlled that

368
00:15:10,870 --> 00:15:09,199
and northrop and the sunshield team did

369
00:15:12,629 --> 00:15:10,880
a great job on that

370
00:15:14,790 --> 00:15:12,639
the second part of our deployments are

371
00:15:16,949 --> 00:15:14,800
what i call precision deployments this

372
00:15:19,030 --> 00:15:16,959
we're actually you know rebuilding and

373
00:15:21,110 --> 00:15:19,040
retuning an optical and infrared

374
00:15:22,870 --> 00:15:21,120
telescope remotely

375
00:15:25,110 --> 00:15:22,880
and those deployments had to happen such

376
00:15:27,110 --> 00:15:25,120
that they position the mirrors

377
00:15:29,350 --> 00:15:27,120
accurately enough so that our wavefront

378
00:15:31,829 --> 00:15:29,360
sensing and control optical engineers

379
00:15:34,389 --> 00:15:31,839
can start taking that that state where

380
00:15:36,150 --> 00:15:34,399
they're in and tune a telescope so

381
00:15:37,749 --> 00:15:36,160
between the fact that we had large and

382
00:15:40,389 --> 00:15:37,759
deterministic deployments like the

383
00:15:42,550 --> 00:15:40,399
sunshield and we had large precision

384
00:15:45,030 --> 00:15:42,560
deployments like in the ote like in the

385
00:15:47,350 --> 00:15:45,040
telescope this has been a you know

386
00:15:54,710 --> 00:15:47,360
arguably the most challenging deployment

387
00:16:00,470 --> 00:15:56,470
thank you our next question is from

388
00:16:02,550 --> 00:16:00,480

david curley from the discovery channel

389
00:16:04,550 --> 00:16:02,560
thank you very much um bill if i could

390
00:16:06,389 --> 00:16:04,560
get you to come back up one more time

391
00:16:07,749 --> 00:16:06,399
you know we've heard this through uh

392
00:16:09,189 --> 00:16:07,759
this process of the last couple of

393
00:16:11,030 --> 00:16:09,199
months that

394
00:16:13,430 --> 00:16:11,040
great confidence

395
00:16:15,829 --> 00:16:13,440
but we had sleepless nights

396
00:16:17,509 --> 00:16:15,839
i get that but and i do hear relief in

397
00:16:18,870 --> 00:16:17,519
your voice especially to the answer to

398
00:16:21,430 --> 00:16:18,880
the first question

399
00:16:23,829 --> 00:16:21,440
can you just talk about that and then

400
00:16:25,990 --> 00:16:23,839
the bigger picture of the science

401
00:16:28,470 --> 00:16:26,000
when the first image from all the

402
00:16:30,629 --> 00:16:28,480
mirrors once they've been all set comes

403
00:16:36,790 --> 00:16:30,639
back and what what all this work has

404
00:16:40,550 --> 00:16:38,870
um as far as relief goes yes i mean

405
00:16:42,949 --> 00:16:40,560
there's obviously a huge

406
00:16:44,230 --> 00:16:42,959
feeling of relief

407
00:16:45,829 --> 00:16:44,240
a couple of times people have made

408
00:16:46,949 --> 00:16:45,839
comments about the easiness of the

409
00:16:48,310 --> 00:16:46,959
deployments

410
00:16:50,389 --> 00:16:48,320
just because we made it look easy

411
00:16:51,910 --> 00:16:50,399
doesn't mean it was easy

412
00:16:53,590 --> 00:16:51,920
but it is like i mentioned earlier just

413
00:16:56,069 --> 00:16:53,600

a tribute to everyone who's worked on

414
00:16:58,150 --> 00:16:56,079
this to get us through it but yes there

415
00:16:59,670 --> 00:16:58,160
was a huge sigh of relief i think you

416
00:17:01,509 --> 00:16:59,680
could see that if you watched the the

417
00:17:03,590 --> 00:17:01,519
video of us being in there

418
00:17:05,029 --> 00:17:03,600
today when that final mirror got latched

419
00:17:07,270 --> 00:17:05,039
and the folks in the back room were

420
00:17:09,110 --> 00:17:07,280
doing a wave we're all off giving each

421
00:17:10,470 --> 00:17:09,120
other high fives so that's all of a sign

422
00:17:12,390 --> 00:17:10,480
of relief

423
00:17:13,829 --> 00:17:12,400
as far as the first science goes um

424
00:17:16,630 --> 00:17:13,839
there will be a couple of science folks

425
00:17:19,110 --> 00:17:16,640
on the next panel they can discuss that

426
00:17:20,470 --> 00:17:19,120
but obviously we are all looking forward

427
00:17:22,710 --> 00:17:20,480
to that time when they release those

428
00:17:23,750 --> 00:17:22,720
first images and first spectrographs and

429
00:17:25,029 --> 00:17:23,760
spectrum

430
00:17:26,870 --> 00:17:25,039
and really talk about some of the

431
00:17:28,069 --> 00:17:26,880
amazing discoveries that we'll be making

432
00:17:30,870 --> 00:17:28,079
and demonstrating that we're gonna be

433
00:17:32,630 --> 00:17:30,880
making with jvst

434
00:17:36,230 --> 00:17:32,640
let them know how you feel nancy have

435
00:17:40,310 --> 00:17:38,710
so part of um i think making it look

436
00:17:42,630 --> 00:17:40,320
easy was

437
00:17:44,630 --> 00:17:42,640
we developed all our procedures

438
00:17:47,830 --> 00:17:44,640

very early we were

439
00:17:49,909 --> 00:17:47,840
using them back in panel integration

440
00:17:52,630 --> 00:17:49,919
we used them through int

441
00:17:54,710 --> 00:17:52,640
we tested as much flight like as we

442
00:17:56,789 --> 00:17:54,720
could from day one

443
00:17:59,029 --> 00:17:56,799
and so by the time we went through

444
00:18:01,430 --> 00:17:59,039
rehearsals and got here everyone who was

445
00:18:03,830 --> 00:18:01,440
supporting was very familiar

446
00:18:06,470 --> 00:18:03,840
with all the procedures did how they

447
00:18:08,950 --> 00:18:06,480
work and what to expect

448
00:18:10,310 --> 00:18:08,960
you know in terms of data return so

449
00:18:13,350 --> 00:18:10,320
we were lucky

450
00:18:16,870 --> 00:18:13,360
to some extent smart to some extent but

451
00:18:17,990 --> 00:18:16,880
everything you know was just very smooth

452
00:18:20,549 --> 00:18:18,000
and

453
00:18:27,270 --> 00:18:20,559
you know very predictable

454
00:18:32,390 --> 00:18:29,270
thank you our next question is from rhys

455
00:18:34,310 --> 00:18:32,400
nations from the well news washington

456
00:18:36,390 --> 00:18:34,320
d.c

457
00:18:38,070 --> 00:18:36,400
hey uh thanks for the call everyone

458
00:18:40,070 --> 00:18:38,080
pleasure to be hearing your voices

459
00:18:42,630 --> 00:18:40,080
congratulations on a successful mission

460
00:18:43,830 --> 00:18:42,640
um i just wanted to ask real quickly uh

461
00:18:46,070 --> 00:18:43,840
about the

462
00:18:47,909 --> 00:18:46,080
november payload processing incident

463
00:18:50,310 --> 00:18:47,919

where a client ban broke how close did

464
00:18:52,150 --> 00:18:50,320
that come to damaging the uh the vehicle

465
00:18:53,350 --> 00:18:52,160
and i would have that complicated the

466
00:18:54,710 --> 00:18:53,360
efforts from there going forward it

467
00:18:56,070 --> 00:18:54,720
seems that you guys touched on that

468
00:18:58,150 --> 00:18:56,080
earlier a little bit everything's going

469
00:19:04,870 --> 00:18:58,160
smoothly but uh was that cutting it a

470
00:19:07,990 --> 00:19:06,390
um so yeah i think you were talking

471
00:19:10,150 --> 00:19:08,000
about the clamp band innocent down at

472
00:19:12,710 --> 00:19:10,160
the launch site

473
00:19:13,990 --> 00:19:12,720
there was no damage to the spacecraft we

474
00:19:15,270 --> 00:19:14,000
proved that we proved that down to

475
00:19:17,029 --> 00:19:15,280
launch site through our testing that

476
00:19:19,350 --> 00:19:17,039
we've done we did some specific testing

477
00:19:21,909 --> 00:19:19,360
as well as learning the liveness test

478
00:19:23,510 --> 00:19:21,919
we've done a boatload of analysis

479
00:19:25,350 --> 00:19:23,520
to determine that the shock event that

480
00:19:27,270 --> 00:19:25,360
we saw did no damage to the spacecraft

481
00:19:29,110 --> 00:19:27,280
and we've demonstrated that today from a

482
00:19:30,789 --> 00:19:29,120
standpoint of deployments

483
00:19:36,710 --> 00:19:30,799
um so i hope that that answers your

484
00:19:42,549 --> 00:19:38,549
thank you our next question is from leo

485
00:19:44,789 --> 00:19:42,559
enright from irish television

486
00:19:47,430 --> 00:19:44,799
thanks very much uh for doing this and

487
00:19:48,789 --> 00:19:47,440
congratulations um the administrator a

488
00:19:52,789 --> 00:19:48,799

few minutes ago

489
00:19:53,590 --> 00:19:52,799
on nasa tv made a passing reference

490
00:19:54,549 --> 00:19:53,600
to

491
00:20:09,590 --> 00:19:54,559
a

492
00:20:10,750 --> 00:20:09,600
cruising speed which just fell

493
00:20:13,909 --> 00:20:10,760
to

494
00:20:17,430 --> 00:20:13,919
395 meters a second i mean you're not

495
00:20:18,470 --> 00:20:17,440
going much faster than a 747 jet at the

496
00:20:20,390 --> 00:20:18,480
moment

497
00:20:23,029 --> 00:20:20,400
and i'm just wondering what speed are

498
00:20:24,950 --> 00:20:23,039
you going to be doing when you get up

499
00:20:26,549 --> 00:20:24,960
the hill to l2

500
00:20:29,430 --> 00:20:26,559
and is there anything that really

501
00:20:31,750 --> 00:20:29,440
worries you about that burn or are you

502
00:20:39,590 --> 00:20:31,760
comfortable that you already had enough

503
00:20:44,789 --> 00:20:41,590
yeah the the burn you're referring to is

504
00:20:46,149 --> 00:20:44,799
uh what we call the mcc to burn and to

505
00:20:47,750 --> 00:20:46,159
be honest with you we're not at all

506
00:20:49,750 --> 00:20:47,760
worried about it it's a very minor burn

507
00:20:50,549 --> 00:20:49,760
i don't actually have the delta v at you

508
00:20:52,870 --> 00:20:50,559
know

509
00:20:54,470 --> 00:20:52,880
available right now but uh it's a very

510
00:20:56,950 --> 00:20:54,480
minor burn it would be done at about

511
00:20:59,669 --> 00:20:56,960
launch plus 29 days

512
00:21:02,230 --> 00:20:59,679
and after that burn we pretty much

513
00:21:05,029 --> 00:21:02,240

actually fall into the orbit around the

514
00:21:06,789 --> 00:21:05,039
l2 point so we do have to do the burn

515
00:21:08,950 --> 00:21:06,799
but in terms of its timing and in terms

516
00:21:11,270 --> 00:21:08,960
of its delta v compared to some of the

517
00:21:13,669 --> 00:21:11,280
other burns we've already successfully

518
00:21:16,549 --> 00:21:13,679
um accomplished and you know and

519
00:21:18,549 --> 00:21:16,559
implemented this isn't all that critical

520
00:21:20,470 --> 00:21:18,559
so you know and

521
00:21:24,789 --> 00:21:20,480
we're not that worried about this burn

522
00:21:31,029 --> 00:21:26,390
thank you our next question is from

523
00:21:34,470 --> 00:21:32,950
thanks so much i've been interested in

524
00:21:35,830 --> 00:21:34,480
hearing from the northrop grumman

525
00:21:38,390 --> 00:21:35,840
representatives

526
00:21:41,430 --> 00:21:38,400
how this all looks from their standpoint

527
00:21:44,230 --> 00:21:41,440
it's been a long haul to get james webb

528
00:21:45,990 --> 00:21:44,240
built and probably many more years than

529
00:21:47,350 --> 00:21:46,000
northrop grumman had planned so i'm

530
00:21:48,950 --> 00:21:47,360
curious about how it looks from a

531
00:21:50,310 --> 00:21:48,960
corporate perspective and what lessons

532
00:21:52,549 --> 00:21:50,320
you may have learned on this program

533
00:21:55,029 --> 00:21:52,559
that can be applicable to others

534
00:21:57,669 --> 00:21:55,039
and i'm also curious about the

535
00:21:58,710 --> 00:21:57,679
visualization tool that nasa's been

536
00:22:00,710 --> 00:21:58,720
showing

537
00:22:02,230 --> 00:22:00,720
and which has been very very helpful and

538
00:22:04,390 --> 00:22:02,240

i'm curious is that something norfolk

539
00:22:05,190 --> 00:22:04,400
grumman developed or where did that come

540
00:22:07,350 --> 00:22:05,200
from

541
00:22:09,350 --> 00:22:07,360
and my last question is what is northrop

542
00:22:11,350 --> 00:22:09,360
grumman's role going forward are you

543
00:22:14,070 --> 00:22:11,360
going to be involved in

544
00:22:18,149 --> 00:22:14,080
operations from here on or is your job

545
00:22:21,990 --> 00:22:20,070
um let me address a little and have

546
00:22:24,230 --> 00:22:22,000
events come up the one thing that made

547
00:22:26,950 --> 00:22:24,240
this special for us is

548
00:22:29,909 --> 00:22:26,960
as northrop as an industry

549
00:22:31,190 --> 00:22:29,919
uh player works with nasa

550
00:22:33,190 --> 00:22:31,200
it's different than most of our

551
00:22:35,110 --> 00:22:33,200
customers because nasa designs and

552
00:22:37,350 --> 00:22:35,120
builds and tests things so

553
00:22:39,029 --> 00:22:37,360
we're going to their shop at goddard and

554
00:22:41,909 --> 00:22:39,039
we're watching hardware get built and

555
00:22:43,510 --> 00:22:41,919
tested on shaker tables or at johnson as

556
00:22:45,270 --> 00:22:43,520
we're building so

557
00:22:47,029 --> 00:22:45,280
so you know when you talk about i'll

558
00:22:49,110 --> 00:22:47,039
call it a lesson learn but certainly

559
00:22:51,110 --> 00:22:49,120
what we learned to do was collaborate at

560
00:22:52,789 --> 00:22:51,120
an engineering level that's how you make

561
00:22:54,470 --> 00:22:52,799
something there's no way

562
00:22:57,190 --> 00:22:54,480
any one company could have done the

563
00:22:59,029 --> 00:22:57,200

james webb space telescope so as a as a

564
00:23:01,190 --> 00:22:59,039
company working joint with nasa as we

565
00:23:02,870 --> 00:23:01,200
had back on the chandra x-ray telescope

566
00:23:05,430 --> 00:23:02,880
and the compton gamma-ray telescope we

567
00:23:07,430 --> 00:23:05,440
have decades of experience of building

568
00:23:08,950 --> 00:23:07,440
things together which sometimes can

569
00:23:10,950 --> 00:23:08,960
create tension but you hope it's a

570
00:23:13,190 --> 00:23:10,960
healthy tension as engineers debate and

571
00:23:15,590 --> 00:23:13,200
that brings out the best of you and then

572
00:23:17,270 --> 00:23:15,600
it's you know okay what we agreed to and

573
00:23:19,590 --> 00:23:17,280
and bill and i will often broker that

574
00:23:21,190 --> 00:23:19,600
for the teams and then go focus on it

575
00:23:23,270 --> 00:23:21,200
and get it done so

576
00:23:26,470 --> 00:23:23,280
so i think that that that relationship

577
00:23:27,669 --> 00:23:26,480
you know got perfected over the years um

578
00:23:29,190 --> 00:23:27,679
you know from a lessons learned

579
00:23:30,870 --> 00:23:29,200
perspective i always look at the

580
00:23:32,950 --> 00:23:30,880
management perspective what does it take

581
00:23:34,789 --> 00:23:32,960
to manage something this big this

582
00:23:36,630 --> 00:23:34,799
complex how do you make

583
00:23:38,390 --> 00:23:36,640
risk-based decisions there isn't a

584
00:23:40,549 --> 00:23:38,400
meeting we usually walked out of where

585
00:23:42,630 --> 00:23:40,559
we just focused on plan a where we

586
00:23:44,149 --> 00:23:42,640
didn't say where is plan b

587
00:23:45,350 --> 00:23:44,159
where were we going to be ready if we

588
00:23:46,950 --> 00:23:45,360

had to make a difference you know

589
00:23:48,789 --> 00:23:46,960
something the result doesn't come out we

590
00:23:50,870 --> 00:23:48,799
don't want to run a test before knowing

591
00:23:52,630 --> 00:23:50,880
what to expect as the results so we're

592
00:23:54,710 --> 00:23:52,640
not reacting after the fact we're

593
00:23:56,230 --> 00:23:54,720
preparing before the fact and that's

594
00:23:57,510 --> 00:23:56,240
where we brought the best out of each

595
00:24:00,230 --> 00:23:57,520
other um

596
00:24:02,149 --> 00:24:00,240
i'll let you know miker or bill talk

597
00:24:03,990 --> 00:24:02,159
about the visualization tool but in

598
00:24:06,230 --> 00:24:04,000
terms of the future we are part of the

599
00:24:08,230 --> 00:24:06,240
operations we have a test bed we have an

600
00:24:10,390 --> 00:24:08,240
electrical test bed also in addition to

601
00:24:12,070 --> 00:24:10,400
a mechanical test bed that we'll have up

602
00:24:14,070 --> 00:24:12,080
and running if there's software patches

603
00:24:15,350 --> 00:24:14,080
if there's questions on orbit we'll run

604
00:24:16,870 --> 00:24:15,360
those back you don't want to do

605
00:24:18,630 --> 00:24:16,880
something for a first time in a vehicle

606
00:24:20,630 --> 00:24:18,640
you don't have to do so we'll

607
00:24:22,070 --> 00:24:20,640
demonstrate that i'm going to add a

608
00:24:23,669 --> 00:24:22,080
little vents

609
00:24:25,110 --> 00:24:23,679
yeah i would just say you know certainly

610
00:24:27,510 --> 00:24:25,120
there's a lot of lessons learned from an

611
00:24:28,870 --> 00:24:27,520
int perspective which is really my most

612
00:24:31,110 --> 00:24:28,880
of my background

613
00:24:33,510 --> 00:24:31,120

it was incredibly complex i mean just

614
00:24:35,269 --> 00:24:33,520
for us to for the iva that bill was

615
00:24:37,830 --> 00:24:35,279
talking about back at the factory it

616
00:24:40,149 --> 00:24:37,840
took that team 45 days to fold it back

617
00:24:42,950 --> 00:24:40,159
up and stow it so that we could deploy

618
00:24:44,310 --> 00:24:42,960
as we watched the deployments here live

619
00:24:45,830 --> 00:24:44,320
and then when you look at you know you

620
00:24:47,990 --> 00:24:45,840
look at the sun shield and everybody's

621
00:24:49,909 --> 00:24:48,000
asking is it really that complicated if

622
00:24:50,870 --> 00:24:49,919
if you look at the guts of that right

623
00:24:53,350 --> 00:24:50,880
it's

624
00:24:55,190 --> 00:24:53,360
feet and feet of cables and pulleys and

625
00:24:57,669 --> 00:24:55,200
dog houses and clips

626
00:25:00,950 --> 00:24:57,679
all this stuff that has to work perfect

627
00:25:03,110 --> 00:25:00,960
i mean are you kidding me it is complex

628
00:25:05,669 --> 00:25:03,120
but it's a tribute to

629
00:25:08,149 --> 00:25:05,679
the technicians and engineers that last

630
00:25:09,750 --> 00:25:08,159
touched the satellite at space park they

631
00:25:11,190 --> 00:25:09,760
just diligently made sure that

632
00:25:13,190 --> 00:25:11,200
everything they did was going to be

633
00:25:15,029 --> 00:25:13,200
perfect and that's why we just had the

634
00:25:16,950 --> 00:25:15,039
best deployment of the sun shield that

635
00:25:19,750 --> 00:25:16,960
we've had in the four times that we've

636
00:25:22,710 --> 00:25:19,760
done it so uh congratulations to those

637
00:25:28,950 --> 00:25:25,510
thank you our next visualization tool is

638
00:25:30,549 --> 00:25:28,960

actually part i apologize

639
00:25:32,470 --> 00:25:30,559
yeah the visualization tool is actually

640
00:25:34,789 --> 00:25:32,480
part of the ground system uh was

641
00:25:36,870 --> 00:25:34,799
provided by raytheon out of denver

642
00:25:38,470 --> 00:25:36,880
um and basically it's made up of our

643
00:25:40,870 --> 00:25:38,480
various

644
00:25:42,230 --> 00:25:40,880
drawings of the telescope that we've

645
00:25:43,590 --> 00:25:42,240
taken and converted they converted into

646
00:25:45,029 --> 00:25:43,600
an animation

647
00:25:47,430 --> 00:25:45,039
but the whole thing is driven by

648
00:25:49,750 --> 00:25:47,440
telemetry from the spacecraft

649
00:25:51,269 --> 00:25:49,760
such that as as the configuration

650
00:25:59,669 --> 00:25:51,279
changed on the spacecraft we could see

651
00:26:04,630 --> 00:26:01,110
thank you our next question is from

652
00:26:07,430 --> 00:26:04,640
alicia sowers from mashable

653
00:26:08,950 --> 00:26:07,440
hi thank you uh for taking my questions

654
00:26:11,909 --> 00:26:08,960
congratulations

655
00:26:13,510 --> 00:26:11,919
um the observatory hasn't reached its

656
00:26:15,750 --> 00:26:13,520
destination yet and all of these

657
00:26:18,470 --> 00:26:15,760
deployments have occurred while web is

658
00:26:20,149 --> 00:26:18,480
traveling um to l2 so

659
00:26:22,630 --> 00:26:20,159
i'm just kind of wondering is there any

660
00:26:25,430 --> 00:26:22,640
risk that the structures could be

661
00:26:28,710 --> 00:26:25,440
damaged or come out of alignment as it

662
00:26:30,630 --> 00:26:28,720
continues um toward its destination

663
00:26:32,710 --> 00:26:30,640

and the other thing i wanted to ask was

664
00:26:34,710 --> 00:26:32,720
um you know you've got a really large

665
00:26:36,549 --> 00:26:34,720
audience right now on the edge of their

666
00:26:37,909 --> 00:26:36,559
seats for web

667
00:26:39,750 --> 00:26:37,919
and i'm just wondering you know there's

668
00:26:41,669 --> 00:26:39,760
a long time between now

669
00:26:42,710 --> 00:26:41,679
and june when we're going to see those

670
00:26:44,549 --> 00:26:42,720
images

671
00:26:47,669 --> 00:26:44,559
i'm wondering if there are any uh

672
00:26:49,909 --> 00:26:47,679
upcoming milestones that uh people can

673
00:26:55,909 --> 00:26:49,919
look forward to in the meantime thank

674
00:26:59,750 --> 00:26:57,830
there are no there are no dangers to the

675
00:27:00,950 --> 00:26:59,760
to the structure by virtue of where we

676
00:27:03,269 --> 00:27:00,960
are in the orbit where we are in the

677
00:27:05,029 --> 00:27:03,279
orbit right now is a very benign a very

678
00:27:07,430 --> 00:27:05,039
benign trajectory and as i said before

679
00:27:09,510 --> 00:27:07,440
we're literally after the mcc-2 will

680
00:27:10,470 --> 00:27:09,520
literally fall into orbit around the l2

681
00:27:11,909 --> 00:27:10,480
point

682
00:27:14,630 --> 00:27:11,919
and then for the other the other

683
00:27:16,070 --> 00:27:14,640
question was um

684
00:27:17,909 --> 00:27:16,080
well what's coming up you'll hear that

685
00:27:27,190 --> 00:27:17,919
on the that's a better question for the

686
00:27:32,950 --> 00:27:28,789
thank you our next question is from

687
00:27:35,590 --> 00:27:32,960
irene klotz aviation week

688
00:27:37,430 --> 00:27:35,600

good afternoon um for northrep grumman

689
00:27:40,950 --> 00:27:37,440
uh probably mr willoughby

690
00:27:43,830 --> 00:27:40,960
does the deployment uh complete a uh the

691
00:27:46,710 --> 00:27:43,840
jwst primary contract and then you

692
00:27:49,350 --> 00:27:46,720
switch over to the technical support

693
00:27:51,029 --> 00:27:49,360
um or is it all still part of the same

694
00:27:53,190 --> 00:27:51,039
contract or did that

695
00:27:57,590 --> 00:27:53,200
initial contract complete when the

696
00:27:59,590 --> 00:27:57,600
telescope was turned over to nasa

697
00:28:01,110 --> 00:27:59,600
so our primary contract goes to launch

698
00:28:03,430 --> 00:28:01,120
plus one year

699
00:28:05,190 --> 00:28:03,440
we did have bill and i a signing party

700
00:28:07,990 --> 00:28:05,200
down at the launch base when we do

701
00:28:09,990 --> 00:28:08,000
what's called the dd250 so that transfer

702
00:28:11,350 --> 00:28:10,000
of ownership of the vehicle

703
00:28:14,630 --> 00:28:11,360
because we had a you know as we

704
00:28:16,630 --> 00:28:14,640
completed out putting the final mli and

705
00:28:18,710 --> 00:28:16,640
parts on the vehicle so but with that

706
00:28:21,350 --> 00:28:18,720
that's still under our prime contract so

707
00:28:23,029 --> 00:28:21,360
as in terms of that responsibility

708
00:28:24,710 --> 00:28:23,039
certainly commissioning for the next six

709
00:28:25,669 --> 00:28:24,720
months and six months of science

710
00:28:27,350 --> 00:28:25,679
missions

711
00:28:34,149 --> 00:28:27,360
and then we'll transition to what's

712
00:28:39,590 --> 00:28:36,149
thank you our next question is from ken

713
00:28:41,269 --> 00:28:39,600

kramer space up close

714
00:28:43,350 --> 00:28:41,279
hi thank you for doing this taking my

715
00:28:46,389 --> 00:28:43,360
question and congratulations on the

716
00:28:48,230 --> 00:28:46,399
spectacular success there um my question

717
00:28:50,230 --> 00:28:48,240
is about uh

718
00:28:51,510 --> 00:28:50,240
lessons learned you've accomplished this

719
00:28:53,430 --> 00:28:51,520
great deployment what what are the

720
00:28:55,190 --> 00:28:53,440
lessons learned going forward and how

721
00:28:57,990 --> 00:28:55,200
would you apply this

722
00:28:59,990 --> 00:28:58,000
to larger larger deployable telescopes i

723
00:29:03,269 --> 00:29:00,000
wonder if you could speculate what what

724
00:29:11,590 --> 00:29:03,279
is possible beyond web now that you have

725
00:29:16,070 --> 00:29:14,149
okay well well well in terms of lessons

726
00:29:18,070 --> 00:29:16,080
learned we're compiling that a lot of us

727
00:29:20,310 --> 00:29:18,080
are compiling that now i think it's

728
00:29:22,070 --> 00:29:20,320
a little too premature for me to to

729
00:29:24,630 --> 00:29:22,080
comment on that honestly

730
00:29:26,789 --> 00:29:24,640
uh our deployments went so smooth you

731
00:29:28,870 --> 00:29:26,799
know uh it would be hard right now to

732
00:29:31,029 --> 00:29:28,880
have some obvious lessons learned from

733
00:29:32,870 --> 00:29:31,039
that we probably uh you know when i

734
00:29:35,110 --> 00:29:32,880
caucus with the engineering teams and we

735
00:29:37,110 --> 00:29:35,120
start compiling our lessons learned it

736
00:29:38,950 --> 00:29:37,120
might be some of the telemetries that we

737
00:29:41,830 --> 00:29:38,960
found a little funny maybe some

738
00:29:44,149 --> 00:29:41,840

telemetry extra secondary proceeds

739
00:29:46,389 --> 00:29:44,159
secondary telemetry procedures that we

740
00:29:47,990 --> 00:29:46,399
might want to do things like that

741
00:29:49,750 --> 00:29:48,000
so right now

742
00:29:51,830 --> 00:29:49,760
the honest answer would be too uh too

743
00:29:54,149 --> 00:29:51,840
early for me to give you some some real

744
00:29:57,350 --> 00:29:54,159
definitive lessons learned from this but

745
00:29:58,710 --> 00:29:57,360
overall it went smoothly and uh you know

746
00:30:01,190 --> 00:29:58,720
i think the lessons learned would be

747
00:30:03,669 --> 00:30:01,200
something along the lines of uh hey

748
00:30:05,430 --> 00:30:03,679
here's how we should plan contingencies

749
00:30:07,029 --> 00:30:05,440
here's how we should uh

750
00:30:09,029 --> 00:30:07,039
you know

751
00:30:11,430 --> 00:30:09,039
provide other telemetry points things

752
00:30:13,430 --> 00:30:11,440
like that

753
00:30:15,029 --> 00:30:13,440
i'd like to add a little bit you talk

754
00:30:16,389 --> 00:30:15,039
about what's next we proved that we

755
00:30:18,549 --> 00:30:16,399
could build a telescope bigger than the

756
00:30:20,789 --> 00:30:18,559
top of the rocket right i mean something

757
00:30:22,070 --> 00:30:20,799
that had to be folded the optics itself

758
00:30:23,190 --> 00:30:22,080
right the sun shield that had to be

759
00:30:26,310 --> 00:30:23,200
stowed

760
00:30:28,870 --> 00:30:26,320
and in that we learned in a positive way

761
00:30:30,070 --> 00:30:28,880
that how you test and how you test like

762
00:30:31,830 --> 00:30:30,080
you fly

763
00:30:33,590 --> 00:30:31,840

which is always the number one mantra

764
00:30:35,350 --> 00:30:33,600
and what you do right on the ground we

765
00:30:37,190 --> 00:30:35,360
had to come up with alternate ways so

766
00:30:38,470 --> 00:30:37,200
when we had a sun shield too big for the

767
00:30:41,430 --> 00:30:38,480
chamber

768
00:30:43,430 --> 00:30:41,440
we took that we scaled it to one third

769
00:30:45,430 --> 00:30:43,440
every feature perfect to a one third

770
00:30:47,990 --> 00:30:45,440
scale put it in the chamber took our

771
00:30:50,630 --> 00:30:48,000
computer model scale that to a one third

772
00:30:53,510 --> 00:30:50,640
test correlated the model so we did have

773
00:30:55,430 --> 00:30:53,520
a cornering in terms of a test verified

774
00:30:58,549 --> 00:30:55,440
and then dimensionally controlled it as

775
00:31:00,710 --> 00:30:58,559
we scaled it out right so so the team

776
00:31:02,950 --> 00:31:00,720
found solutions where we were to some

777
00:31:03,750 --> 00:31:02,960
degree limited by the physics right and

778
00:31:07,350 --> 00:31:03,760
and

779
00:31:09,430 --> 00:31:07,360
that's what i call a hugely positive

780
00:31:11,190 --> 00:31:09,440
lesson learned because i don't think our

781
00:31:13,029 --> 00:31:11,200
appetite is going to get smaller from

782
00:31:15,190 --> 00:31:13,039
web right so when you look at that we're

783
00:31:16,870 --> 00:31:15,200
going to have similar limitations

784
00:31:18,310 --> 00:31:16,880
and we have now evidence and we're going

785
00:31:20,470 --> 00:31:18,320
to be building more certainly over the

786
00:31:22,549 --> 00:31:20,480
next you know five and a half months of

787
00:31:24,950 --> 00:31:22,559
how our ability to correlate models and

788
00:31:27,350 --> 00:31:24,960

subscale articles and then scale it up

789
00:31:28,789 --> 00:31:27,360
and predict it right now thermals got a

790
00:31:34,710 --> 00:31:28,799
lot of thumbs up in there in terms of

791
00:31:44,070 --> 00:31:36,710
thank you our next question is from

792
00:31:49,509 --> 00:31:47,269
thank you uh my question is uh

793
00:31:51,669 --> 00:31:49,519
there are a lot of people wondering here

794
00:31:53,830 --> 00:31:51,679
what programming languages were used for

795
00:31:56,630 --> 00:31:53,840
the onboard software

796
00:31:59,590 --> 00:31:56,640
how did you handle the computational

797
00:32:02,710 --> 00:31:59,600
redundancy uh thank you thank you for

798
00:32:05,110 --> 00:32:02,720
your amazing work and and i hope you

799
00:32:10,789 --> 00:32:05,120
hear more most about the

800
00:32:14,630 --> 00:32:12,549
processor languages

801
00:32:16,389 --> 00:32:14,640
it's a good question i think it's c plus

802
00:32:17,669 --> 00:32:16,399
plus yes

803
00:32:19,509 --> 00:32:17,679
okay well uh

804
00:32:20,870 --> 00:32:19,519
for our language it's i believe it's c

805
00:32:22,630 --> 00:32:20,880
plus plus

806
00:32:25,430 --> 00:32:22,640
and uh i wasn't sure i caught the other

807
00:32:27,830 --> 00:32:25,440
part of your question the redundancies

808
00:32:30,149 --> 00:32:27,840
everything yeah our our ctr our our

809
00:32:32,149 --> 00:32:30,159
computers were fully redundant

810
00:32:33,909 --> 00:32:32,159
and uh i think

811
00:32:39,190 --> 00:32:33,919
that's about as much as i understood the

812
00:32:41,750 --> 00:32:40,950
thank you thank you for all and what

813
00:32:46,630 --> 00:32:41,760

what

814
00:32:49,110 --> 00:32:46,640
the james webb telescope

815
00:32:57,190 --> 00:32:49,120
and i'm wondering if you can extend

816
00:32:59,990 --> 00:32:57,990
well

817
00:33:01,509 --> 00:33:00,000
uh when it comes to the james webb space

818
00:33:03,350 --> 00:33:01,519
telescope life

819
00:33:05,110 --> 00:33:03,360
um right now uh when we launched by

820
00:33:06,230 --> 00:33:05,120
design our limiting resource was

821
00:33:08,710 --> 00:33:06,240
propellant

822
00:33:10,549 --> 00:33:08,720
and and right now because of uh the the

823
00:33:13,509 --> 00:33:10,559
efficiency or the accuracy with which

824
00:33:15,669 --> 00:33:13,519
airing put us on orbit and our uh

825
00:33:18,230 --> 00:33:15,679
accuracy and effectiveness instead of

826
00:33:20,230 --> 00:33:18,240
implementing our mid-course corrections

827
00:33:22,789 --> 00:33:20,240
we have uh quite a bit of fuel margin

828
00:33:24,549 --> 00:33:22,799
right now relative to 10 years uh you

829
00:33:27,029 --> 00:33:24,559
know roughly speaking it's around 20

830
00:33:32,389 --> 00:33:27,039
years of propellant roughly speaking and

831
00:33:42,470 --> 00:33:34,230
thank you our next question is from lee

832
00:33:42,480 --> 00:33:47,029
the roof your line is open

833
00:33:52,149 --> 00:33:49,669
yes hello uh thanks for doing this and

834
00:33:54,630 --> 00:33:52,159
thanks for taking my question i'm uh

835
00:33:55,990 --> 00:33:54,640
talking to you from huntsville where we

836
00:33:57,190 --> 00:33:56,000
have been following this people been

837
00:33:59,909 --> 00:33:57,200
following this

838
00:34:01,909 --> 00:33:59,919

uh really closely since the launch and

839
00:34:04,630 --> 00:34:01,919
uh i know that we

840
00:34:07,269 --> 00:34:04,640
uh some folks down here built the the

841
00:34:08,790 --> 00:34:07,279
sun shields and some other contributions

842
00:34:11,190 --> 00:34:08,800
just like is there anyone that could

843
00:34:13,109 --> 00:34:11,200
tell me uh you know how uh how did

844
00:34:16,950 --> 00:34:13,119
everything that we contributed to you

845
00:34:20,310 --> 00:34:18,550
yeah there was a lot of contributions

846
00:34:22,149 --> 00:34:20,320
from huntsville i remember going down

847
00:34:24,790 --> 00:34:22,159
after we completed the first sunshield

848
00:34:26,950 --> 00:34:24,800
layer so those big silver diamond shaped

849
00:34:28,629 --> 00:34:26,960
you know patterns five of them that give

850
00:34:30,069 --> 00:34:28,639
us this 600 degree fahrenheit

851
00:34:32,149 --> 00:34:30,079
differential

852
00:34:33,909 --> 00:34:32,159
right now look wonderful we're already

853
00:34:36,629 --> 00:34:33,919
seeing something on the order of about

854
00:34:38,950 --> 00:34:36,639
500 degrees and the differential between

855
00:34:41,669 --> 00:34:38,960
those layers so with nexol down there

856
00:34:43,589 --> 00:34:41,679
they did a wonderful job the optics were

857
00:34:46,629 --> 00:34:43,599
also tested at marshall space flight

858
00:34:49,190 --> 00:34:46,639
center uh six at a time once uh with

859
00:34:51,430 --> 00:34:49,200
just bare beryllium to 150 nanometers of

860
00:34:53,750 --> 00:34:51,440
surface figure accuracy and then again

861
00:34:55,589 --> 00:34:53,760
after being um you know coated with

862
00:34:57,349 --> 00:34:55,599
their their gold reflective layer for

863
00:34:59,270 --> 00:34:57,359

infrared down to better than 20

864
00:35:01,430 --> 00:34:59,280
nanometers and that's where laser

865
00:35:03,109 --> 00:35:01,440
interferometry techniques were perfected

866
00:35:05,829 --> 00:35:03,119
so greatly they're used now for

867
00:35:07,990 --> 00:35:05,839
ophthalmology and lasik so so in

868
00:35:10,230 --> 00:35:08,000
huntsville between marshall and nexon in

869
00:35:11,589 --> 00:35:10,240
particular uh tremendous contributions i

870
00:35:13,510 --> 00:35:11,599
remember being down there for that later

871
00:35:15,829 --> 00:35:13,520
one i got i got a coin from the mayor of

872
00:35:17,670 --> 00:35:15,839
huntsville um there still got it on my

873
00:35:19,829 --> 00:35:17,680
shelf with all my other coins so it was

874
00:35:23,109 --> 00:35:19,839
a proud moment for for me and for the

875
00:35:26,230 --> 00:35:24,630
thank you and that is all the time we

876
00:35:28,310 --> 00:35:26,240
have for the first question and answer

877
00:35:30,390 --> 00:35:28,320
session we will now move on to the next

878
00:35:34,870 --> 00:35:30,400
set of speakers and hold another q a

879
00:35:38,950 --> 00:35:36,550
thank you so much

880
00:35:41,030 --> 00:35:38,960
thank you to all of our speakers i will

881
00:35:42,230 --> 00:35:41,040
encourage you to step off and we will

882
00:35:44,710 --> 00:35:42,240
get our

883
00:35:48,310 --> 00:35:44,720
new group up here thank you so much

884
00:35:52,470 --> 00:35:50,790
and we have the next group coming in

885
00:35:56,710 --> 00:35:52,480
filing in behind me

886
00:36:03,030 --> 00:35:58,870
i'll let the noise go on behind me for a

887
00:36:05,030 --> 00:36:03,040
moment as we mentioned this will be a

888
00:36:08,230 --> 00:36:05,040

section where we start focusing on

889
00:36:10,790 --> 00:36:08,240
what's coming up next uh for anybody for

890
00:36:12,310 --> 00:36:10,800
the last session who uh didn't get a

891
00:36:13,910 --> 00:36:12,320
question completely answered or has some

892
00:36:15,190 --> 00:36:13,920
more follow-up as always go ahead and

893
00:36:17,190 --> 00:36:15,200
write someone in the nasa office of

894
00:36:19,270 --> 00:36:17,200
communications and we will get you an

895
00:36:21,109 --> 00:36:19,280
answer or any more details

896
00:36:23,750 --> 00:36:21,119
but for now moving on

897
00:36:25,670 --> 00:36:23,760
to our second group

898
00:36:27,910 --> 00:36:25,680
we have today

899
00:36:31,510 --> 00:36:27,920
john derning the web deputy project

900
00:36:34,069 --> 00:36:31,520
manager at nasa goddard lee feinberg the

901
00:36:36,470 --> 00:36:34,079
web optical telescope element manager at

902
00:36:38,870 --> 00:36:36,480
nasa goddard jane rigby

903
00:36:40,950 --> 00:36:38,880
web operations project scientist at nasa

904
00:36:43,349 --> 00:36:40,960
goddard and heidi hamill the vice

905
00:36:45,430 --> 00:36:43,359
president for science at aura which

906
00:36:47,349 --> 00:36:45,440
manages the space telescope science

907
00:36:49,829 --> 00:36:47,359
institute we're going to have the exact

908
00:36:51,990 --> 00:36:49,839
same plan as before we'll have a couple

909
00:36:53,670 --> 00:36:52,000
of opening remarks from john derning and

910
00:36:55,430 --> 00:36:53,680
then we will switch right into the bulk

911
00:36:57,589 --> 00:36:55,440
of the time being for questions as

912
00:37:00,470 --> 00:36:57,599
before you would press star one to get

913
00:37:01,990 --> 00:37:00,480

yourself into the queue for questions so

914
00:37:03,430 --> 00:37:02,000
with that

915
00:37:06,710 --> 00:37:03,440
passing off

916
00:37:11,430 --> 00:37:08,710
well hello yes my name is john derning

917
00:37:13,510 --> 00:37:11,440
uh let's see the last two weeks 14 days

918
00:37:14,710 --> 00:37:13,520
have been a spectacular success and set

919
00:37:17,430 --> 00:37:14,720
the table

920
00:37:18,310 --> 00:37:17,440
for the fantastic sciences to come

921
00:37:20,069 --> 00:37:18,320
so

922
00:37:23,190 --> 00:37:20,079
on our panel we have two scientists to

923
00:37:26,950 --> 00:37:23,200
talk about that but in the next 15 days

924
00:37:29,990 --> 00:37:26,960
uh we're gonna uh get to our and uh

925
00:37:33,430 --> 00:37:30,000
let's talk okay then the next 15 days or

926
00:37:36,870 --> 00:37:33,440
at 15 days from now january 20 23rd we

927
00:37:38,310 --> 00:37:36,880
will arrive at our l2 insertion location

928
00:37:41,430 --> 00:37:38,320
and then we'll fire as we talked about

929
00:37:43,349 --> 00:37:41,440
previously our mcc 2 burn and get into

930
00:37:45,030 --> 00:37:43,359
that but in while we're getting to that

931
00:37:47,109 --> 00:37:45,040
point in the next 15 days we will be

932
00:37:48,790 --> 00:37:47,119
phasing the mirror taking those 18

933
00:37:49,589 --> 00:37:48,800
mirror segments and aligning them so

934
00:37:51,670 --> 00:37:49,599
they

935
00:37:53,589 --> 00:37:51,680
essentially perform as one monolith and

936
00:37:54,950 --> 00:37:53,599
lee is on the panel here to talk about

937
00:37:56,870 --> 00:37:54,960
those i'm sure there's questions about

938
00:38:00,230 --> 00:37:56,880

that he's here to help you understand

939
00:38:01,510 --> 00:38:00,240
how that works so uh without further ado

940
00:38:03,910 --> 00:38:01,520
that's what's happening in the future i

941
00:38:05,270 --> 00:38:03,920
should say also that we'll start turning

942
00:38:06,790 --> 00:38:05,280
on the instruments

943
00:38:08,630 --> 00:38:06,800
in the next week or so and then after we

944
00:38:10,470 --> 00:38:08,640
get into l2 as the instruments get cold

945
00:38:11,990 --> 00:38:10,480
enough they're going to be start turning

946
00:38:15,190 --> 00:38:12,000
on all the various instruments so that

947
00:38:17,829 --> 00:38:15,200
we can cool down do their own

948
00:38:18,790 --> 00:38:17,839
calibration activities to end the

949
00:38:20,390 --> 00:38:18,800
commissioning when they're all

950
00:38:22,310 --> 00:38:20,400
calibrated and ready for that first

951
00:38:34,710 --> 00:38:22,320
light so with that i'll turn over to the

952
00:38:39,030 --> 00:38:36,630
and once again to ask a question please

953
00:38:40,230 --> 00:38:39,040
press star one

954
00:38:42,150 --> 00:38:40,240
and our next

955
00:38:44,150 --> 00:38:42,160
question is from elizabeth howell from

956
00:38:45,990 --> 00:38:44,160
space.com

957
00:38:47,589 --> 00:38:46,000
hello congratulations again this is

958
00:38:49,829 --> 00:38:47,599
probably for john you just gave us a

959
00:38:52,069 --> 00:38:49,839
good robot of what to expect can you

960
00:38:54,470 --> 00:38:52,079
also give us a sense about which ones of

961
00:38:55,910 --> 00:38:54,480
these milestones um if any would be the

962
00:38:58,310 --> 00:38:55,920
most technically complex of the ones

963
00:38:59,430 --> 00:38:58,320

that could be potential um difficulties

964
00:39:06,390 --> 00:38:59,440
the one that you're trying to manage the

965
00:39:09,990 --> 00:39:08,630
so what the most difficult milestones

966
00:39:12,069 --> 00:39:10,000
ahead well

967
00:39:13,670 --> 00:39:12,079
let's see each instrument has their own

968
00:39:15,990 --> 00:39:13,680
set of milestones

969
00:39:17,910 --> 00:39:16,000
that will be challenging to them once

970
00:39:20,150 --> 00:39:17,920
they reach temperature making sure they

971
00:39:21,910 --> 00:39:20,160
get it all aligned

972
00:39:23,190 --> 00:39:21,920
but there's nothing

973
00:39:25,030 --> 00:39:23,200
project or

974
00:39:26,870 --> 00:39:25,040
mission wide that is a major milestone

975
00:39:29,109 --> 00:39:26,880
once we get an l2 and we start cooling

976
00:39:30,950 --> 00:39:29,119
down the mirror themselves i'll let lee

977
00:39:33,589 --> 00:39:30,960
touch base on what are significant

978
00:39:35,990 --> 00:39:33,599
milestones over the next 10 12 days as

979
00:39:37,349 --> 00:39:36,000
they align the telescope so with that

980
00:39:38,550 --> 00:39:37,359
you want to talk about

981
00:39:40,470 --> 00:39:38,560
what's going on

982
00:39:42,710 --> 00:39:40,480
okay yeah um

983
00:39:44,310 --> 00:39:42,720
so let's see starting on tuesday we'll

984
00:39:46,390 --> 00:39:44,320
we'll start deploying the mirrors so

985
00:39:48,470 --> 00:39:46,400
they're in a launch configuration and

986
00:39:50,310 --> 00:39:48,480
there's about a 10 to 12 day process to

987
00:39:53,349 --> 00:39:50,320
get all of the mirrors

988
00:39:55,030 --> 00:39:53,359

forward by uh roughly half an inch and

989
00:39:57,030 --> 00:39:55,040
that puts them in a position where we

990
00:39:58,310 --> 00:39:57,040
can do the detailed optical alignment so

991
00:40:00,230 --> 00:39:58,320
this is sort of the first step we call

992
00:40:01,670 --> 00:40:00,240
it mirror deployment

993
00:40:03,430 --> 00:40:01,680
but then after that there's actually a

994
00:40:05,109 --> 00:40:03,440
three-month process

995
00:40:07,750 --> 00:40:05,119
to align the mirrors starting with the

996
00:40:09,750 --> 00:40:07,760
very first light on all 18 segments

997
00:40:12,230 --> 00:40:09,760
and at roughly four months into the

998
00:40:13,670 --> 00:40:12,240
mission right around day 120 is when we

999
00:40:14,790 --> 00:40:13,680
think the entire telescope will be

1000
00:40:16,790 --> 00:40:14,800
aligned

1001
00:40:18,470 --> 00:40:16,800
but that's happening in parallel to the

1002
00:40:20,870 --> 00:40:18,480
commissioning of instruments so we'll be

1003
00:40:22,470 --> 00:40:20,880
working closely with our instrument team

1004
00:40:24,309 --> 00:40:22,480
partners and they'll be turning on

1005
00:40:26,150 --> 00:40:24,319
different instruments and turning on the

1006
00:40:27,990 --> 00:40:26,160
cooler and we'll then use those

1007
00:40:33,670 --> 00:40:28,000
instruments to align the telescope and

1008
00:40:39,750 --> 00:40:35,190
thank you our next question is from

1009
00:40:44,950 --> 00:40:43,270
everyone uh congratulations uh

1010
00:40:47,190 --> 00:40:44,960
first one for lee

1011
00:40:48,950 --> 00:40:47,200
why did designers go with hexagon-shaped

1012
00:40:51,510 --> 00:40:48,960
mirrors for this telescope and how are

1013
00:40:54,870 --> 00:40:51,520

you feeling about making those final

1014
00:40:57,109 --> 00:40:54,880
segment adjustments in the coming days

1015
00:40:59,589 --> 00:40:57,119
and then a question for john

1016
00:41:01,750 --> 00:40:59,599
how many people in the mock have tested

1017
00:41:03,349 --> 00:41:01,760
positive for covet in the last

1018
00:41:05,349 --> 00:41:03,359
two weeks and how are you handling

1019
00:41:11,430 --> 00:41:05,359
shifts and work moving forward if people

1020
00:41:16,230 --> 00:41:13,990
well i guess i'll take this softball

1021
00:41:17,990 --> 00:41:16,240
so hexagons actually there were a couple

1022
00:41:20,470 --> 00:41:18,000
of different configurations very early

1023
00:41:23,030 --> 00:41:20,480
on it wasn't only hexagons

1024
00:41:24,870 --> 00:41:23,040
but hexagons are a really nice shape for

1025
00:41:26,470 --> 00:41:24,880
making a mirror that you want to make in

1026
00:41:27,510 --> 00:41:26,480
pieces

1027
00:41:29,190 --> 00:41:27,520
you know if you think about the

1028
00:41:31,829 --> 00:41:29,200
different geometries that you could use

1029
00:41:33,589 --> 00:41:31,839
like triangles and squares

1030
00:41:34,950 --> 00:41:33,599
those have very sharp corners which we

1031
00:41:36,150 --> 00:41:34,960
generally don't like when we make

1032
00:41:37,589 --> 00:41:36,160
mirrors we like mirrors that are

1033
00:41:39,030 --> 00:41:37,599
symmetric

1034
00:41:40,150 --> 00:41:39,040
if you remember there's an actuator at

1035
00:41:42,630 --> 00:41:40,160
the center of the mirror that moves

1036
00:41:44,550 --> 00:41:42,640
forward and back and the hexagon shape

1037
00:41:46,390 --> 00:41:44,560
works well with being able to change the

1038
00:41:48,390 --> 00:41:46,400

curvature of the mirror and we were able

1039
00:41:49,990 --> 00:41:48,400
to put three mirrors on each wing which

1040
00:41:56,870 --> 00:41:50,000
really was nice to be able to fold it up

1041
00:42:01,349 --> 00:41:58,950
okay so for the coveted question

1042
00:42:04,309 --> 00:42:01,359
turns out we've overcome many challenges

1043
00:42:05,589 --> 00:42:04,319
on this uh project from hurricanes

1044
00:42:07,750 --> 00:42:05,599
earthquakes

1045
00:42:09,589 --> 00:42:07,760
uh you name it so this was just another

1046
00:42:10,790 --> 00:42:09,599
challenge that we faced and we basically

1047
00:42:14,069 --> 00:42:10,800
are following

1048
00:42:16,230 --> 00:42:14,079
the cdc guidelines as far as uh

1049
00:42:18,870 --> 00:42:16,240
distancing wearing masks all the time as

1050
00:42:21,670 --> 00:42:18,880
you can see as well as close contact

1051
00:42:24,150 --> 00:42:21,680
proximity we have had positive tests

1052
00:42:26,550 --> 00:42:24,160
here at the institute but fortunately we

1053
00:42:27,990 --> 00:42:26,560
have testing people before they come on

1054
00:42:30,150 --> 00:42:28,000
have to be tested before they get into

1055
00:42:31,349 --> 00:42:30,160
the facility or show when they you know

1056
00:42:34,790 --> 00:42:31,359
if they left their hotel that they've

1057
00:42:36,870 --> 00:42:34,800
tested and a test positive they identify

1058
00:42:39,109 --> 00:42:36,880
they call the uh organization here at

1059
00:42:40,550 --> 00:42:39,119
the institute the hr group and they say

1060
00:42:43,270 --> 00:42:40,560
they've been positive and we have these

1061
00:42:45,270 --> 00:42:43,280
trackers on us that you know proximity

1062
00:42:46,710 --> 00:42:45,280
trackers that they can then take that

1063
00:42:48,790 --> 00:42:46,720

piece of information say who was in

1064
00:42:50,630 --> 00:42:48,800
close contact to the people who had

1065
00:42:52,150 --> 00:42:50,640
tested positive and then we take the

1066
00:42:55,589 --> 00:42:52,160
protocol that we need to do which is

1067
00:42:57,430 --> 00:42:55,599
isolate them and um make sure that uh

1068
00:42:58,470 --> 00:42:57,440
you know we don't have um they have to

1069
00:43:00,950 --> 00:42:58,480
go and

1070
00:43:02,950 --> 00:43:00,960
stay in isolation take tests to make

1071
00:43:05,109 --> 00:43:02,960
sure they're they're negative

1072
00:43:07,190 --> 00:43:05,119
so we've had that exercise a couple of

1073
00:43:08,550 --> 00:43:07,200
times in the past two weeks and we've

1074
00:43:11,190 --> 00:43:08,560
actually worked out very well there were

1075
00:43:12,950 --> 00:43:11,200
very intense top periods to do what we

1076
00:43:15,030 --> 00:43:12,960
did the past two weeks of deployments

1077
00:43:17,030 --> 00:43:15,040
and we're able to accomplish that even

1078
00:43:19,510 --> 00:43:17,040
with these positive tests

1079
00:43:21,589 --> 00:43:19,520
because we've we've been proactive as

1080
00:43:24,069 --> 00:43:21,599
well as we have work stations in our

1081
00:43:26,309 --> 00:43:24,079
laptops that we can work remotely

1082
00:43:28,150 --> 00:43:26,319
and still do the job we need to do those

1083
00:43:30,150 --> 00:43:28,160
they're not as fancy as the workstations

1084
00:43:31,750 --> 00:43:30,160
you see behind us but they're sufficient

1085
00:43:34,790 --> 00:43:31,760
we can get the telemetry all this

1086
00:43:37,270 --> 00:43:34,800
engineers can work at their hotels or

1087
00:43:39,910 --> 00:43:37,280
nearby at their homes get their job done

1088
00:43:42,470 --> 00:43:39,920

and be successful and then we have taken

1089
00:43:44,069 --> 00:43:42,480
this the measure starting today given

1090
00:43:45,670 --> 00:43:44,079
you know the uh

1091
00:43:48,150 --> 00:43:45,680
surge of cover that's in the area that

1092
00:43:50,710 --> 00:43:48,160
we have decided to proactively

1093
00:43:53,030 --> 00:43:50,720
reduce the in-presence staffing in this

1094
00:43:55,109 --> 00:43:53,040
room and distribute it across the

1095
00:43:56,630 --> 00:43:55,119
part of the building and remotely to

1096
00:43:58,950 --> 00:43:56,640
home so that we even get greater

1097
00:44:01,589 --> 00:43:58,960
distance than the cdc guidelines for the

1098
00:44:03,190 --> 00:44:01,599
next couple of weeks as we work through

1099
00:44:04,710 --> 00:44:03,200
the recent surge of the covert around

1100
00:44:06,790 --> 00:44:04,720
this but we've been very successful

1101
00:44:07,910 --> 00:44:06,800
accomplishing our task unfortunately

1102
00:44:09,990 --> 00:44:07,920
while there have been people with

1103
00:44:11,750 --> 00:44:10,000
symptoms for covid most everybody is

1104
00:44:13,430 --> 00:44:11,760
recovered from that that exposure and

1105
00:44:15,190 --> 00:44:13,440
they seem to if they're not back at work

1106
00:44:16,630 --> 00:44:15,200
they're turned in the right direction to

1107
00:44:18,630 --> 00:44:16,640
come back to work so it was it's

1108
00:44:20,230 --> 00:44:18,640
actually a challenge we we overcome just

1109
00:44:23,270 --> 00:44:20,240
like all the others we've paced thank

1110
00:44:28,390 --> 00:44:25,190
thank you our next question is from jeff

1111
00:44:31,270 --> 00:44:28,400
faust from space news

1112
00:44:32,309 --> 00:44:31,280
uh good afternoon a question for leigh i

1113
00:44:34,550 --> 00:44:32,319

wonder if you can go in a little bit

1114
00:44:37,430 --> 00:44:34,560
more detail the the optical alignment

1115
00:44:39,589 --> 00:44:37,440
process what steps are involved in

1116
00:44:41,430 --> 00:44:39,599
getting all the mirrors aligned and what

1117
00:44:43,589 --> 00:44:41,440
sort of update can we expect along the

1118
00:44:50,309 --> 00:44:43,599
way before you reach the final alignment

1119
00:44:54,150 --> 00:44:51,829
yeah i'll go through the alignment and

1120
00:44:56,150 --> 00:44:54,160
and uh then i'll pass it to jane to go

1121
00:44:57,990 --> 00:44:56,160
give you how we'll be updating

1122
00:44:59,670 --> 00:44:58,000
um but basically you know that the first

1123
00:45:02,309 --> 00:44:59,680
thing it's it's kind of a unique thing

1124
00:45:04,309 --> 00:45:02,319
here because we have this 18 segments

1125
00:45:05,589 --> 00:45:04,319
and we expect them to be very misaligned

1126
00:45:07,510 --> 00:45:05,599
you know we just we just literally

1127
00:45:09,510 --> 00:45:07,520
deployed a wing so this is not a perfect

1128
00:45:11,589 --> 00:45:09,520
monolithic mirror at this point

1129
00:45:13,349 --> 00:45:11,599
um so when we when we take what we call

1130
00:45:15,190 --> 00:45:13,359
the first light of the telescope we're

1131
00:45:17,670 --> 00:45:15,200
actually expecting to see

1132
00:45:18,710 --> 00:45:17,680
18 separate spots that are probably

1133
00:45:20,470 --> 00:45:18,720
going to be pretty blurry because

1134
00:45:21,430 --> 00:45:20,480
everything's going to be misaligned but

1135
00:45:23,589 --> 00:45:21,440
it's essentially like we're going to

1136
00:45:24,790 --> 00:45:23,599
have 18 separate telescopes and the

1137
00:45:27,190 --> 00:45:24,800
first thing we're going to have to do is

1138
00:45:29,430 --> 00:45:27,200

sort of align those individual

1139
00:45:30,790 --> 00:45:29,440
telescopes the those individual primary

1140
00:45:31,990 --> 00:45:30,800
mirror segments

1141
00:45:33,589 --> 00:45:32,000
and then we're going to take all those

1142
00:45:36,069 --> 00:45:33,599
18 spots and put them on top of each

1143
00:45:37,670 --> 00:45:36,079
other we call that stacking

1144
00:45:39,510 --> 00:45:37,680
but at that point we still don't have a

1145
00:45:40,790 --> 00:45:39,520
nice tight you know a star doesn't quite

1146
00:45:42,710 --> 00:45:40,800
look like a star it's still going to be

1147
00:45:45,349 --> 00:45:42,720
very blurry and we have to go through

1148
00:45:47,349 --> 00:45:45,359
the process of aligning the mirrors

1149
00:45:49,109 --> 00:45:47,359
to the point at which they're actually

1150
00:45:49,990 --> 00:45:49,119
aligned to a fraction of a wavelength of

1151
00:45:52,150 --> 00:45:50,000
light

1152
00:45:54,069 --> 00:45:52,160
and we we use a series of algorithms

1153
00:45:55,670 --> 00:45:54,079
that we developed actually very early in

1154
00:45:56,790 --> 00:45:55,680
the program to demonstrate this program

1155
00:45:59,109 --> 00:45:56,800
is feasible

1156
00:46:01,990 --> 00:45:59,119
we demonstrated them on a a scaled test

1157
00:46:03,510 --> 00:46:02,000
bed um so and we and we have models that

1158
00:46:05,030 --> 00:46:03,520
simulate all this but this will be the

1159
00:46:06,630 --> 00:46:05,040
first time that we do it

1160
00:46:08,390 --> 00:46:06,640
on the flight telescope with real stars

1161
00:46:10,230 --> 00:46:08,400
so we're real excited it's a little bit

1162
00:46:12,230 --> 00:46:10,240
of a long process

1163
00:46:14,550 --> 00:46:12,240

but at the end of it we expect to see an

1164
00:46:16,150 --> 00:46:14,560
image of a star that looks like a star

1165
00:46:17,510 --> 00:46:16,160
and then we expect to get that over the

1166
00:46:19,829 --> 00:46:17,520
full field which means all four

1167
00:46:21,349 --> 00:46:19,839
instruments will have beautiful images

1168
00:46:22,790 --> 00:46:21,359
and i'm going to pass it to jane to talk

1169
00:46:24,309 --> 00:46:22,800
a little bit about how we'll be

1170
00:46:28,390 --> 00:46:24,319
communicating some of this information

1171
00:46:32,550 --> 00:46:31,109
and i should just add that that um to

1172
00:46:35,750 --> 00:46:32,560
add a little bit to what lisa said you

1173
00:46:37,030 --> 00:46:35,760
know just the the change of alignment we

1174
00:46:39,910 --> 00:46:37,040
start with the mirrors off by

1175
00:46:41,910 --> 00:46:39,920
millimeters and we're driving them to be

1176
00:46:43,510 --> 00:46:41,920
aligned to within less than the size of

1177
00:46:45,750 --> 00:46:43,520
a chronovirus right like to tens of

1178
00:46:47,910 --> 00:46:45,760
nanometers it's just it's this very

1179
00:46:49,030 --> 00:46:47,920
deliberate process that is time

1180
00:46:51,910 --> 00:46:49,040
consuming

1181
00:46:54,150 --> 00:46:51,920
so yeah like just so everybody knows the

1182
00:46:56,230 --> 00:46:54,160
first images that we take are not this

1183
00:46:58,870 --> 00:46:56,240
telescope is not ready out of the box

1184
00:47:00,870 --> 00:46:58,880
the first images are going to be ugly

1185
00:47:02,950 --> 00:47:00,880
it's going to be blurry and as we said

1186
00:47:04,550 --> 00:47:02,960
18 of these little

1187
00:47:08,230 --> 00:47:04,560
images all over the sky so we have to

1188
00:47:10,630 --> 00:47:08,240

drive that into one telescope i like to

1189
00:47:12,390 --> 00:47:10,640
think of it as it's like we have 18

1190
00:47:14,390 --> 00:47:12,400
mirrors that are right now little prima

1191
00:47:15,990 --> 00:47:14,400
donnas all doing their own thing singing

1192
00:47:17,430 --> 00:47:16,000
their own tune in whatever key they're

1193
00:47:20,150 --> 00:47:17,440
in and we have to make them work like a

1194
00:47:22,630 --> 00:47:20,160
chorus and that is a that is a

1195
00:47:24,069 --> 00:47:22,640
methodical laborious process

1196
00:47:26,549 --> 00:47:24,079
we want to make sure that the first

1197
00:47:29,190 --> 00:47:26,559
images that the world sees that the that

1198
00:47:31,510 --> 00:47:29,200
that humanity sees from this telescope

1199
00:47:32,390 --> 00:47:31,520
are due justice to this 10 billion

1200
00:47:35,510 --> 00:47:32,400
dollar

1201
00:47:37,349 --> 00:47:35,520
uh uh telescope and are not those you

1202
00:47:40,309 --> 00:47:37,359
know hey look a star

1203
00:47:42,230 --> 00:47:40,319
so we are planning a series of wow

1204
00:47:44,069 --> 00:47:42,240
images to be released at the end of

1205
00:47:46,549 --> 00:47:44,079
commissioning when we start normal

1206
00:47:49,270 --> 00:47:46,559
science operations that are designed to

1207
00:47:50,790 --> 00:47:49,280
showcase what this telescope can do and

1208
00:47:52,630 --> 00:47:50,800
it showcased all four science

1209
00:47:58,790 --> 00:47:52,640
instruments and to really knock

1210
00:48:04,390 --> 00:48:00,549
thank you our next question is from

1211
00:48:06,630 --> 00:48:04,400
alexandra with nature magazine

1212
00:48:08,790 --> 00:48:06,640
hi thanks i have a follow-up on that i

1213
00:48:11,109 --> 00:48:08,800

think for jane as well

1214
00:48:13,109 --> 00:48:11,119
um i'm really curious about like where

1215
00:48:15,030 --> 00:48:13,119
the photons are coming from during this

1216
00:48:16,710 --> 00:48:15,040
whole commissioning process

1217
00:48:19,270 --> 00:48:16,720
what are sort of the astronomical

1218
00:48:21,510 --> 00:48:19,280
targets you'll be pointing at during

1219
00:48:23,430 --> 00:48:21,520
alignment and commissioning and and

1220
00:48:25,349 --> 00:48:23,440
where are those photons coming from that

1221
00:48:30,549 --> 00:48:25,359
will be bouncing around in the scope for

1222
00:48:36,230 --> 00:48:33,190
so the the first images are the first

1223
00:48:38,230 --> 00:48:36,240
targets are some stars that are the

1224
00:48:39,589 --> 00:48:38,240
brightness that lee and team need

1225
00:48:40,470 --> 00:48:39,599
so they're not

1226
00:48:41,670 --> 00:48:40,480
um

1227
00:48:43,349 --> 00:48:41,680
you know they're fainter than your eye

1228
00:48:45,430 --> 00:48:43,359
can see but not by a whole lot they're

1229
00:48:47,190 --> 00:48:45,440
reasonably bright stars so for the first

1230
00:48:49,349 --> 00:48:47,200
part of telescope alignment that's it we

1231
00:48:51,829 --> 00:48:49,359
look at some stars that's kind of boring

1232
00:48:53,430 --> 00:48:51,839
then as we get into but important as we

1233
00:48:55,430 --> 00:48:53,440
get into science instrument

1234
00:48:58,470 --> 00:48:55,440
commissioning which is the last six

1235
00:48:59,910 --> 00:48:58,480
weeks of of this six month process

1236
00:49:01,910 --> 00:48:59,920
then we start looking at a larger

1237
00:49:03,270 --> 00:49:01,920
variety of targets that's where we're

1238
00:49:05,510 --> 00:49:03,280

checking that all four science

1239
00:49:07,670 --> 00:49:05,520
instruments are working correctly

1240
00:49:09,349 --> 00:49:07,680
those targets are chosen not because

1241
00:49:10,950 --> 00:49:09,359
they're scientifically amazing but

1242
00:49:13,349 --> 00:49:10,960
because they're useful things like

1243
00:49:15,510 --> 00:49:13,359
wavelength calibration

1244
00:49:17,270 --> 00:49:15,520
things like check we have some sources

1245
00:49:19,190 --> 00:49:17,280
that are nice and uniform brightness so

1246
00:49:20,309 --> 00:49:19,200
we can check how the detectors are

1247
00:49:22,150 --> 00:49:20,319
working so there's a bunch of

1248
00:49:23,829 --> 00:49:22,160
calibration and

1249
00:49:26,150 --> 00:49:23,839
checkout that's happening

1250
00:49:29,270 --> 00:49:26,160
a lot of those targets are in the large

1251
00:49:30,390 --> 00:49:29,280
magellanic cloud because um we can

1252
00:49:32,950 --> 00:49:30,400
always see

1253
00:49:34,870 --> 00:49:32,960
the north and south ecliptic poles

1254
00:49:36,630 --> 00:49:34,880
they're always available so looking out

1255
00:49:37,990 --> 00:49:36,640
of the plane of the solar system up and

1256
00:49:41,030 --> 00:49:38,000
out of the plane of the solar system

1257
00:49:42,790 --> 00:49:41,040
down that's always available so a lot of

1258
00:49:44,710 --> 00:49:42,800
our targets for commissioning are there

1259
00:49:46,549 --> 00:49:44,720
because then we could we knew we didn't

1260
00:49:52,710 --> 00:49:46,559
have to keep re-planning if the launch

1261
00:49:59,270 --> 00:49:54,790
thank you our next question is from jim

1262
00:50:03,430 --> 00:50:01,109
thank you obviously

1263
00:50:05,190 --> 00:50:03,440

the number of

1264
00:50:07,829 --> 00:50:05,200
scientific engineering and even

1265
00:50:08,790 --> 00:50:07,839
educational achievements

1266
00:50:12,470 --> 00:50:08,800
will be

1267
00:50:15,349 --> 00:50:12,480
very significant from james webb uh

1268
00:50:16,309 --> 00:50:15,359
however um i'd like to ask you if you

1269
00:50:18,069 --> 00:50:16,319
could

1270
00:50:18,790 --> 00:50:18,079
if uh like

1271
00:50:21,349 --> 00:50:18,800
the

1272
00:50:24,829 --> 00:50:21,359
ordinary people

1273
00:50:28,470 --> 00:50:24,839
so to speak uh on earth the rest of us

1274
00:50:29,829 --> 00:50:28,480
earthlings what can i tell my readers of

1275
00:50:32,790 --> 00:50:29,839
those people

1276
00:50:35,829 --> 00:50:32,800
about what this james webb

1277
00:50:40,230 --> 00:50:35,839
telescope means to them

1278
00:50:45,190 --> 00:50:42,309
hi this is heidi hamill you know what

1279
00:50:46,390 --> 00:50:45,200
you can tell ordinary people about this

1280
00:50:48,309 --> 00:50:46,400
telescope

1281
00:50:50,950 --> 00:50:48,319
is that it's an example

1282
00:50:54,309 --> 00:50:50,960
of what nasa and its

1283
00:50:56,790 --> 00:50:54,319
collaborators can do when they work

1284
00:50:59,349 --> 00:50:56,800
together when nasa and issa and the

1285
00:51:02,710 --> 00:50:59,359
canadian space agency work together they

1286
00:51:04,549 --> 00:51:02,720
can achieve remarkable things

1287
00:51:08,790 --> 00:51:04,559
you've you've heard people talking about

1288
00:51:10,950 --> 00:51:08,800

how oh it looks so easy it is not easy

1289
00:51:12,790 --> 00:51:10,960
nasa makes it look easy and sometimes

1290
00:51:15,670 --> 00:51:12,800
they're a victim of their own success

1291
00:51:19,109 --> 00:51:15,680
because it looks easy but it's not easy

1292
00:51:22,950 --> 00:51:19,119
it's very challenging and i think that

1293
00:51:26,549 --> 00:51:22,960
we all as humanity can be proud

1294
00:51:28,390 --> 00:51:26,559
that we are working collectively to do

1295
00:51:29,430 --> 00:51:28,400
great things

1296
00:51:32,309 --> 00:51:29,440
to to

1297
00:51:34,710 --> 00:51:32,319
expand our knowledge of the universe

1298
00:51:37,750 --> 00:51:34,720
to make the universe more accessible to

1299
00:51:39,910 --> 00:51:37,760
all of us all of the pictures and all of

1300
00:51:41,990 --> 00:51:39,920
the data and the knowledge from this

1301
00:51:44,309 --> 00:51:42,000
telescope will be shared

1302
00:51:47,829 --> 00:51:44,319
with all of the taxpayers who paid for

1303
00:51:50,950 --> 00:51:47,839
it so this becomes a part of our legacy

1304
00:51:53,589 --> 00:51:50,960
to the future this exploration that we

1305
00:51:55,829 --> 00:51:53,599
as a team have been doing

1306
00:52:02,150 --> 00:51:55,839
so i i think that that that's something

1307
00:52:07,670 --> 00:52:03,670
thank you our next question is from

1308
00:52:09,670 --> 00:52:07,680
irene klotz aviation week

1309
00:52:12,150 --> 00:52:09,680
you know um can i just refer you a

1310
00:52:13,829 --> 00:52:12,160
little bit to that

1311
00:52:16,150 --> 00:52:13,839
can you hear me

1312
00:52:18,230 --> 00:52:16,160
um have you actually selected a target

1313
00:52:19,990 --> 00:52:18,240

boring or otherwise that's going to be

1314
00:52:21,829 --> 00:52:20,000
used for the mirror alignment and the

1315
00:52:23,190 --> 00:52:21,839
image stacking and if so could you

1316
00:52:28,069 --> 00:52:23,200
please provide the name or the

1317
00:52:31,750 --> 00:52:30,069
there's a list of stars that are bright

1318
00:52:33,430 --> 00:52:31,760
enough and we'll pick and

1319
00:52:35,829 --> 00:52:33,440
we'll look up which ones are observable

1320
00:52:37,430 --> 00:52:35,839
now and we'll pick one of them

1321
00:52:39,030 --> 00:52:37,440
um but just to go back to a minute to

1322
00:52:41,190 --> 00:52:39,040
the previous question i just want to add

1323
00:52:43,349 --> 00:52:41,200
a little bit and say that i think if you

1324
00:52:44,870 --> 00:52:43,359
look at a really big picture of what is

1325
00:52:47,109 --> 00:52:44,880
the science that we're doing with this

1326
00:52:49,750 --> 00:52:47,119
telescope it's understanding what is our

1327
00:52:52,790 --> 00:52:49,760
place where do we all come from and like

1328
00:52:55,270 --> 00:52:52,800
how do we fit in to the universe um how

1329
00:52:57,190 --> 00:52:55,280
did we get here how weird are planets

1330
00:52:59,829 --> 00:52:57,200
like the earth

1331
00:53:01,109 --> 00:52:59,839
how did our galaxy and our solar system

1332
00:53:03,270 --> 00:53:01,119
come to be

1333
00:53:04,950 --> 00:53:03,280
and so you know for a normal for an

1334
00:53:06,950 --> 00:53:04,960
average person that's also a very

1335
00:53:09,349 --> 00:53:06,960
personal question how did i get here

1336
00:53:12,069 --> 00:53:09,359
what is my history not just of my own

1337
00:53:14,150 --> 00:53:12,079
life or my own ancestors but how did we

1338
00:53:15,990 --> 00:53:14,160

all get here how did it all happen

1339
00:53:25,670 --> 00:53:16,000
that's the big big big picture that

1340
00:53:31,670 --> 00:53:28,790
comes from race nations the well news

1341
00:53:33,349 --> 00:53:31,680
washington d.c

1342
00:53:34,230 --> 00:53:33,359
hi thank you so a large part of my

1343
00:53:36,309 --> 00:53:34,240
question we're pretty much already

1344
00:53:38,230 --> 00:53:36,319
touched on but i was wondering you know

1345
00:53:39,670 --> 00:53:38,240
given the the launch accuracy and the

1346
00:53:42,549 --> 00:53:39,680
accuracy of the mid-course corrections

1347
00:53:43,750 --> 00:53:42,559
on the way to l2 um are there any is

1348
00:53:46,790 --> 00:53:43,760
there any possibility that we might be

1349
00:53:48,549 --> 00:53:46,800
able to see the first clear images from

1350
00:53:55,270 --> 00:53:48,559
the james webb a little bit early ahead

1351
00:53:59,750 --> 00:53:58,230
yeah um yeah i mean so one of the things

1352
00:54:01,990 --> 00:53:59,760
that we're paying very close attention

1353
00:54:03,589 --> 00:54:02,000
to is how the telescope and the

1354
00:54:05,270 --> 00:54:03,599
instruments are cooling

1355
00:54:07,190 --> 00:54:05,280
because actually what prevents us from

1356
00:54:08,950 --> 00:54:07,200
getting images even sooner is how long

1357
00:54:10,390 --> 00:54:08,960
they take to cool

1358
00:54:11,829 --> 00:54:10,400
it turns out actually early in the

1359
00:54:13,670 --> 00:54:11,839
mission we did find things we're calling

1360
00:54:16,069 --> 00:54:13,680
a little bit faster than our models have

1361
00:54:17,910 --> 00:54:16,079
predicted and so it does look like

1362
00:54:19,270 --> 00:54:17,920
there's a potential maybe of a day or

1363
00:54:21,190 --> 00:54:19,280

two faster

1364
00:54:22,230 --> 00:54:21,200
but not a significant not significantly

1365
00:54:23,670 --> 00:54:22,240
faster

1366
00:54:25,670 --> 00:54:23,680
so basically our original timeline is

1367
00:54:33,750 --> 00:54:25,680
close we might be a couple days before

1368
00:54:37,510 --> 00:54:35,589
thank you our next question is from

1369
00:54:42,150 --> 00:54:37,520
felipe

1370
00:54:47,430 --> 00:54:45,190
okay hello i hope you can hear me my

1371
00:54:50,309 --> 00:54:47,440
name is philippe rossi from the science

1372
00:54:52,470 --> 00:54:50,319
channel of the polish public television

1373
00:54:54,870 --> 00:54:52,480
first of all i would like to thank you

1374
00:54:57,109 --> 00:54:54,880
for the opportunity to see the launch of

1375
00:54:59,430 --> 00:54:57,119
the james webster stop live in

1376
00:55:02,069 --> 00:54:59,440
frankliana now we are preparing a

1377
00:55:03,030 --> 00:55:02,079
documentary movie about the jbs mission

1378
00:55:05,670 --> 00:55:03,040
called

1379
00:55:06,630 --> 00:55:05,680
a new window to the universe

1380
00:55:08,950 --> 00:55:06,640
so

1381
00:55:11,589 --> 00:55:08,960
and now we know that the most of the

1382
00:55:12,630 --> 00:55:11,599
dangerous and difficult that are behind

1383
00:55:14,789 --> 00:55:12,640
us

1384
00:55:17,589 --> 00:55:14,799
and i'm very happy about this

1385
00:55:19,349 --> 00:55:17,599
so do we have any future

1386
00:55:20,390 --> 00:55:19,359
steps of deployment and

1387
00:55:23,190 --> 00:55:20,400
calibration

1388
00:55:25,990 --> 00:55:23,200

to be concerned about or can we be 100

1389
00:55:27,990 --> 00:55:26,000
percent sure that the jdst deployment is

1390
00:55:28,950 --> 00:55:28,000
a complete success and

1391
00:55:31,910 --> 00:55:28,960
maybe

1392
00:55:35,430 --> 00:55:31,920
what are you the most proud of when it

1393
00:55:40,390 --> 00:55:35,440
goes to the whole mission

1394
00:55:45,190 --> 00:55:42,870
excuse me can you repeat 100 sure of

1395
00:55:47,510 --> 00:55:45,200
what i didn't catch that

1396
00:55:50,470 --> 00:55:47,520
uh can we be 100

1397
00:55:53,990 --> 00:55:50,480
sure that the jvc's deployment is a

1398
00:55:59,030 --> 00:55:56,789
oh yes we can confirm that the

1399
00:56:01,109 --> 00:55:59,040
deployments that just have taken place

1400
00:56:03,670 --> 00:56:01,119
has been 100 successful we have the

1401
00:56:05,510 --> 00:56:03,680
telemetry and the performance that

1402
00:56:07,670 --> 00:56:05,520
matches our predictions so we know for

1403
00:56:15,109 --> 00:56:07,680
sure that the telescope is deployed the

1404
00:56:20,390 --> 00:56:18,309
oh what were we most proud of oh

1405
00:56:22,309 --> 00:56:20,400
oh my gosh we were most proud of the

1406
00:56:24,630 --> 00:56:22,319
collaborative effort to reach this

1407
00:56:26,870 --> 00:56:24,640
moment i mean for me it's been 15 years

1408
00:56:29,829 --> 00:56:26,880
for lee it's been longer and for jane

1409
00:56:32,309 --> 00:56:29,839
and for heidi it's been equally many

1410
00:56:34,069 --> 00:56:32,319
years put in of sweat and labor to get

1411
00:56:35,990 --> 00:56:34,079
to this point we're most proud of

1412
00:56:38,549 --> 00:56:36,000
looking at that screen that shows an

1413
00:56:40,069 --> 00:56:38,559

image of what's on an orbit but knowing

1414
00:56:41,670 --> 00:56:40,079
based on telemetry that that's what it

1415
00:56:44,150 --> 00:56:41,680
looks like it is a fully deployed

1416
00:56:46,309 --> 00:56:44,160
telescope ready to form fantastic

1417
00:56:47,430 --> 00:56:46,319
science to expand our knowledge so

1418
00:56:48,870 --> 00:56:47,440
that's what we're all asking me

1419
00:56:49,829 --> 00:56:48,880
personally that's what i'm all pr very

1420
00:56:51,030 --> 00:56:49,839
proud of

1421
00:56:53,270 --> 00:56:51,040
and if you guys have wondering do you

1422
00:56:55,349 --> 00:56:53,280
want to add anything well i just want to

1423
00:56:57,030 --> 00:56:55,359
say one thing is

1424
00:56:59,270 --> 00:56:57,040
you know from an optical perspective we

1425
00:57:01,270 --> 00:56:59,280
still have a long way to go so

1426
00:57:03,829 --> 00:57:01,280
this was an incredible achievement um

1427
00:57:05,109 --> 00:57:03,839
one of the most amazing uh you know

1428
00:57:06,789 --> 00:57:05,119
achievements in space that i've

1429
00:57:08,549 --> 00:57:06,799
personally ever witnessed

1430
00:57:09,910 --> 00:57:08,559
but we're not there yet we still have to

1431
00:57:10,950 --> 00:57:09,920
deploy all the mirrors we have to align

1432
00:57:12,390 --> 00:57:10,960
all the mirrors we have to get all the

1433
00:57:13,990 --> 00:57:12,400
instruments working

1434
00:57:16,230 --> 00:57:14,000
and so um i will tell you the

1435
00:57:18,230 --> 00:57:16,240
engineering team is not resting

1436
00:57:20,069 --> 00:57:18,240
we're still you know we still have that

1437
00:57:21,430 --> 00:57:20,079
drive and we have a few long months in

1438
00:57:23,589 --> 00:57:21,440

front of us

1439
00:57:25,670 --> 00:57:23,599
i think when we have you know images

1440
00:57:27,829 --> 00:57:25,680
that look like you know fine images

1441
00:57:29,910 --> 00:57:27,839
that's when we're really going to be 100

1442
00:57:33,430 --> 00:57:29,920
confident in everything so that that's

1443
00:57:38,630 --> 00:57:36,150
and i'm going to add that um i'm i'm

1444
00:57:40,230 --> 00:57:38,640
just a scientist i wasn't involved in

1445
00:57:42,069 --> 00:57:40,240
building this telescope although i've

1446
00:57:44,789 --> 00:57:42,079
been involved in the advisory process

1447
00:57:47,910 --> 00:57:44,799
for over 20 years but what i'm really

1448
00:57:50,630 --> 00:57:47,920
proud of is the fact that this uh

1449
00:57:52,069 --> 00:57:50,640
engineering team that we are celebrating

1450
00:57:55,190 --> 00:57:52,079
today

1451
00:57:58,710 --> 00:57:55,200
has done such a fantastic job of getting

1452
00:58:01,990 --> 00:57:58,720
us from just concepts 30 years ago and

1453
00:58:02,950 --> 00:58:02,000
then just drawings and then pieces to a

1454
00:58:06,549 --> 00:58:02,960
fully

1455
00:58:08,950 --> 00:58:06,559
deployed telescope that lee and and his

1456
00:58:11,910 --> 00:58:08,960
team is now going to focus and

1457
00:58:14,390 --> 00:58:11,920
eventually uh the scientists will get to

1458
00:58:15,670 --> 00:58:14,400
use i think we're all proud to be a part

1459
00:58:17,990 --> 00:58:15,680
of that team

1460
00:58:24,309 --> 00:58:18,000
and proud of the achievements of the

1461
00:58:28,470 --> 00:58:26,150
we're at about 3 30 but we have quite a

1462
00:58:32,870 --> 00:58:28,480
few questions left so we are going to

1463
00:58:36,470 --> 00:58:32,880

extend and keep answering questions

1464
00:58:38,150 --> 00:58:36,480
so have at it thank you so much

1465
00:58:49,990 --> 00:58:38,160
thank you our next question is from

1466
00:58:50,000 --> 00:58:56,789
marcia we're not able to hear you

1467
00:58:56,799 --> 00:59:02,210
right now

1468
00:59:05,829 --> 00:59:03,990
[Music]

1469
00:59:08,069 --> 00:59:05,839
think we'll move on to the next question

1470
00:59:13,030 --> 00:59:08,079
our next question is from stephen clark

1471
00:59:17,990 --> 00:59:14,950
thank you and congrats again

1472
00:59:20,069 --> 00:59:18,000
a couple of quick questions hopefully um

1473
00:59:22,150 --> 00:59:20,079
first of all can someone just confirm on

1474
00:59:24,390 --> 00:59:22,160
the record that you know nasa isn't is

1475
00:59:26,549 --> 00:59:24,400
not planning to release any of the

1476
00:59:27,589 --> 00:59:26,559
early images those blurry for the images

1477
00:59:28,870 --> 00:59:27,599
of

1478
00:59:30,789 --> 00:59:28,880
starlight

1479
00:59:32,630 --> 00:59:30,799
i just want to confirm whether those

1480
00:59:34,870 --> 00:59:32,640
will be released publicly as they are

1481
00:59:37,750 --> 00:59:34,880
gathered or will we not see any any

1482
00:59:40,470 --> 00:59:37,760
images until that big public release uh

1483
00:59:43,990 --> 00:59:40,480
in the summer time and also um is there

1484
00:59:46,630 --> 00:59:44,000
a chance um that the l2 insertion boom

1485
00:59:48,150 --> 00:59:46,640
uh i think on the 23rd of january

1486
00:59:49,349 --> 00:59:48,160
uh based on the what you're seeing with

1487
00:59:50,549 --> 00:59:49,359
the trajectory is there a chance that

1488
00:59:53,990 --> 00:59:50,559

that could be

1489
00:59:55,270 --> 00:59:54,000
deleted or deferred um you know and that

1490
01:00:05,030 --> 00:59:55,280
would afford you some further fuel

1491
01:00:08,870 --> 01:00:07,510
uh to your first question the plan is

1492
01:00:12,069 --> 01:00:08,880
still to issue

1493
01:00:13,030 --> 01:00:12,079
the releases at one time not on the way

1494
01:00:15,750 --> 01:00:13,040
but

1495
01:00:17,109 --> 01:00:15,760
the other answer is

1496
01:00:18,710 --> 01:00:17,119
the burn

1497
01:00:21,910 --> 01:00:18,720
um

1498
01:00:23,190 --> 01:00:21,920
is targeted for the 23rd it's it is uh

1499
01:00:25,750 --> 01:00:23,200
has to happen

1500
01:00:28,630 --> 01:00:25,760
uh but it is a low-risk burn and we have

1501
01:00:30,789 --> 01:00:28,640
tolerance if we miss it by a day or so

1502
01:00:33,990 --> 01:00:30,799
for whatever reason we're fine but

1503
01:00:35,349 --> 01:00:34,000
yes so the burn is uh targeted for the

1504
01:00:40,630 --> 01:00:35,359
23rd but there is some flexibility

1505
01:00:44,470 --> 01:00:42,870
so i think one of the the watchwords for

1506
01:00:46,390 --> 01:00:44,480
all of commissioning is flexibility

1507
01:00:48,870 --> 01:00:46,400
things are not going to go exactly the

1508
01:00:49,910 --> 01:00:48,880
way we expected um and that's that's

1509
01:00:51,990 --> 01:00:49,920
okay

1510
01:00:53,270 --> 01:00:52,000
we have a timeline for commissioning

1511
01:00:55,910 --> 01:00:53,280
that is

1512
01:00:57,430 --> 01:00:55,920
this excel spreadsheet that has down to

1513
01:00:58,710 --> 01:00:57,440

the minute how we're all going to be

1514
01:01:00,870 --> 01:00:58,720
spending the next six months of our

1515
01:01:01,990 --> 01:01:00,880
lives and we all know that that is not

1516
01:01:03,430 --> 01:01:02,000
actually the timeline we're going to

1517
01:01:05,270 --> 01:01:03,440
execute but that's the plan and we're

1518
01:01:08,549 --> 01:01:05,280
going to we will move it around as we

1519
01:01:09,750 --> 01:01:08,559
need be the current plan um is yes that

1520
01:01:11,829 --> 01:01:09,760
we're going to hold the images to

1521
01:01:14,069 --> 01:01:11,839
release at six months when all four

1522
01:01:16,150 --> 01:01:14,079
instruments are are are ready for

1523
01:01:17,670 --> 01:01:16,160
science um but i

1524
01:01:19,750 --> 01:01:17,680
we have to be flexible during this

1525
01:01:20,549 --> 01:01:19,760
process and um

1526
01:01:29,270 --> 01:01:20,559
so

1527
01:01:35,030 --> 01:01:31,109
thank you our next question comes from

1528
01:01:37,510 --> 01:01:35,040
manuel mazzanti from debate

1529
01:01:39,190 --> 01:01:37,520
hello everybody congratulations

1530
01:01:41,190 --> 01:01:39,200
on this incredible day

1531
01:01:43,109 --> 01:01:41,200
i'm still curious about the speed of

1532
01:01:45,270 --> 01:01:43,119
this telescope uh we know that it's

1533
01:01:47,270 --> 01:01:45,280
slowing down day by day

1534
01:01:49,910 --> 01:01:47,280
we went from several kilometers per hour

1535
01:01:53,270 --> 01:01:49,920
to 0.4 kilometers

1536
01:01:55,430 --> 01:01:53,280
per hour right now per second uh

1537
01:01:56,630 --> 01:01:55,440
and and i was wondering what is the

1538
01:01:58,950 --> 01:01:56,640

speed that you are planning the

1539
01:02:01,990 --> 01:01:58,960
telescope to have when it reaches the l2

1540
01:02:03,190 --> 01:02:02,000
point and it has to be a precise speed

1541
01:02:05,109 --> 01:02:03,200
in order to

1542
01:02:06,630 --> 01:02:05,119
exactly do the l2 bars

1543
01:02:08,950 --> 01:02:06,640
thank you

1544
01:02:13,430 --> 01:02:10,870
so i mean i don't know this precise

1545
01:02:16,309 --> 01:02:13,440
speed but it is driven by physics so

1546
01:02:17,910 --> 01:02:16,319
we're we have our trajectory and it's

1547
01:02:21,029 --> 01:02:17,920
going to slow down

1548
01:02:22,870 --> 01:02:21,039
uh by just the orbit dynamic phenomena

1549
01:02:23,829 --> 01:02:22,880
at the trajectory we're at

1550
01:02:26,069 --> 01:02:23,839
and

1551
01:02:28,309 --> 01:02:26,079
uh it's we already can calculate what

1552
01:02:31,029 --> 01:02:28,319
that is i don't know person firsthand

1553
01:02:32,470 --> 01:02:31,039
but we have our burn maneuver uh

1554
01:02:34,870 --> 01:02:32,480
factoring in the speed we're going to

1555
01:02:37,109 --> 01:02:34,880
get when we get there so

1556
01:02:39,029 --> 01:02:37,119
it's really uh pretty much basic physics

1557
01:02:43,029 --> 01:02:39,039
at this point how it will slow down and

1558
01:02:43,039 --> 01:02:47,190
thanks

1559
01:02:53,510 --> 01:02:49,190
thank you our next question is from leo

1560
01:03:01,109 --> 01:02:57,589
uh thanks again uh today would have been

1561
01:03:03,510 --> 01:03:01,119
stephen hawking's 80th birthday

1562
01:03:06,549 --> 01:03:03,520
now stephen absolutely loves

1563
01:03:07,750 --> 01:03:06,559

coincidences so i'm quite certain he

1564
01:03:10,950 --> 01:03:07,760
would have been

1565
01:03:13,029 --> 01:03:10,960
chuffed uh by this coincidence and the

1566
01:03:16,710 --> 01:03:13,039
question is is almost impossible i think

1567
01:03:18,549 --> 01:03:16,720
which is why it must be for heidi um

1568
01:03:22,390 --> 01:03:18,559
can you talk is there anything you can

1569
01:03:24,470 --> 01:03:22,400
say about what jwst will be doing

1570
01:03:27,109 --> 01:03:24,480
that might give us further information

1571
01:03:28,870 --> 01:03:27,119
about the stuff that stephen hawking

1572
01:03:31,510 --> 01:03:28,880
cared about so much you know

1573
01:03:34,950 --> 01:03:31,520
thermodynamics of black holes

1574
01:03:40,710 --> 01:03:34,960
hawking radiation penrose stuff you know

1575
01:03:43,990 --> 01:03:41,910
i'm going to take that one because i

1576
01:03:46,150 --> 01:03:44,000
love black holes

1577
01:03:47,990 --> 01:03:46,160
right so the web science program for the

1578
01:03:51,430 --> 01:03:48,000
first year we are going to be doing more

1579
01:03:53,670 --> 01:03:51,440
than 300 different science programs

1580
01:03:55,910 --> 01:03:53,680
that were submitted by researchers from

1581
01:03:57,990 --> 01:03:55,920
all over the globe it was a cutthroat

1582
01:03:59,990 --> 01:03:58,000
competition we rejected three quarters

1583
01:04:02,470 --> 01:04:00,000
of all the accepted proposals

1584
01:04:05,190 --> 01:04:02,480
and we're taking the top ranked quarter

1585
01:04:06,870 --> 01:04:05,200
those include quite a few proposals to

1586
01:04:10,309 --> 01:04:06,880
study black holes

1587
01:04:12,230 --> 01:04:10,319
that are in the centers of galaxies it

1588
01:04:14,950 --> 01:04:12,240

turns out that every galaxy has a black

1589
01:04:16,549 --> 01:04:14,960
hole lurking in its center big galaxies

1590
01:04:17,910 --> 01:04:16,559
have big black holes little galaxies

1591
01:04:18,870 --> 01:04:17,920
have little black holes we don't know

1592
01:04:20,390 --> 01:04:18,880
why

1593
01:04:22,950 --> 01:04:20,400
um but when i tell this to school kids

1594
01:04:24,549 --> 01:04:22,960
they're like that's fair it's sharing um

1595
01:04:27,109 --> 01:04:24,559
but we don't actually understand how

1596
01:04:28,470 --> 01:04:27,119
that how that evolves to be

1597
01:04:30,230 --> 01:04:28,480
one of the projects i'm really

1598
01:04:31,430 --> 01:04:30,240
interested in is a project to look at

1599
01:04:33,589 --> 01:04:31,440
the first

1600
01:04:35,750 --> 01:04:33,599
of the most distant quasars that have

1601
01:04:38,309 --> 01:04:35,760
ever been found these are billion with a

1602
01:04:40,789 --> 01:04:38,319
b solar mass black holes

1603
01:04:42,549 --> 01:04:40,799
that we see as they looked only a couple

1604
01:04:44,789 --> 01:04:42,559
hundred million years after the big bang

1605
01:04:47,270 --> 01:04:44,799
so very far away that light's been

1606
01:04:48,789 --> 01:04:47,280
traveling through time for almost

1607
01:04:50,069 --> 01:04:48,799
traveling for almost the whole history

1608
01:04:52,069 --> 01:04:50,079
of the universe

1609
01:04:54,630 --> 01:04:52,079
and nobody really knows how do you make

1610
01:04:57,510 --> 01:04:54,640
a quasar how do you put a billion

1611
01:04:59,270 --> 01:04:57,520
you know sons worth of stuff in a black

1612
01:05:00,789 --> 01:04:59,280
hole and get all that done in only a

1613
01:05:02,470 --> 01:05:00,799

couple hundred million years nobody

1614
01:05:03,990 --> 01:05:02,480
really knows but we found them and

1615
01:05:05,670 --> 01:05:04,000
that's going to be one target to go

1616
01:05:07,910 --> 01:05:05,680
study those and then there are other

1617
01:05:10,309 --> 01:05:07,920
programs to see how those black holes

1618
01:05:15,029 --> 01:05:10,319
and their galaxies have co-evolved

1619
01:05:19,190 --> 01:05:17,910
and i'm just going to jump in here to

1620
01:05:21,430 --> 01:05:19,200
make a pitch

1621
01:05:23,750 --> 01:05:21,440
to remind people that

1622
01:05:27,349 --> 01:05:23,760
the core science of

1623
01:05:28,549 --> 01:05:27,359
this telescope was to see the very first

1624
01:05:31,430 --> 01:05:28,559
light

1625
01:05:34,150 --> 01:05:31,440
in the universe the first galaxies that

1626
01:05:35,430 --> 01:05:34,160
formed with some clever projects perhaps

1627
01:05:37,270 --> 01:05:35,440
even the first

1628
01:05:39,750 --> 01:05:37,280
stars that formed

1629
01:05:42,470 --> 01:05:39,760
and and that's it's raison d'etre that's

1630
01:05:45,190 --> 01:05:42,480
why it was built the way it was built

1631
01:05:47,670 --> 01:05:45,200
but this is a great observatory that not

1632
01:05:49,750 --> 01:05:47,680
only can do that science but also the

1633
01:05:50,630 --> 01:05:49,760
black hole science that jane was talking

1634
01:05:53,990 --> 01:05:50,640
about

1635
01:05:55,270 --> 01:05:54,000
also the cosmic evolution of galaxies

1636
01:05:58,230 --> 01:05:55,280
over time

1637
01:06:00,069 --> 01:05:58,240
also probing the atmospheres of planets

1638
01:06:02,309 --> 01:06:00,079

around other stars

1639
01:06:05,990 --> 01:06:02,319
looking for the first stars that are

1640
01:06:09,349 --> 01:06:06,000
forming inside dusty nebulae in our own

1641
01:06:11,829 --> 01:06:09,359
milky way galaxy and even exploring many

1642
01:06:13,990 --> 01:06:11,839
things in our solar system which is my

1643
01:06:15,510 --> 01:06:14,000
field of science which is why jane took

1644
01:06:17,910 --> 01:06:15,520
that question

1645
01:06:20,230 --> 01:06:17,920
but we will have a really robust program

1646
01:06:23,510 --> 01:06:20,240
of solar system observations to

1647
01:06:25,829 --> 01:06:23,520
complement the in-situ spacecraft work

1648
01:06:28,549 --> 01:06:25,839
that we're doing with the nasa planetary

1649
01:06:29,750 --> 01:06:28,559
science division and this is the power

1650
01:06:31,510 --> 01:06:29,760
of web

1651
01:06:34,789 --> 01:06:31,520
just like it has been the power of

1652
01:06:35,589 --> 01:06:34,799
hubble with a great observatory you can

1653
01:06:39,109 --> 01:06:35,599
do

1654
01:06:42,710 --> 01:06:39,119
amazing science over a vast range of

1655
01:06:45,270 --> 01:06:42,720
astrophysical topics and that is why we

1656
01:06:47,589 --> 01:06:45,280
as a community have been so excited

1657
01:06:50,789 --> 01:06:47,599
about this day getting to the point

1658
01:06:53,670 --> 01:06:50,799
where this telescope is is on its way uh

1659
01:06:59,349 --> 01:06:53,680
to get our science done starting about

1660
01:07:03,990 --> 01:07:01,829
thank you our next question is from dawn

1661
01:07:08,150 --> 01:07:04,000
ladilladia from

1662
01:07:11,670 --> 01:07:10,069
[Applause]

1663
01:07:14,150 --> 01:07:11,680

thank you for taking my question and

1664
01:07:16,710 --> 01:07:14,160
congratulations my first question is for

1665
01:07:19,349 --> 01:07:16,720
john or lee are you able to provide an

1666
01:07:22,150 --> 01:07:19,359
approximate date for when instruments

1667
01:07:24,549 --> 01:07:22,160
like the fine guidance sensor or nearest

1668
01:07:26,549 --> 01:07:24,559
will be tested and calibrated and my

1669
01:07:29,349 --> 01:07:26,559
second question is for heidi are there

1670
01:07:33,670 --> 01:07:29,359
any plans to use hubble to take an image

1671
01:07:40,390 --> 01:07:33,680
of it of its successor jwst at l2 thank

1672
01:07:44,789 --> 01:07:43,190
yeah so um the the the fine guidance

1673
01:07:46,390 --> 01:07:44,799
sensor the key there is getting the

1674
01:07:48,470 --> 01:07:46,400
detectors cold enough

1675
01:07:50,789 --> 01:07:48,480
um the first instrument that will come

1676
01:07:53,109 --> 01:07:50,799
on can is the near near infrared camera

1677
01:07:56,870 --> 01:07:53,119
which takes the images and that comes on

1678
01:07:58,630 --> 01:07:56,880
in between days 30 through day 40. the

1679
01:07:59,990 --> 01:07:58,640
near cam instrument will come on about

1680
01:08:01,990 --> 01:08:00,000
i'm sorry the fine guidance sensor will

1681
01:08:03,670 --> 01:08:02,000
come on about 10 days after that

1682
01:08:05,190 --> 01:08:03,680
we have to get the detectors cold enough

1683
01:08:07,109 --> 01:08:05,200
and then as soon as it comes on we'll

1684
01:08:12,230 --> 01:08:07,119
start using it while we're doing

1685
01:08:16,630 --> 01:08:14,870
looking at a star to guide

1686
01:08:19,030 --> 01:08:16,640
uh early on and then we'll eventually

1687
01:08:20,789 --> 01:08:19,040
transition to using stars that come from

1688
01:08:22,870 --> 01:08:20,799

all 18 mirrors so there's a whole

1689
01:08:25,110 --> 01:08:22,880
sequence we do and we we want to get

1690
01:08:26,870 --> 01:08:25,120
that guider on as fast as we can but we

1691
01:08:30,789 --> 01:08:26,880
have to wait for the detectors to get to

1692
01:08:34,789 --> 01:08:32,950
the question of whether hubble will be

1693
01:08:38,149 --> 01:08:34,799
used to look at webb is a question that

1694
01:08:41,189 --> 01:08:38,159
has been asked a lot in social media and

1695
01:08:42,709 --> 01:08:41,199
also in social media there are many many

1696
01:08:45,349 --> 01:08:42,719
images from

1697
01:08:47,510 --> 01:08:45,359
even amateur astronomers who have been

1698
01:08:50,789 --> 01:08:47,520
tracking james webb space telescope

1699
01:08:54,870 --> 01:08:50,799
already imaging it uh the challenge here

1700
01:08:56,229 --> 01:08:54,880
is that james webb space telescope is so

1701
01:08:58,950 --> 01:08:56,239
far away

1702
01:09:02,870 --> 01:08:58,960
that even for the power of the hubble

1703
01:09:04,709 --> 01:09:02,880
space telescope we cannot resolve it to

1704
01:09:06,950 --> 01:09:04,719
more than a point source

1705
01:09:08,309 --> 01:09:06,960
and so we could see a point source and

1706
01:09:10,070 --> 01:09:08,319
see it moving

1707
01:09:11,510 --> 01:09:10,080
but that would not be scientifically

1708
01:09:13,590 --> 01:09:11,520
useful for us

1709
01:09:15,990 --> 01:09:13,600
what if you would say well maybe you can

1710
01:09:19,110 --> 01:09:16,000
see the brightness variations we can do

1711
01:09:21,349 --> 01:09:19,120
that with ground-based telescopes and so

1712
01:09:24,550 --> 01:09:21,359
we don't need to use the hubble space

1713
01:09:27,030 --> 01:09:24,560

telescope to do those observations of

1714
01:09:29,189 --> 01:09:27,040
the james webb space telescope and we

1715
01:09:32,149 --> 01:09:29,199
have many many other astrophysical

1716
01:09:34,789 --> 01:09:32,159
things that we want to use hubble for

1717
01:09:36,870 --> 01:09:34,799
and so i think it is unlikely that we

1718
01:09:39,430 --> 01:09:36,880
will use hubble to look at web because

1719
01:09:41,910 --> 01:09:39,440
there's no scientific or engineering

1720
01:09:43,030 --> 01:09:41,920
reason for it

1721
01:09:44,950 --> 01:09:43,040
but oh

1722
01:09:47,829 --> 01:09:44,960
jane points out

1723
01:09:50,709 --> 01:09:47,839
what we as scientists are really excited

1724
01:09:53,430 --> 01:09:50,719
about is using both hubble and web

1725
01:09:55,189 --> 01:09:53,440
together to study the universe

1726
01:09:57,189 --> 01:09:55,199
simultaneously

1727
01:09:59,990 --> 01:09:57,199
and that's because

1728
01:10:02,390 --> 01:10:00,000
we care about the colors of the light

1729
01:10:05,669 --> 01:10:02,400
from objects in outer space

1730
01:10:08,470 --> 01:10:05,679
and the hubble space telescope uh uh is

1731
01:10:10,950 --> 01:10:08,480
focused primarily on ultraviolet and

1732
01:10:12,550 --> 01:10:10,960
visible light and a little bit of near

1733
01:10:15,030 --> 01:10:12,560
infrared light

1734
01:10:17,750 --> 01:10:15,040
and then webb picks up at the near

1735
01:10:20,870 --> 01:10:17,760
infrared and pushes out into the mid

1736
01:10:23,149 --> 01:10:20,880
infrared in so you get a much broader

1737
01:10:26,310 --> 01:10:23,159
wavelength coverage of your

1738
01:10:28,790 --> 01:10:26,320

astrophysical objects by using both of

1739
01:10:30,470 --> 01:10:28,800
these telescopes together and that's why

1740
01:10:35,110 --> 01:10:30,480
we're very excited that both are going

1741
01:10:43,030 --> 01:10:36,630
thank you

1742
01:10:44,310 --> 01:10:43,040
kramer from space up close

1743
01:10:46,790 --> 01:10:44,320
hi thank you for doing this and

1744
01:10:48,709 --> 01:10:46,800
congratulations again uh my question is

1745
01:10:50,950 --> 01:10:48,719
for uh jane

1746
01:10:53,990 --> 01:10:50,960
and uh and heidi i wonder if you could

1747
01:10:55,750 --> 01:10:54,000
talk a little bit about uh

1748
01:10:57,750 --> 01:10:55,760
using the telescope to look for life

1749
01:10:59,590 --> 01:10:57,760
beyond earth in our solar system dr

1750
01:11:01,830 --> 01:10:59,600
sabukin talked about this a lot even

1751
01:11:04,630 --> 01:11:01,840
this morning targeting europa so i'm

1752
01:11:07,110 --> 01:11:04,640
wondering uh when when that might happen

1753
01:11:09,430 --> 01:11:07,120
and which instruments will you use if

1754
01:11:11,030 --> 01:11:09,440
you talk specifically about that what

1755
01:11:12,310 --> 01:11:11,040
what you hope to learn if there's an

1756
01:11:13,270 --> 01:11:12,320
emission there and will you look at

1757
01:11:16,790 --> 01:11:13,280
other

1758
01:11:19,270 --> 01:11:16,800
at in our solar system for that

1759
01:11:24,390 --> 01:11:19,280
enceladus maybe triton

1760
01:11:29,590 --> 01:11:27,030
one of the programs that we plan to do

1761
01:11:33,590 --> 01:11:29,600
with some of our guaranteed time

1762
01:11:36,390 --> 01:11:33,600
is to target the the areas um in the

1763
01:11:38,470 --> 01:11:36,400

southern uh part of europa's

1764
01:11:41,590 --> 01:11:38,480
jupiter's moon europa

1765
01:11:44,149 --> 01:11:41,600
and saturn's moon enceladus we have

1766
01:11:48,870 --> 01:11:44,159
evidence from the hubble space telescope

1767
01:11:51,590 --> 01:11:48,880
that there is water jets uh emitting

1768
01:11:53,750 --> 01:11:51,600
water from possibly from the subsurface

1769
01:11:56,790 --> 01:11:53,760
ocean of europa

1770
01:11:59,350 --> 01:11:56,800
that's hubble observations for enceladus

1771
01:12:02,950 --> 01:11:59,360
the cassini spacecraft actually got

1772
01:12:05,510 --> 01:12:02,960
images of jets of water erupting from

1773
01:12:08,310 --> 01:12:05,520
the southern pole of enceladus it flew

1774
01:12:10,630 --> 01:12:08,320
through that and sampled it and and you

1775
01:12:13,590 --> 01:12:10,640
know determined that it was water what

1776
01:12:16,550 --> 01:12:13,600
we will try to do with this time

1777
01:12:17,430 --> 01:12:16,560
is image the plume area

1778
01:12:19,750 --> 01:12:17,440
and

1779
01:12:21,910 --> 01:12:19,760
more so than images that's not the

1780
01:12:24,870 --> 01:12:21,920
important part the important part is

1781
01:12:27,110 --> 01:12:24,880
we're going to try to do spectroscopy

1782
01:12:29,750 --> 01:12:27,120
that means taking the light from that

1783
01:12:32,229 --> 01:12:29,760
region of the southern poles of those

1784
01:12:35,030 --> 01:12:32,239
tiny moons and spreading it out into a

1785
01:12:36,470 --> 01:12:35,040
rainbow of colors and then looking at

1786
01:12:39,430 --> 01:12:36,480
that rainbow of light

1787
01:12:42,550 --> 01:12:39,440
for the chemical fingerprints

1788
01:12:45,350 --> 01:12:42,560

of molecules in that water we'll be

1789
01:12:46,870 --> 01:12:45,360
looking to see if there is carbon

1790
01:12:49,189 --> 01:12:46,880
dioxide

1791
01:12:51,750 --> 01:12:49,199
will is there methane

1792
01:12:53,270 --> 01:12:51,760
is there formaldehyde

1793
01:12:55,270 --> 01:12:53,280
those those

1794
01:12:59,270 --> 01:12:55,280
carbon-bearing products

1795
01:13:02,229 --> 01:12:59,280
could be evidence of of activity

1796
01:13:05,189 --> 01:13:02,239
in the subsurface of the sub ice oceans

1797
01:13:08,070 --> 01:13:05,199
on those worlds we're very interested in

1798
01:13:11,510 --> 01:13:08,080
those worlds and so what webb can do

1799
01:13:14,790 --> 01:13:11,520
is it can provide additional information

1800
01:13:18,070 --> 01:13:14,800
about those plumes and what material

1801
01:13:21,110 --> 01:13:18,080
could be dredged up from those sub-ice

1802
01:13:23,830 --> 01:13:21,120
oceans into this plume material

1803
01:13:25,990 --> 01:13:23,840
i will say it's a risky observation

1804
01:13:27,270 --> 01:13:26,000
risky in this way not risky to the

1805
01:13:29,990 --> 01:13:27,280
telescope

1806
01:13:30,830 --> 01:13:30,000
but risky in the sense that we may not

1807
01:13:33,430 --> 01:13:30,840
see

1808
01:13:35,669 --> 01:13:33,440
anything those plumes are not always

1809
01:13:37,030 --> 01:13:35,679
active at least on the case of europa it

1810
01:13:39,110 --> 01:13:37,040
seems

1811
01:13:40,390 --> 01:13:39,120
and we may make an observation and see

1812
01:13:43,030 --> 01:13:40,400
nothing

1813
01:13:44,870 --> 01:13:43,040

and that is that's that's tough um

1814
01:13:48,630 --> 01:13:44,880
that's why we're using the guarantee

1815
01:13:51,510 --> 01:13:48,640
time uh that that i have a proposal to

1816
01:13:55,030 --> 01:13:51,520
uh to do this like jane was explaining

1817
01:13:57,189 --> 01:13:55,040
you you're not going to get a proposal

1818
01:13:59,030 --> 01:13:57,199
approved for something that may not give

1819
01:14:00,310 --> 01:13:59,040
you any science

1820
01:14:02,229 --> 01:14:00,320
so that's why we're using this

1821
01:14:04,310 --> 01:14:02,239
guaranteed time to do that

1822
01:14:06,470 --> 01:14:04,320
uh triton we're not gonna be we'll be

1823
01:14:08,870 --> 01:14:06,480
looking at triton but it's too far away

1824
01:14:10,870 --> 01:14:08,880
i think to really do this kind of uh

1825
01:14:13,590 --> 01:14:10,880
chemistry we will be looking at surface

1826
01:14:15,430 --> 01:14:13,600
chemistry of triton just as we are

1827
01:14:17,590 --> 01:14:15,440
looking at surface chemistry of all the

1828
01:14:20,229 --> 01:14:17,600
kuiper belt objects pluto

1829
01:14:22,950 --> 01:14:20,239
um it's moon sharon

1830
01:14:24,630 --> 01:14:22,960
aeris machemake any tri any kuiper belt

1831
01:14:27,110 --> 01:14:24,640
object that has a name we're likely

1832
01:14:29,110 --> 01:14:27,120
going to be looking at it with web

1833
01:14:30,149 --> 01:14:29,120
we will also be looking at saturn's moon

1834
01:14:35,750 --> 01:14:30,159
titan

1835
01:14:38,229 --> 01:14:35,760
call a prebiotic atmosphere and we will

1836
01:14:41,189 --> 01:14:38,239
be able to look at atmospheric clouds

1837
01:14:43,910 --> 01:14:41,199
with the infrared power of web we can

1838
01:14:47,590 --> 01:14:43,920

look through some of these clouds to the

1839
01:14:50,149 --> 01:14:47,600
surface perhaps even detect the evidence

1840
01:14:51,430 --> 01:14:50,159
for lakes on that uh on that moon we

1841
01:14:54,070 --> 01:14:51,440
know there are lakes there from the

1842
01:14:55,550 --> 01:14:54,080
cassini mission so that's another very

1843
01:14:58,229 --> 01:14:55,560
interesting aspect what we call

1844
01:15:00,310 --> 01:14:58,239
astrobiological target because of the

1845
01:15:01,669 --> 01:15:00,320
interesting prebiotic chemistry in that

1846
01:15:03,510 --> 01:15:01,679
atmosphere

1847
01:15:06,470 --> 01:15:03,520
did you want to talk about exoplanets

1848
01:15:11,990 --> 01:15:08,390
so heidi just talked about our own solar

1849
01:15:12,790 --> 01:15:12,000
system we now know that solar systems

1850
01:15:15,750 --> 01:15:12,800
are

1851
01:15:18,310 --> 01:15:15,760
really common in the in our galaxy that

1852
01:15:21,030 --> 01:15:18,320
on average there's a planet for every

1853
01:15:22,149 --> 01:15:21,040
star which still blows my mind

1854
01:15:24,229 --> 01:15:22,159
and so

1855
01:15:27,030 --> 01:15:24,239
about a quarter of all the time in the

1856
01:15:29,430 --> 01:15:27,040
first year of web science operations

1857
01:15:32,470 --> 01:15:29,440
will be spent spent studying planets

1858
01:15:34,470 --> 01:15:32,480
orbiting other stars exoplanets and so

1859
01:15:37,270 --> 01:15:34,480
those observations include studying

1860
01:15:39,350 --> 01:15:37,280
planets that are nothing like the earth

1861
01:15:41,270 --> 01:15:39,360
right that are

1862
01:15:44,149 --> 01:15:41,280
massive you know jupiter saturn or

1863
01:15:46,310 --> 01:15:44,159

neptune-like uh objects they also

1864
01:15:48,070 --> 01:15:46,320
include planets that are

1865
01:15:49,750 --> 01:15:48,080
more like the earth that are that could

1866
01:15:53,110 --> 01:15:49,760
be rocky

1867
01:15:55,030 --> 01:15:53,120
in particular for webb webb can study

1868
01:15:56,709 --> 01:15:55,040
planets that are in the habitable zone

1869
01:15:57,830 --> 01:15:56,719
that is that might have liquid water

1870
01:15:59,270 --> 01:15:57,840
they're at the right temperature

1871
01:16:00,149 --> 01:15:59,280
distance from their sun to have liquid

1872
01:16:02,149 --> 01:16:00,159
water

1873
01:16:04,950 --> 01:16:02,159
webb can do that for solar systems that

1874
01:16:08,310 --> 01:16:04,960
aren't like ours webb can do that for

1875
01:16:09,990 --> 01:16:08,320
stop for planets orbiting red dwarfs so

1876
01:16:11,430 --> 01:16:10,000
there are programs to do that that's

1877
01:16:13,750 --> 01:16:11,440
where we'll have our best shot at

1878
01:16:16,550 --> 01:16:13,760
looking at rocky planets

1879
01:16:19,110 --> 01:16:16,560
and so i think webb's role in that is

1880
01:16:21,350 --> 01:16:19,120
it's part of the story

1881
01:16:23,990 --> 01:16:21,360
webb's role is to look at those types of

1882
01:16:27,110 --> 01:16:24,000
systems of rocky planets orbiting red

1883
01:16:29,189 --> 01:16:27,120
dwarfs um and tell us whether those

1884
01:16:32,229 --> 01:16:29,199
those whether the atmospheres of those

1885
01:16:33,990 --> 01:16:32,239
planets have water vapor

1886
01:16:36,470 --> 01:16:34,000
whether they look temperate whether they

1887
01:16:38,790 --> 01:16:36,480
look you know moderate temperatures

1888
01:16:46,550 --> 01:16:38,800

it is not the life finding machine that

1889
01:16:53,189 --> 01:16:48,149
thank you our next question is from

1890
01:16:56,870 --> 01:16:54,470
thanks so much

1891
01:16:59,910 --> 01:16:56,880
i think my question is probably both uh

1892
01:17:03,350 --> 01:16:59,920
jane and heidi and could you clarify

1893
01:17:06,149 --> 01:17:03,360
whether it's borah or nasa that oversees

1894
01:17:08,630 --> 01:17:06,159
this collection process for who wins to

1895
01:17:10,390 --> 01:17:08,640
get observing time or does one of you do

1896
01:17:12,149 --> 01:17:10,400
it for the guaranteed observers and the

1897
01:17:15,110 --> 01:17:12,159
other does it for the guest observers

1898
01:17:17,830 --> 01:17:15,120
just how does that process work and as

1899
01:17:21,030 --> 01:17:17,840
part of that if someone proposals

1900
01:17:23,669 --> 01:17:21,040
proposes something for to use both web

1901
01:17:25,350 --> 01:17:23,679
and hubble does that get priority

1902
01:17:27,110 --> 01:17:25,360
because hubble is so old and we don't

1903
01:17:29,430 --> 01:17:27,120
know how long it's going to last

1904
01:17:31,990 --> 01:17:29,440
and are any of the 300 that you're going

1905
01:17:35,830 --> 01:17:32,000
to do in the first year using both web

1906
01:17:39,990 --> 01:17:37,510
so let me talk a little bit about the

1907
01:17:42,390 --> 01:17:40,000
process of deciding who

1908
01:17:44,709 --> 01:17:42,400
got time on this telescope

1909
01:17:46,630 --> 01:17:44,719
the people who were serving on very on

1910
01:17:49,110 --> 01:17:46,640
the science working group and building

1911
01:17:52,390 --> 01:17:49,120
instruments had some guaranteed time

1912
01:17:54,630 --> 01:17:52,400
um i'm one of those people and uh that

1913
01:17:56,390 --> 01:17:54,640

time we get to choose ourselves what we

1914
01:17:57,990 --> 01:17:56,400
are going to do has to be feasible of

1915
01:18:01,830 --> 01:17:58,000
course

1916
01:18:03,750 --> 01:18:01,840
once that was set in stone then a all of

1917
01:18:06,149 --> 01:18:03,760
the there was a call for proposals that

1918
01:18:08,709 --> 01:18:06,159
went out to the world everybody can

1919
01:18:11,510 --> 01:18:08,719
apply for time this is a process that's

1920
01:18:14,229 --> 01:18:11,520
overseen here at the space telescope

1921
01:18:16,790 --> 01:18:14,239
science institute which is managed by

1922
01:18:19,830 --> 01:18:16,800
aura but but space telescope here the

1923
01:18:22,229 --> 01:18:19,840
people here form review panels and they

1924
01:18:23,590 --> 01:18:22,239
assess every one of those proposals they

1925
01:18:25,830 --> 01:18:23,600
read them

1926
01:18:28,630 --> 01:18:25,840
they don't know who wrote them these

1927
01:18:31,830 --> 01:18:28,640
proposals are evaluated in a

1928
01:18:33,510 --> 01:18:31,840
dual anonymous way so that all you can

1929
01:18:35,430 --> 01:18:33,520
see is the science

1930
01:18:38,229 --> 01:18:35,440
and they rank them and the the really

1931
01:18:39,910 --> 01:18:38,239
great ones get the time the ones that

1932
01:18:42,550 --> 01:18:39,920
needed some more work or didn't even

1933
01:18:44,390 --> 01:18:42,560
need web they don't get time and they

1934
01:18:47,110 --> 01:18:44,400
debate the ones in the middle and they

1935
01:18:49,750 --> 01:18:47,120
fill up the time accordingly

1936
01:18:51,350 --> 01:18:49,760
so it's a very rigorous process as jane

1937
01:18:53,830 --> 01:18:51,360
explained

1938
01:18:55,189 --> 01:18:53,840

many people propose but they don't get

1939
01:18:57,110 --> 01:18:55,199
the time

1940
01:18:58,870 --> 01:18:57,120
every year there'll be another call and

1941
01:19:00,870 --> 01:18:58,880
so you'll get another shot and the year

1942
01:19:03,990 --> 01:19:00,880
after that and the year after that

1943
01:19:05,990 --> 01:19:04,000
um in terms of hubble and webb together

1944
01:19:07,590 --> 01:19:06,000
i actually want to flip the question a

1945
01:19:09,430 --> 01:19:07,600
little bit marcia i will share with you

1946
01:19:12,189 --> 01:19:09,440
that there have been

1947
01:19:14,550 --> 01:19:12,199
programs being done with hubble in

1948
01:19:15,750 --> 01:19:14,560
preparation for james webb space

1949
01:19:17,910 --> 01:19:15,760
telescope

1950
01:19:19,669 --> 01:19:17,920
really focusing for example on hubble's

1951
01:19:21,990 --> 01:19:19,679
uv capability

1952
01:19:23,990 --> 01:19:22,000
so that all of those observations are in

1953
01:19:25,990 --> 01:19:24,000
place so that when webb does

1954
01:19:28,390 --> 01:19:26,000
observations there's complementary

1955
01:19:29,350 --> 01:19:28,400
hubble observations as well

1956
01:19:32,229 --> 01:19:29,360
um

1957
01:19:33,590 --> 01:19:32,239
i don't i'm not do you know about hubble

1958
01:19:36,709 --> 01:19:33,600
web together okay i'm gonna let jane

1959
01:19:38,550 --> 01:19:36,719
answer the next part sure so and uh just

1960
01:19:41,750 --> 01:19:38,560
um to go back to that you asked about

1961
01:19:44,630 --> 01:19:41,760
the formal relationship so formally nasa

1962
01:19:46,630 --> 01:19:44,640
delegates uh the authority to the head

1963
01:19:48,470 --> 01:19:46,640

of stsci the space telescope science

1964
01:19:51,189 --> 01:19:48,480
institute so

1965
01:19:53,110 --> 01:19:51,199
the authority to select the cycle one

1966
01:19:55,189 --> 01:19:53,120
general observer programs is delegated

1967
01:19:57,110 --> 01:19:55,199
to the head of space telescope sciences

1968
01:20:00,070 --> 01:19:57,120
dude which is overseen by aura and then

1969
01:20:01,990 --> 01:20:00,080
nasa has oversight over that process so

1970
01:20:03,990 --> 01:20:02,000
um i got to be an observer watching that

1971
01:20:06,149 --> 01:20:04,000
whole process happening

1972
01:20:07,830 --> 01:20:06,159
sitting in on a lot of those meetings

1973
01:20:09,830 --> 01:20:07,840
as far as

1974
01:20:12,149 --> 01:20:09,840
doing joint time

1975
01:20:14,470 --> 01:20:12,159
it is a common thing that we do with

1976
01:20:17,030 --> 01:20:14,480
more established missions to do joint

1977
01:20:20,629 --> 01:20:17,040
time so that observers can apply

1978
01:20:22,550 --> 01:20:20,639
right one proposal to get to

1979
01:20:25,350 --> 01:20:22,560
to get time on two

1980
01:20:27,750 --> 01:20:25,360
nasa facilities we didn't do that for

1981
01:20:29,830 --> 01:20:27,760
the first cycle of web because because

1982
01:20:31,990 --> 01:20:29,840
we figured it would be really really

1983
01:20:33,830 --> 01:20:32,000
over subscribed be many proposals we got

1984
01:20:35,590 --> 01:20:33,840
over a thousand and we just wanted to

1985
01:20:37,189 --> 01:20:35,600
keep things a little simple that is

1986
01:20:38,629 --> 01:20:37,199
something we are exploring for the

1987
01:20:41,990 --> 01:20:38,639
second year

1988
01:20:49,590 --> 01:20:42,000

that of doing some joint proposals with

1989
01:20:56,070 --> 01:20:51,110
thank you our next question is from

1990
01:20:58,870 --> 01:20:56,080
daniel regaria from our drone ui

1991
01:21:00,790 --> 01:20:58,880
uh thank you thank you all for this time

1992
01:21:04,229 --> 01:21:00,800
i have two or three questions one of

1993
01:21:05,510 --> 01:21:04,239
them is the amateur

1994
01:21:06,629 --> 01:21:05,520
people

1995
01:21:08,310 --> 01:21:06,639
want to know

1996
01:21:10,390 --> 01:21:08,320
this is a really easy question and

1997
01:21:11,910 --> 01:21:10,400
what's the focal distance of the zenith

1998
01:21:12,950 --> 01:21:11,920
web telescope

1999
01:21:16,550 --> 01:21:12,960
but

2000
01:21:19,590 --> 01:21:16,560
my question uh on this is if we were

2001
01:21:23,510 --> 01:21:20,870
on our

2002
01:21:25,990 --> 01:21:23,520
opposite position of the galaxy not to

2003
01:21:28,629 --> 01:21:26,000
the center of the galaxy and that the

2004
01:21:30,870 --> 01:21:28,639
people that they place the people names

2005
01:21:32,870 --> 01:21:30,880
beyond the south wall

2006
01:21:36,550 --> 01:21:32,880
of the galaxy and the other one the last

2007
01:21:39,990 --> 01:21:36,560
one excuse me is um regarding

2008
01:21:40,830 --> 01:21:40,000
interstellar objects like omo amua

2009
01:21:43,750 --> 01:21:40,840
if

2010
01:21:46,470 --> 01:21:43,760
the director of science

2011
01:21:50,229 --> 01:21:46,480
they have a discretionary time for

2012
01:21:53,189 --> 01:21:50,239
predict the telescope in case we have a

2013
01:21:54,950 --> 01:21:53,199

in advance uh information of one

2014
01:21:57,189 --> 01:21:54,960
interstellar object

2015
01:21:59,189 --> 01:21:57,199
coming to our system thank you thank you

2016
01:22:02,870 --> 01:21:59,199
for your time and it will be a wonderful

2017
01:22:07,750 --> 01:22:04,709
focal length is easy so the effective

2018
01:22:09,350 --> 01:22:07,760
focal length is about 134 meters

2019
01:22:14,790 --> 01:22:09,360
so not to be confused with that focal

2020
01:22:21,430 --> 01:22:17,270
third one

2021
01:22:23,910 --> 01:22:21,440
interstellar object like omumu or

2022
01:22:29,110 --> 01:22:23,920
borisov we actually have what we call a

2023
01:22:33,030 --> 01:22:30,390
and um

2024
01:22:34,950 --> 01:22:33,040
therefore once we if we do find an

2025
01:22:37,990 --> 01:22:34,960
interstellar object we are ready to do

2026
01:22:40,550 --> 01:22:38,000
the science observations for that

2027
01:22:42,390 --> 01:22:40,560
and to follow up on that there are uh

2028
01:22:43,350 --> 01:22:42,400
there is discretionary time that the

2029
01:22:46,070 --> 01:22:43,360
director

2030
01:22:47,990 --> 01:22:46,080
can uh can choose generally for things

2031
01:22:50,550 --> 01:22:48,000
that could not have been foreseen at the

2032
01:22:52,709 --> 01:22:50,560
time of our annual call for proposals

2033
01:22:54,950 --> 01:22:52,719
which tends to be stuff blowing up stuff

2034
01:22:56,629 --> 01:22:54,960
going boom or stuff zipping through our

2035
01:22:58,629 --> 01:22:56,639
solar system from elsewhere in the

2036
01:23:01,110 --> 01:22:58,639
galaxy so there is an opportunity for

2037
01:23:02,550 --> 01:23:01,120
those sorts of unprecedented um could

2038
01:23:04,070 --> 01:23:02,560

not although in this case it was

2039
01:23:05,910 --> 01:23:04,080
precedented and they planned it it's a

2040
01:23:07,110 --> 01:23:05,920
proposal but for things that are truly

2041
01:23:08,950 --> 01:23:07,120
like oh my gosh no one could have

2042
01:23:10,950 --> 01:23:08,960
foreseen this there is an avenue for

2043
01:23:12,550 --> 01:23:10,960
those ideas to get in really fast into

2044
01:23:19,669 --> 01:23:12,560
the system and get those observations

2045
01:23:25,030 --> 01:23:21,750
our final question today is from irene

2046
01:23:26,709 --> 01:23:25,040
klotz from aviation week

2047
01:23:29,830 --> 01:23:26,719
thank you just real quick i wanted to

2048
01:23:33,350 --> 01:23:29,840
clarify the date of the mcc-2 barn the

2049
01:23:36,629 --> 01:23:33,360
nasa explorer tool shows it on i'll plug

2050
01:23:38,629 --> 01:23:36,639
26 not l plus 29

2051
01:23:40,550 --> 01:23:38,639
was that changed or is was that

2052
01:23:46,470 --> 01:23:40,560
incorrect so it is scheduled for the

2053
01:23:52,709 --> 01:23:48,950
correct it's scheduled for the 23rd

2054
01:23:53,990 --> 01:23:52,719
l plus 29 is the plan

2055
01:24:02,070 --> 01:23:54,000
thank you

2056
01:24:03,910 --> 01:24:02,080
great questions and wonderful answers i

2057
01:24:06,149 --> 01:24:03,920
really enjoyed listening to them

2058
01:24:08,629 --> 01:24:06,159
we are going to finish up this telecon

2059
01:24:10,550 --> 01:24:08,639
as always you can send us more questions

2060
01:24:12,229 --> 01:24:10,560
or get details hammered out if you need

2061
01:24:14,470 --> 01:24:12,239
to by sending an email to the office of

2062
01:24:15,189 --> 01:24:14,480
communications you can travel along with

2063
01:24:16,470 --> 01:24:15,199

us

2064
01:24:18,229 --> 01:24:16,480
through the rest of the journey at

2065
01:24:24,149 --> 01:24:18,239
nasa.gov

2066
01:24:31,340 --> 01:24:24,159
information at both places and thank you

2067
01:24:52,870 --> 01:24:42,900
[Music]

2068
01:24:54,790 --> 01:24:52,880
i have a feather

2069
01:24:56,550 --> 01:24:54,800
in my right hand a hammer

2070
01:24:58,229 --> 01:24:56,560
and i guess one of the reasons

2071
01:25:00,709 --> 01:24:58,239
we got here today was because of a

2072
01:25:03,110 --> 01:25:00,719
gentleman named galileo a long time ago

2073
01:25:05,750 --> 01:25:03,120
who made a rather significant discovery

2074
01:25:07,270 --> 01:25:05,760
about falling objects in gravity fields

2075
01:25:09,669 --> 01:25:07,280
and we thought that

2076
01:25:10,390 --> 01:25:09,679
where would be a better place to confirm

2077
01:25:11,669 --> 01:25:10,400
his

2078
01:25:13,510 --> 01:25:11,679
findings and