1
00:00:33,040 --> 00:00:44,069
uh

2
00:00:44,079 --> 00:01:16,550
oh

3
00:01:16,560 --> 00:01:52,710
so

4
00:01:52,720 --> 00:02:20,550
rebranding

5
00:02:20,560 --> 00:03:16,630
two minutes

6
00:03:16,640 --> 00:03:40,309
minutes

7
00:03:40,319 --> 00:03:56,550
are we starting with isaac

8
00:03:56,560 --> 00:04:54,260
okay

9
00:04:54,270 --> 00:05:14,629
[Applause]

10
00:05:14,639 --> 00:05:29,510
is

11
00:05:29,520 --> 00:05:54,710
oh

12
00:05:59,110 --> 00:05:56,790
good afternoon and welcome to nasa's

13
00:06:00,870 --> 00:05:59,120

kennedy space center i'm liam martin

14
00:06:03,990 --> 00:06:00,880
with nasa communications and you are

15
00:06:06,070 --> 00:06:04,000
watching the orbital flight test 2

16
00:06:08,790 --> 00:06:06,080
nasa virtual social thanks so much for

17
00:06:11,270 --> 00:06:08,800
being here today now orbital flight test

18
00:06:14,390 --> 00:06:11,280
2 is boeing's certification flight for

19
00:06:16,629 --> 00:06:14,400
their starliner spacecraft a critical

20
00:06:18,629 --> 00:06:16,639
step in having a vehicle that is

21
00:06:20,629 --> 00:06:18,639
certified to fly to and from the

22
00:06:23,110 --> 00:06:20,639
international space station on behalf of

23
00:06:24,870 --> 00:06:23,120
nasa's commercial crew program

24
00:06:27,110 --> 00:06:24,880
t2 is scheduled to launch from the cape

25
00:06:31,350 --> 00:06:27,120
canaveral space force station on may

26
00:06:34,230 --> 00:06:31,360
19th at 6 54 pm eastern time atop an

27
00:06:36,309 --> 00:06:34,240
atlas 5 rocket provided by the united

28
00:06:38,870 --> 00:06:36,319
launch alliance you can ask your

29
00:06:40,950 --> 00:06:38,880
questions today via facebook or

30
00:06:43,350 --> 00:06:40,960
by facebook in the comments youtube in

31
00:06:46,629 --> 00:06:43,360
the comments or on twitter by using

32
00:06:49,350 --> 00:06:46,639
ask nasa i'm joined here today by bob

33
00:06:51,430 --> 00:06:49,360
cadana associate administrator for nasa

34
00:06:53,510 --> 00:06:51,440
uh we have nasa astronaut sunny williams

35
00:06:55,909 --> 00:06:53,520
and then of course nasa astronaut

36
00:06:57,430 --> 00:06:55,919
mr mike fink thank you so much for being

37
00:06:59,189 --> 00:06:57,440
here today and taking the questions that

38
00:07:01,749 --> 00:06:59,199

we have coming in from all over the

39
00:07:02,950 --> 00:07:01,759
country and all over the world so we're

40
00:07:04,950 --> 00:07:02,960
actually going to start off a little bit

41
00:07:06,629 --> 00:07:04,960
differently than we normally do bob i'm

42
00:07:26,950 --> 00:07:06,639
actually going to let you ask the first

43
00:07:26,960 --> 00:07:31,749
but i'm really pleased to be here

44
00:07:36,150 --> 00:07:34,230
you guys have been you know following uh

45
00:07:38,629 --> 00:07:36,160
the bowling spacecraft for a long time

46
00:07:41,510 --> 00:07:38,639
participating in a developmental test

47
00:07:43,110 --> 00:07:41,520
flight you know and i'd like to know so

48
00:07:44,150 --> 00:07:43,120
what do you think about the spacecraft

49
00:07:47,029 --> 00:07:44,160
what he what are you guys going to be

50
00:07:47,909 --> 00:07:47,039
doing tonight uh as it gets ready to fly

51
00:07:50,150 --> 00:07:47,919
uh

52
00:07:52,869 --> 00:07:50,160
any thoughts of stone away or what's

53
00:07:55,430 --> 00:07:52,879
what's going through your minds

54
00:07:57,430 --> 00:07:55,440
yeah we would uh yeah you better check

55
00:07:58,950 --> 00:07:57,440
the badges at the end to see how many

56
00:08:01,189 --> 00:07:58,960
people go up and how many people come

57
00:08:03,749 --> 00:08:01,199
back i mean rosie looks you know she's

58
00:08:05,589 --> 00:08:03,759
uh she's the uh she's about my size yeah

59
00:08:07,110 --> 00:08:05,599
well coincidentally

60
00:08:09,110 --> 00:08:07,120
now i'm walking back with my friend

61
00:08:11,749 --> 00:08:09,120
sonny she's just not talking right now

62
00:08:13,670 --> 00:08:11,759
right uh so no we uh so we do we do have

63
00:08:15,189 --> 00:08:13,680

a test mannequin on board and and and

64
00:08:17,270 --> 00:08:15,199
she's instrumented so we'll be able to

65
00:08:20,150 --> 00:08:17,280
get some good flight test data uh you

66
00:08:21,830 --> 00:08:20,160
know go rosy um but yeah we would uh we

67
00:08:24,710 --> 00:08:21,840
just like you bobby we're looking

68
00:08:26,550 --> 00:08:24,720
forward to every flight but we won't fly

69
00:08:29,029 --> 00:08:26,560
you know people aboard starliner until

70
00:08:31,110 --> 00:08:29,039
it's ready and and sonny and i and barry

71
00:08:32,709 --> 00:08:31,120
wilmore butch uh we've been working

72
00:08:34,630 --> 00:08:32,719
along with uh you know from the

73
00:08:37,509 --> 00:08:34,640
astronaut office but along with our

74
00:08:39,269 --> 00:08:37,519
boeing friends uh to to get ready so

75
00:08:41,029 --> 00:08:39,279
that we can feel as an agency

76
00:08:42,149 --> 00:08:41,039
comfortable to fly people on board

77
00:08:43,110 --> 00:08:42,159
absolutely sonny you're going to be in

78
00:08:44,790 --> 00:08:43,120
the vehicle tonight what are you going

79
00:08:46,550 --> 00:08:44,800
to be doing both mike and i will be up

80
00:08:47,910 --> 00:08:46,560
there so it's really nice actually to be

81
00:08:49,350 --> 00:08:47,920
up there when it's night time and the

82
00:08:51,110 --> 00:08:49,360
lights are on the vehicle

83
00:08:53,110 --> 00:08:51,120
it'll be awesome we will be talking not

84
00:08:54,550 --> 00:08:53,120
like rosie not like rosie she does not

85
00:08:56,310 --> 00:08:54,560
talk so we will be doing the

86
00:08:58,470 --> 00:08:56,320
communications check for the vehicle

87
00:09:01,030 --> 00:08:58,480
we'll be talking to the folks here as

88
00:09:02,949 --> 00:09:01,040

well as folks back in houston and then

89
00:09:04,790 --> 00:09:02,959
we will also doing the final switch list

90
00:09:06,150 --> 00:09:04,800
which is historic we've done that in

91
00:09:08,710 --> 00:09:06,160
shuttle where we make sure all the

92
00:09:10,310 --> 00:09:08,720
switches are in the right configuration

93
00:09:11,829 --> 00:09:10,320
and then we'll leave a couple switches

94
00:09:13,269 --> 00:09:11,839
for the pad team who's out there who's

95
00:09:15,030 --> 00:09:13,279
going to be with the vehicle all night

96
00:09:16,310 --> 00:09:15,040
long until they actually do the close-up

97
00:09:17,590 --> 00:09:16,320
but it's going to be really exciting

98
00:09:19,269 --> 00:09:17,600
we'll we'll be

99
00:09:20,550 --> 00:09:19,279
waiting for a tdrs pass that's why it's

100
00:09:22,470 --> 00:09:20,560
going to be the time that it's going to

101
00:09:24,630 --> 00:09:22,480
be so we can actually simulate the

102
00:09:26,389 --> 00:09:24,640
communications that we'll be using while

103
00:09:28,150 --> 00:09:26,399
we're in space with the spacecraft so

104
00:09:29,910 --> 00:09:28,160
really exciting it's fun to be in there

105
00:09:32,790 --> 00:09:29,920
if you have to be we have to be careful

106
00:09:34,790 --> 00:09:32,800
i'm really excited that boeing and ula

107
00:09:36,230 --> 00:09:34,800
trust us to go up there and do that and

108
00:09:37,750 --> 00:09:36,240
make sure that we don't mess up the

109
00:09:39,829 --> 00:09:37,760
spacecraft but it's a little bit of a

110
00:09:42,470 --> 00:09:39,839
preview for what the crude flight test

111
00:09:44,630 --> 00:09:42,480
will be like in that same timeline

112
00:09:45,829 --> 00:09:44,640
later on when we get to do that

113
00:09:47,670 --> 00:09:45,839

awesome

114
00:09:49,430 --> 00:09:47,680
should we take some questions i think so

115
00:09:50,550 --> 00:09:49,440
i actually uh the first question i think

116
00:09:51,670 --> 00:09:50,560
is great and i'm going to address it to

117
00:09:53,430 --> 00:09:51,680
all of you because i want to hear your

118
00:09:55,430 --> 00:09:53,440
opinions on this we have a question that

119
00:09:57,430 --> 00:09:55,440
came in from facebook that said that we

120
00:09:59,590 --> 00:09:57,440
have a submitter who's in town with

121
00:10:01,430 --> 00:09:59,600
their family on vacation and they are so

122
00:10:04,630 --> 00:10:01,440
excited to see this launch and they want

123
00:10:06,790 --> 00:10:04,640
to know if you have any inside um inside

124
00:10:08,870 --> 00:10:06,800
information on the best place to catch a

125
00:10:11,509 --> 00:10:08,880
launch from the space coast

126
00:10:13,430 --> 00:10:11,519
well actually the very best place to

127
00:10:14,790 --> 00:10:13,440
catch a launch is on top of the rocket

128
00:10:16,550 --> 00:10:14,800
yes yes

129
00:10:18,949 --> 00:10:16,560
but you don't see the fire there but

130
00:10:20,710 --> 00:10:18,959
unfortunately unfortunately we can't all

131
00:10:21,750 --> 00:10:20,720
do that um

132
00:10:24,150 --> 00:10:21,760
you know

133
00:10:26,230 --> 00:10:24,160
there are so many good places uh to

134
00:10:28,870 --> 00:10:26,240
watch and depending on if you can get a

135
00:10:29,990 --> 00:10:28,880
car pass obviously be on on site here at

136
00:10:31,750 --> 00:10:30,000
ksc

137
00:10:33,190 --> 00:10:31,760
but there's places on the beach too if

138
00:10:35,350 --> 00:10:33,200

you're up in titusville up on the max

139
00:10:37,829 --> 00:10:35,360
brewer bridge is a great place to watch

140
00:10:40,310 --> 00:10:37,839
uh there's places along the indian river

141
00:10:44,470 --> 00:10:40,320
uh down at

142
00:10:47,430 --> 00:10:44,480
the park down in cape canaveral

143
00:10:50,069 --> 00:10:47,440
that's jetty park is a a great place to

144
00:10:52,630 --> 00:10:50,079
watch a launch so um

145
00:10:54,310 --> 00:10:52,640
i think you know any any other thoughts

146
00:10:55,829 --> 00:10:54,320
yeah i think anywhere on the space coast

147
00:10:57,670 --> 00:10:55,839
in particular because this spacecraft is

148
00:11:00,069 --> 00:10:57,680
going to the international space station

149
00:11:01,509 --> 00:11:00,079
so as it lifts off it's going to head up

150
00:11:02,949 --> 00:11:01,519
north ish

151
00:11:05,030 --> 00:11:02,959
to get on the inclination of the

152
00:11:07,269 --> 00:11:05,040
international space station so i even

153
00:11:09,430 --> 00:11:07,279
watched a launch from daytona not too

154
00:11:11,430 --> 00:11:09,440
long ago and it was still super

155
00:11:13,110 --> 00:11:11,440
impressive all the way up there you can

156
00:11:14,790 --> 00:11:13,120
actually see the fire

157
00:11:16,150 --> 00:11:14,800
you know the flame of the spacecraft

158
00:11:18,310 --> 00:11:16,160
starting up and then you could watch the

159
00:11:21,110 --> 00:11:18,320
trajectory so i think anywhere on the

160
00:11:24,150 --> 00:11:21,120
coast is particularly awesome yeah one

161
00:11:26,470 --> 00:11:24,160
one small thing to add is that um most

162
00:11:29,750 --> 00:11:26,480
nasa launches happen from here at the

163
00:11:32,630 --> 00:11:29,760

kennedy space center uh some uh uh um

164
00:11:34,470 --> 00:11:32,640
happened from the uh space force base uh

165
00:11:37,110 --> 00:11:34,480
but this is uh we're getting ready for

166
00:11:39,590 --> 00:11:37,120
the first humans to launch from uh cape

167
00:11:41,350 --> 00:11:39,600
canaveral in a long time so it's uh so

168
00:11:42,710 --> 00:11:41,360
you're gonna be able to see your kind of

169
00:11:44,389 --> 00:11:42,720
look where you normally look and just

170
00:11:46,389 --> 00:11:44,399
look a little bit south more south and

171
00:11:48,069 --> 00:11:46,399
that's where the this launch pad is uh

172
00:11:50,470 --> 00:11:48,079
most people you know we do launch

173
00:11:52,550 --> 00:11:50,480
atlases on a fairly regular basis but

174
00:11:55,030 --> 00:11:52,560
it's not like pad 39 where a lot of

175
00:11:57,190 --> 00:11:55,040
people are used to to looking for the

176
00:11:58,790 --> 00:11:57,200
launch absolutely and then of course if

177
00:12:01,750 --> 00:11:58,800
you're not local a great place to watch

178
00:12:02,949 --> 00:12:01,760
it is on uh nasa uh the nasa website and

179
00:12:05,590 --> 00:12:02,959
you can catch it from anywhere in the

180
00:12:07,590 --> 00:12:05,600
world nasa.gov that's exactly right um

181
00:12:08,629 --> 00:12:07,600
so we have another question we have um

182
00:12:10,470 --> 00:12:08,639
someone who's watching with their

183
00:12:12,550 --> 00:12:10,480
nine-year-old and they want to know what

184
00:12:15,269 --> 00:12:12,560
do you do with your free time on the

185
00:12:16,949 --> 00:12:15,279
international space station

186
00:12:19,030 --> 00:12:16,959
well you know you know we don't have

187
00:12:20,470 --> 00:12:19,040
that much free time but we do have free

188
00:12:22,389 --> 00:12:20,480

time you know and so you want to use it

189
00:12:24,389 --> 00:12:22,399
wisely right so i didn't want to do

190
00:12:25,829 --> 00:12:24,399
things on the space station that i did

191
00:12:27,590 --> 00:12:25,839
that i could do on earth so i want to do

192
00:12:29,110 --> 00:12:27,600
something different and one of the

193
00:12:30,790 --> 00:12:29,120
most fun things of course is floating

194
00:12:32,470 --> 00:12:30,800
and zooming around like a gymnast and

195
00:12:34,069 --> 00:12:32,480
that's super cool and also looking out

196
00:12:36,389 --> 00:12:34,079
the window looking back at our beautiful

197
00:12:38,150 --> 00:12:36,399
planet and just trying to identify

198
00:12:39,910 --> 00:12:38,160
places and things like that i think are

199
00:12:41,030 --> 00:12:39,920
a lot of fun but i think one other

200
00:12:43,110 --> 00:12:41,040
really cool thing is we're up there

201
00:12:44,150 --> 00:12:43,120
usually with the international team

202
00:12:45,990 --> 00:12:44,160
folks from

203
00:12:48,710 --> 00:12:46,000
all over the world and just spending

204
00:12:50,710 --> 00:12:48,720
time hanging out floating having dinner

205
00:12:52,870 --> 00:12:50,720
together i think is one of the most

206
00:12:55,110 --> 00:12:52,880
favorite times that i had up there

207
00:12:56,949 --> 00:12:55,120
yeah what she said we really love uh

208
00:12:58,790 --> 00:12:56,959
love looking out the window we have a

209
00:13:00,949 --> 00:12:58,800
beautiful planet planet earth and i got

210
00:13:02,949 --> 00:13:00,959
to see all kinds of places i've actually

211
00:13:05,190 --> 00:13:02,959
never been south of the equator except

212
00:13:06,470 --> 00:13:05,200
up in space i've never you know my feeds

213
00:13:08,470 --> 00:13:06,480

never touched but all these all these

214
00:13:11,030 --> 00:13:08,480
cool places to go explore on our own

215
00:13:12,710 --> 00:13:11,040
home planet or uh it's really a great

216
00:13:14,230 --> 00:13:12,720
thing to look out we have that beautiful

217
00:13:16,150 --> 00:13:14,240
cupola how would you compare looking out

218
00:13:18,069 --> 00:13:16,160
the cupola compared to when you do a

219
00:13:19,990 --> 00:13:18,079
spacewalk

220
00:13:22,150 --> 00:13:20,000
well let's see yeah i did a lot of space

221
00:13:24,629 --> 00:13:22,160
walks um space walks are amazing because

222
00:13:26,310 --> 00:13:24,639
you're outside and uh the rest of the

223
00:13:28,069 --> 00:13:26,320
universe is in front of you except for

224
00:13:29,910 --> 00:13:28,079
your you know the glass of your helmet

225
00:13:31,750 --> 00:13:29,920
and it's a it's really amazing but

226
00:13:33,829 --> 00:13:31,760
looking out of the cupola from the

227
00:13:35,910 --> 00:13:33,839
international space station is the next

228
00:13:38,629 --> 00:13:35,920
best thing and also on a spacewalk

229
00:13:40,230 --> 00:13:38,639
they're always telling you to do stuff

230
00:13:43,110 --> 00:13:40,240
you have to do work

231
00:13:44,470 --> 00:13:43,120
but it's nice when you do have free time

232
00:13:46,389 --> 00:13:44,480
like sunny said we don't get a lot but

233
00:13:47,670 --> 00:13:46,399
when we do we do look out the window and

234
00:13:50,069 --> 00:13:47,680
it's nice you're not you're not

235
00:13:51,670 --> 00:13:50,079
constrained confined by your spacesuit

236
00:13:53,189 --> 00:13:51,680
and you can just see the whole the whole

237
00:13:54,470 --> 00:13:53,199
universe

238
00:13:55,829 --> 00:13:54,480

yeah that's an opportunity you

239
00:13:57,269 --> 00:13:55,839
definitely have to take advantage of

240
00:13:58,710 --> 00:13:57,279
while you have it

241
00:14:00,069 --> 00:13:58,720
we have another question from katie on

242
00:14:01,829 --> 00:14:00,079
facebook and she wants to know what

243
00:14:05,030 --> 00:14:01,839
starliner will be bringing to the

244
00:14:08,710 --> 00:14:05,040
international space station

245
00:14:10,629 --> 00:14:08,720
cargo cargo yeah absolutely so well like

246
00:14:12,470 --> 00:14:10,639
mike alluded to already there's a

247
00:14:15,189 --> 00:14:12,480
there's a mannequin in there rosie and

248
00:14:17,829 --> 00:14:15,199
she's um she's going to be she's our

249
00:14:19,509 --> 00:14:17,839
test subject there so we'll get load

250
00:14:21,189 --> 00:14:19,519
data from her being in the seat so we'll

251
00:14:22,870 --> 00:14:21,199
be able to she's there but that's not

252
00:14:25,030 --> 00:14:22,880
going to the space station we also have

253
00:14:26,470 --> 00:14:25,040
like mike said some cargo that for the

254
00:14:29,350 --> 00:14:26,480
space station i think we're bringing up

255
00:14:31,189 --> 00:14:29,360
some eva hardware from nasa and some

256
00:14:33,189 --> 00:14:31,199
some stuff from from boeing that they're

257
00:14:35,350 --> 00:14:33,199
going to give to the space station so

258
00:14:38,550 --> 00:14:35,360
the the spacecraft isn't totally packed

259
00:14:40,069 --> 00:14:38,560
but it has enough stuff to uh have folks

260
00:14:41,670 --> 00:14:40,079
go in there and be able to operate the

261
00:14:43,430 --> 00:14:41,680
spacecraft and then some stuff that will

262
00:14:45,269 --> 00:14:43,440
transfer okay there's a little bit of

263
00:14:46,790 --> 00:14:45,279

cargo on there we have another question

264
00:14:48,870 --> 00:14:46,800
from facebook can you address this a

265
00:14:50,470 --> 00:14:48,880
little bit um about having roseanne

266
00:14:53,189 --> 00:14:50,480
board and this being an uncrewed flight

267
00:14:55,509 --> 00:14:53,199
test but uh how many people are going to

268
00:14:56,710 --> 00:14:55,519
be on board the space station or how

269
00:14:58,230 --> 00:14:56,720
many people are on board the space

270
00:15:00,150 --> 00:14:58,240
station right now and when will

271
00:15:01,910 --> 00:15:00,160
starliner start bringing astronauts to

272
00:15:03,910 --> 00:15:01,920
the iss

273
00:15:05,670 --> 00:15:03,920
we have seven people aboard the

274
00:15:06,550 --> 00:15:05,680
international space station right now we

275
00:15:08,949 --> 00:15:06,560
have

276
00:15:12,389 --> 00:15:08,959
three of our russian friends

277
00:15:13,910 --> 00:15:12,399
we have three americans and the fourth

278
00:15:16,310 --> 00:15:13,920
one is

279
00:15:18,629 --> 00:15:16,320
samantha samantha christopher reddy that

280
00:15:20,230 --> 00:15:18,639
she's from italy uh yes so and this is

281
00:15:22,790 --> 00:15:20,240
her second mission and i know she's

282
00:15:24,710 --> 00:15:22,800
super excited uh so they're aboard the

283
00:15:27,910 --> 00:15:24,720
international space station right now

284
00:15:30,310 --> 00:15:27,920
and we're going to get some help of um

285
00:15:33,350 --> 00:15:30,320
for starliner to be opened and we have

286
00:15:35,990 --> 00:15:33,360
looks like we have uh bob heinz and

287
00:15:38,389 --> 00:15:36,000
chell lindgren to open up the hatch and

288
00:15:40,710 --> 00:15:38,399

uh help uh and work with starliner

289
00:15:42,550 --> 00:15:40,720
although i think jessica watkins and and

290
00:15:43,910 --> 00:15:42,560
the rest of the team will probably you

291
00:15:45,509 --> 00:15:43,920
know take a look because it's nice to

292
00:15:47,430 --> 00:15:45,519
see a new spacecraft

293
00:15:50,310 --> 00:15:47,440
special spacecraft smell

294
00:15:51,749 --> 00:15:50,320
yeah and as far as flying uh crew on it

295
00:15:53,509 --> 00:15:51,759
you know we got to get this test flight

296
00:15:56,629 --> 00:15:53,519
done we have a lot of data that we have

297
00:15:57,509 --> 00:15:56,639
to get back from this mission and

298
00:15:58,949 --> 00:15:57,519
then

299
00:16:01,110 --> 00:15:58,959
we'll fly crew when we're ready right

300
00:16:03,030 --> 00:16:01,120
now it's possible we could fly it before

301
00:16:05,030 --> 00:16:03,040
the end of the year but

302
00:16:06,710 --> 00:16:05,040
we've got a lot to do yet to certify

303
00:16:09,189 --> 00:16:06,720
this vehicle to

304
00:16:11,990 --> 00:16:09,199
fly crew and it's really important that

305
00:16:13,749 --> 00:16:12,000
we have uh the boeing spacecraft also

306
00:16:16,470 --> 00:16:13,759
flying we want that dissimilar

307
00:16:18,069 --> 00:16:16,480
redundancy between spacex and boeing so

308
00:16:19,430 --> 00:16:18,079
that if there's a problem with one we

309
00:16:22,310 --> 00:16:19,440
still maintain access to our

310
00:16:24,389 --> 00:16:22,320
international space station absolutely

311
00:16:25,990 --> 00:16:24,399
oft has its own special place its own

312
00:16:27,509 --> 00:16:26,000
mission that it needs to you need to

313
00:16:29,990 --> 00:16:27,519

achieve before we move on to a crude

314
00:16:31,670 --> 00:16:30,000
launch um i love this question and i

315
00:16:34,389 --> 00:16:31,680
never get tired of hearing astronauts

316
00:16:36,069 --> 00:16:34,399
answer it how did you feel when you left

317
00:16:38,310 --> 00:16:36,079
on your first mission for your first

318
00:16:39,670 --> 00:16:38,320
launch what did that feel like

319
00:16:41,350 --> 00:16:39,680
um i'll

320
00:16:42,710 --> 00:16:41,360
say first and then i'm sure these guys

321
00:16:43,749 --> 00:16:42,720
both have something to say about it but

322
00:16:45,749 --> 00:16:43,759
you know like

323
00:16:47,509 --> 00:16:45,759
i i'm in the was in the military and we

324
00:16:49,030 --> 00:16:47,519
went on detachments or deployments

325
00:16:50,470 --> 00:16:49,040
rather and this sort of felt like the

326
00:16:52,949 --> 00:16:50,480
same way like one of those things that

327
00:16:54,310 --> 00:16:52,959
you want to do is make sure that you

328
00:16:56,550 --> 00:16:54,320
talk to your friends and family before

329
00:16:57,670 --> 00:16:56,560
you go and uh give them a big hug and

330
00:16:59,030 --> 00:16:57,680
remind them that you love them because

331
00:17:00,949 --> 00:16:59,040
you're going to be stick yourself on top

332
00:17:03,509 --> 00:17:00,959
of a very ex

333
00:17:05,189 --> 00:17:03,519
a big candle in other words you know and

334
00:17:06,870 --> 00:17:05,199
so um that was the first thing that i

335
00:17:08,870 --> 00:17:06,880
made sure that i got to do make sure i

336
00:17:10,870 --> 00:17:08,880
said hello and goodbye to my friends and

337
00:17:12,870 --> 00:17:10,880
family and then secondly i felt like it

338
00:17:15,029 --> 00:17:12,880

was a month before launch you just sort

339
00:17:16,789 --> 00:17:15,039
of get into this rhythm like you are you

340
00:17:18,230 --> 00:17:16,799
have a job to do you have things that

341
00:17:20,949 --> 00:17:18,240
you have to get done before you go and

342
00:17:22,789 --> 00:17:20,959
you were just sort of like on task um

343
00:17:24,230 --> 00:17:22,799
all of that sort of stopped though i

344
00:17:25,669 --> 00:17:24,240
will say when we got to the bottom of

345
00:17:27,189 --> 00:17:25,679
the space shuttle when we were walking

346
00:17:28,710 --> 00:17:27,199
out there for launch and i looked at

347
00:17:30,470 --> 00:17:28,720
this huge thing that i'd never seen

348
00:17:32,710 --> 00:17:30,480
fueled before sort of breathing and

349
00:17:34,549 --> 00:17:32,720
alive and my stomach sort of dropped a

350
00:17:36,630 --> 00:17:34,559
little bit oh my god this is what we're

351
00:17:38,710 --> 00:17:36,640
getting into and it sort of just sort of

352
00:17:40,630 --> 00:17:38,720
recalibrated myself about what we're

353
00:17:42,630 --> 00:17:40,640
doing and where we're going when we got

354
00:17:44,950 --> 00:17:42,640
up to the flight deck though or in

355
00:17:47,190 --> 00:17:44,960
getting into this the spacecraft all of

356
00:17:48,950 --> 00:17:47,200
a sudden i jumped right back into that

357
00:17:50,549 --> 00:17:48,960
that mindset of boom boom boom i've got

358
00:17:52,710 --> 00:17:50,559
this to do i've got that to do you know

359
00:17:55,190 --> 00:17:52,720
we make sure that we have we've trained

360
00:17:57,270 --> 00:17:55,200
for many many years we have tasks and we

361
00:17:59,270 --> 00:17:57,280
we are on task for when we're actually

362
00:18:01,750 --> 00:17:59,280
launching and i think the next time my

363
00:18:03,430 --> 00:18:01,760

body switched was when we got to space

364
00:18:04,710 --> 00:18:03,440
and then everything started floating and

365
00:18:06,310 --> 00:18:04,720
i mean i just couldn't stop laughing i'm

366
00:18:07,510 --> 00:18:06,320
like this is crazy oh my god there's my

367
00:18:09,270 --> 00:18:07,520
gloves there's my helmet everything's

368
00:18:10,630 --> 00:18:09,280
floating around i can't keep anything i

369
00:18:12,789 --> 00:18:10,640
have to stick it under my legs this is

370
00:18:15,750 --> 00:18:12,799
so unused not like what we did for

371
00:18:17,350 --> 00:18:15,760
training and i was just amazed in

372
00:18:18,870 --> 00:18:17,360
particular when i went to the flight

373
00:18:20,870 --> 00:18:18,880
deck of the space shuttle if you guys

374
00:18:22,710 --> 00:18:20,880
remember um you sat in that seat but i

375
00:18:25,990 --> 00:18:22,720
was downstairs got up there saw the

376
00:18:28,549 --> 00:18:26,000
planet it's round i was blown away like

377
00:18:31,029 --> 00:18:28,559
oh my god this is the most beautiful

378
00:18:33,270 --> 00:18:31,039
awesome place to be and the awesome view

379
00:18:35,270 --> 00:18:33,280
of our planet so like mike said

380
00:18:37,350 --> 00:18:35,280
priceless it was amazing so that that

381
00:18:39,830 --> 00:18:37,360
memory will never change in my mind it's

382
00:18:41,430 --> 00:18:39,840
just spectacular yeah so your first

383
00:18:42,390 --> 00:18:41,440
flight was on shuttle mine was on the

384
00:18:44,070 --> 00:18:42,400
soyuz

385
00:18:47,510 --> 00:18:44,080
and so it was a little bit different

386
00:18:50,549 --> 00:18:47,520
right we colombia had happened and so

387
00:18:54,070 --> 00:18:50,559
we quickly uh moved to sending iss crews

388
00:18:56,230 --> 00:18:54,080

to to uh to fly on soyuz and so i didn't

389
00:18:58,470 --> 00:18:56,240
get to see my family for you know like

390
00:18:59,990 --> 00:18:58,480
it felt like a you know a month

391
00:19:02,230 --> 00:19:00,000
and uh so i did you know my goodbyes

392
00:19:04,470 --> 00:19:02,240
were earlier and uh and it was very

393
00:19:06,549 --> 00:19:04,480
different in the in the russian system

394
00:19:08,789 --> 00:19:06,559
uh but it was still amazing i was uh i

395
00:19:11,190 --> 00:19:08,799
just i i remember after you know it took

396
00:19:13,669 --> 00:19:11,200
just nine minutes to get into orbit and

397
00:19:16,150 --> 00:19:13,679
i got to see the earth like right away

398
00:19:18,230 --> 00:19:16,160
and uh and it was uh and i'm pretty calm

399
00:19:19,909 --> 00:19:18,240
cool and collected steely i'd miss a man

400
00:19:22,710 --> 00:19:19,919
kind of guy and i couldn't breathe for

401
00:19:24,310 --> 00:19:22,720
30 seconds it was literally breathtaking

402
00:19:25,990 --> 00:19:24,320
and so bob yeah this windows on the

403
00:19:27,830 --> 00:19:26,000
space shuttle are like amazing aren't

404
00:19:30,549 --> 00:19:27,840
they so

405
00:19:32,630 --> 00:19:30,559
well first off that that first launch

406
00:19:33,909 --> 00:19:32,640
exactly like sunny said

407
00:19:36,549 --> 00:19:33,919
you know

408
00:19:38,870 --> 00:19:36,559
seeing the vehicle at 195 foot level

409
00:19:40,950 --> 00:19:38,880
getting ready to get in you cannot it's

410
00:19:42,950 --> 00:19:40,960
venting it's creaking it's like it's

411
00:19:44,230 --> 00:19:42,960
alive and and you look at it and you

412
00:19:45,830 --> 00:19:44,240
cannot believe in a couple hours you're

413
00:19:47,430 --> 00:19:45,840

going to be inside this thing blasting

414
00:19:49,830 --> 00:19:47,440
off into space

415
00:19:52,710 --> 00:19:49,840
and uh you know people ask me were you

416
00:19:53,510 --> 00:19:52,720
scared and i wasn't scared okay

417
00:19:55,110 --> 00:19:53,520
and

418
00:19:56,549 --> 00:19:55,120
but i will say you know i had the

419
00:19:58,789 --> 00:19:56,559
privilege of flying four times on the

420
00:20:01,350 --> 00:19:58,799
shuttle with each mission i was a little

421
00:20:03,029 --> 00:20:01,360
more apprehensive getting in the vehicle

422
00:20:05,590 --> 00:20:03,039
you know knowing knowing the risk you're

423
00:20:07,430 --> 00:20:05,600
taking but once inside i just had total

424
00:20:10,149 --> 00:20:07,440
peace and calm about what i was doing

425
00:20:12,149 --> 00:20:10,159
you're so well trained and on the later

426
00:20:14,310 --> 00:20:12,159
missions even more so because you're so

427
00:20:17,270 --> 00:20:14,320
familiar with what what you have to do

428
00:20:19,510 --> 00:20:17,280
but i'm telling you nothing prepares you

429
00:20:20,789 --> 00:20:19,520
for that first launch no simulator

430
00:20:22,230 --> 00:20:20,799
matches it

431
00:20:24,630 --> 00:20:22,240
especially on the shuttle because it

432
00:20:27,110 --> 00:20:24,640
just gets up and goes it's just this

433
00:20:29,270 --> 00:20:27,120
speed and acceleration and all those

434
00:20:30,870 --> 00:20:29,280
pops and crackles that you hear when you

435
00:20:32,390 --> 00:20:30,880
watch it you hear those in the cockpit

436
00:20:34,710 --> 00:20:32,400
and you're being pushed back in your

437
00:20:36,710 --> 00:20:34,720
seat and the gauges are shaking and it's

438
00:20:39,110 --> 00:20:36,720

just going and

439
00:20:41,110 --> 00:20:39,120
once you get off the solids it was like

440
00:20:43,750 --> 00:20:41,120
electric drive it was just as smooth as

441
00:20:45,990 --> 00:20:43,760
could be on those three main engines

442
00:20:50,710 --> 00:20:48,070
in retrospect i mean that first flight i

443
00:20:53,510 --> 00:20:50,720
did not look out the windows okay i i'm

444
00:20:56,390 --> 00:20:53,520
serious on launch i i was just so

445
00:20:58,789 --> 00:20:56,400
focused on on all the systems and the

446
00:20:59,909 --> 00:20:58,799
main engines and making sure because

447
00:21:01,669 --> 00:20:59,919
your biggest fear is that you do

448
00:21:03,669 --> 00:21:01,679
something wrong you know i mean that's

449
00:21:05,270 --> 00:21:03,679
the astronaut's prayer lord don't let me

450
00:21:07,110 --> 00:21:05,280
screw this up you know you don't want to

451
00:21:09,510 --> 00:21:07,120
let your team down right and you don't

452
00:21:11,270 --> 00:21:09,520
right so i was just so focused on

453
00:21:12,710 --> 00:21:11,280
everything that i had to do

454
00:21:13,830 --> 00:21:12,720
it wasn't until my second flight that i

455
00:21:15,510 --> 00:21:13,840
kind of looked out the window and said

456
00:21:17,510 --> 00:21:15,520
this is really cool but but i did look

457
00:21:19,110 --> 00:21:17,520
out the window at main engine cutoff now

458
00:21:21,669 --> 00:21:19,120
in the shuttle when the mansion's cut

459
00:21:23,190 --> 00:21:21,679
off you're about 65 miles above the

460
00:21:24,630 --> 00:21:23,200
earth and then you continue to coast out

461
00:21:28,070 --> 00:21:24,640
to your apogee depending on what your

462
00:21:30,390 --> 00:21:28,080
orbit is you know 160 to 220 nautical

463
00:21:32,310 --> 00:21:30,400

but even at 65 nautical miles you look

464
00:21:34,230 --> 00:21:32,320
out the window and and you can see the

465
00:21:35,909 --> 00:21:34,240
curvature of the earth and and the

466
00:21:37,510 --> 00:21:35,919
atmosphere and that thin little hazy

467
00:21:40,149 --> 00:21:37,520
line and the blackness of space and it's

468
00:21:42,789 --> 00:21:40,159
just it is the most amazing

469
00:21:46,070 --> 00:21:42,799
view now i can i ask a question these

470
00:21:48,470 --> 00:21:46,080
guys absolutely you know um

471
00:21:50,789 --> 00:21:48,480
spanky flew on on the soyuz if we were

472
00:21:52,549 --> 00:21:50,799
to push these seats closer together so

473
00:21:54,310 --> 00:21:52,559
that our arms were touching each other

474
00:21:55,669 --> 00:21:54,320
and then we had our knees up like this

475
00:21:57,270 --> 00:21:55,679
that's what it's like sitting in the

476
00:21:59,190 --> 00:21:57,280
soyuz

477
00:22:01,430 --> 00:21:59,200
compare that to uh

478
00:22:02,710 --> 00:22:01,440
to our new capsules i i don't know if

479
00:22:05,190 --> 00:22:02,720
you've

480
00:22:07,029 --> 00:22:05,200
the dragon and the and the uh boeing

481
00:22:10,549 --> 00:22:07,039
charlotte we've been in both uh both of

482
00:22:13,590 --> 00:22:10,559
them and uh yeah so uh soyuz was built

483
00:22:16,230 --> 00:22:13,600
for i guess soviet uh style uh male you

484
00:22:19,590 --> 00:22:16,240
know five foot four and uh wide and then

485
00:22:21,590 --> 00:22:19,600
five foot six tall and uh so we so i fit

486
00:22:23,430 --> 00:22:21,600
perfectly in soyuz but i think the

487
00:22:25,110 --> 00:22:23,440
taller folks it definitely was a little

488
00:22:27,669 --> 00:22:25,120

painful but we've taken that into

489
00:22:30,549 --> 00:22:27,679
consideration our modern uh spacecraft

490
00:22:32,789 --> 00:22:30,559
that we've worked with spacex and boeing

491
00:22:35,110 --> 00:22:32,799
there's a there's adequate legroom

492
00:22:36,870 --> 00:22:35,120
and uh and uh definitely a little bit

493
00:22:39,029 --> 00:22:36,880
more more room to move around but i'll

494
00:22:41,110 --> 00:22:39,039
say this the the shuttle was was really

495
00:22:43,110 --> 00:22:41,120
special we had a lot of room in shuttle

496
00:22:44,950 --> 00:22:43,120
i felt like i was flying first class and

497
00:22:46,470 --> 00:22:44,960
i could bring all my stuff with me and a

498
00:22:48,789 --> 00:22:46,480
lot of plenty of room for my legs to

499
00:22:50,549 --> 00:22:48,799
switch out and uh i think that both the

500
00:22:52,630 --> 00:22:50,559
starliner and the dragon aren't quite

501
00:22:54,630 --> 00:22:52,640
that but there's definitely a lot more

502
00:22:56,470 --> 00:22:54,640
a lot more room what do you think oh i

503
00:22:58,390 --> 00:22:56,480
agree you know that at least we're not

504
00:23:00,549 --> 00:22:58,400
way close to each other and the other

505
00:23:01,669 --> 00:23:00,559
thing that um i think is

506
00:23:04,070 --> 00:23:01,679
an improvement for both of these

507
00:23:06,710 --> 00:23:04,080
spacecraft compared to soyuz is your leg

508
00:23:08,470 --> 00:23:06,720
angle is essentially like a 90 degree um

509
00:23:10,070 --> 00:23:08,480
for both of them versus on soyuz you're

510
00:23:11,750 --> 00:23:10,080
a little bit curved up like that and

511
00:23:13,190 --> 00:23:11,760
when you're wearing a spacesuit that

512
00:23:14,390 --> 00:23:13,200
sort of hurts a little bit right behind

513
00:23:16,070 --> 00:23:14,400

your legs and you don't want your feet

514
00:23:17,830 --> 00:23:16,080
and stuff to go numb and so having a

515
00:23:20,149 --> 00:23:17,840
little bit better angle that of your

516
00:23:21,909 --> 00:23:20,159
legs your on your knees is is a lot more

517
00:23:24,630 --> 00:23:21,919
comfortable it makes sitting in on the

518
00:23:26,070 --> 00:23:24,640
launch pad for an hour or two or three a

519
00:23:27,990 --> 00:23:26,080
little bit more comfortable so both of

520
00:23:30,950 --> 00:23:28,000
these spacecraft are going to be a

521
00:23:33,270 --> 00:23:30,960
little bit more ergonomically

522
00:23:35,350 --> 00:23:33,280
correct in so far as comfort so they're

523
00:23:38,470 --> 00:23:35,360
nice

524
00:23:40,070 --> 00:23:38,480
well we just heard you talk about uh how

525
00:23:42,950 --> 00:23:40,080
incredible it was to have that first

526
00:23:44,470 --> 00:23:42,960
moment of liftoff as an astronaut and

527
00:23:46,470 --> 00:23:44,480
looking out at the earth so we actually

528
00:23:48,630 --> 00:23:46,480
have a second grade class who's watching

529
00:23:51,029 --> 00:23:48,640
right now and the teacher wants to know

530
00:23:53,029 --> 00:23:51,039
what advice you have for a kid who might

531
00:23:55,750 --> 00:23:53,039
want to work at nasa or become an

532
00:23:58,149 --> 00:23:55,760
astronaut one day

533
00:23:59,909 --> 00:23:58,159
so second grade right so in second grade

534
00:24:02,870 --> 00:23:59,919
you're like reading and you're going to

535
00:24:04,710 --> 00:24:02,880
think about chapter books someday and

536
00:24:06,630 --> 00:24:04,720
you're learning some really good math

537
00:24:08,549 --> 00:24:06,640
things so you know if you want to work

538
00:24:11,350 --> 00:24:08,559

at nasa or anywhere else just do really

539
00:24:12,950 --> 00:24:11,360
well in school that's my advice yeah and

540
00:24:14,549 --> 00:24:12,960
just to capitalize on that i totally

541
00:24:17,750 --> 00:24:14,559
agree and if you're like if you're

542
00:24:20,149 --> 00:24:17,760
curious and you like anything like um

543
00:24:21,590 --> 00:24:20,159
science for example like living animals

544
00:24:23,269 --> 00:24:21,600
or planting and all that kind of stuff

545
00:24:25,430 --> 00:24:23,279
that's the curiosity that we want to

546
00:24:27,590 --> 00:24:25,440
bring to the to our agency kids who are

547
00:24:29,590 --> 00:24:27,600
really curious and ask questions and try

548
00:24:31,510 --> 00:24:29,600
to figure things out that's that's the

549
00:24:33,830 --> 00:24:31,520
type of people we want also i will

550
00:24:35,669 --> 00:24:33,840
remind you just stay healthy i think one

551
00:24:37,190 --> 00:24:35,679
of the biggest things on the astronaut

552
00:24:38,630 --> 00:24:37,200
selection is making sure that we're

553
00:24:40,390 --> 00:24:38,640
healthy because we need to be healthy to

554
00:24:42,390 --> 00:24:40,400
go to space and we also need to be

555
00:24:43,750 --> 00:24:42,400
healthy to come back and live on earth

556
00:24:45,590 --> 00:24:43,760
it's a little bit of a ride as you can

557
00:24:47,430 --> 00:24:45,600
imagine we're describing a rocket ride

558
00:24:50,070 --> 00:24:47,440
and your body has to put up with that

559
00:24:51,669 --> 00:24:50,080
and so to do that very well is we we

560
00:24:53,990 --> 00:24:51,679
make sure that we're healthy we do

561
00:24:55,430 --> 00:24:54,000
exercise we eat right and we get enough

562
00:24:57,430 --> 00:24:55,440
sleep those are a couple things that are

563
00:24:58,789 --> 00:24:57,440

just sort of core and baseline for you

564
00:25:00,950 --> 00:24:58,799
guys in second grade that you can start

565
00:25:03,590 --> 00:25:00,960
now with good habits and those are just

566
00:25:05,590 --> 00:25:03,600
great so work hard in school and and

567
00:25:08,950 --> 00:25:05,600
stay healthy be physically fit totally

568
00:25:10,870 --> 00:25:08,960
agree and then i will also say in in in

569
00:25:12,149 --> 00:25:10,880
second grade it's a little bit hard but

570
00:25:13,590 --> 00:25:12,159
i remember

571
00:25:14,789 --> 00:25:13,600
when i was five years old i wanted to

572
00:25:16,870 --> 00:25:14,799
fly jets

573
00:25:18,470 --> 00:25:16,880
i wanted to fly airplanes and and i

574
00:25:19,909 --> 00:25:18,480
wanted to be a naval aviator and take

575
00:25:21,669 --> 00:25:19,919
off and land on aircraft that was my

576
00:25:23,830 --> 00:25:21,679
goal to fly and i read all the books i

577
00:25:25,029 --> 00:25:23,840
could about flying and stuff so i would

578
00:25:26,950 --> 00:25:25,039
also say

579
00:25:28,149 --> 00:25:26,960
find out what you enjoy now and the only

580
00:25:29,750 --> 00:25:28,159
way you can find out what you really

581
00:25:31,909 --> 00:25:29,760
enjoy is to try a lot of different

582
00:25:33,990 --> 00:25:31,919
things but if you find out something

583
00:25:35,830 --> 00:25:34,000
that you really enjoy that you're

584
00:25:37,750 --> 00:25:35,840
passionate about that you care about

585
00:25:39,669 --> 00:25:37,760
then studying in school isn't hard you

586
00:25:46,310 --> 00:25:39,679
study because you enjoy it and you want

587
00:25:49,190 --> 00:25:47,669
you get good grades because you're

588
00:25:50,710 --> 00:25:49,200

excited about it and then when you do

589
00:25:53,190 --> 00:25:50,720
get to be

590
00:25:55,029 --> 00:25:53,200
where you have a job works not work i i

591
00:25:56,470 --> 00:25:55,039
haven't worked a day in my life i mean

592
00:25:58,710 --> 00:25:56,480
i'm really old right now and i'm still

593
00:26:00,549 --> 00:25:58,720
having fun you know this is a great team

594
00:26:02,789 --> 00:26:00,559
to be a part of and the other thing i

595
00:26:04,950 --> 00:26:02,799
would say is you know don't give up if

596
00:26:07,350 --> 00:26:04,960
you don't get something on the first try

597
00:26:09,510 --> 00:26:07,360
don't give up try again and you know

598
00:26:11,990 --> 00:26:09,520
because if if you really want it then

599
00:26:13,909 --> 00:26:12,000
then don't give up and we need more than

600
00:26:16,230 --> 00:26:13,919
just astronauts at nasa we need

601
00:26:18,390 --> 00:26:16,240
everybody i don't care what you get a

602
00:26:20,710 --> 00:26:18,400
degree in in school there's a job for

603
00:26:23,909 --> 00:26:20,720
you at nasa absolutely

604
00:26:25,350 --> 00:26:23,919
oh man such a great answer

605
00:26:26,710 --> 00:26:25,360
i actually have a couple questions

606
00:26:28,390 --> 00:26:26,720
individually for each of you that have

607
00:26:31,269 --> 00:26:28,400
come in and i think i'm going to start

608
00:26:33,110 --> 00:26:31,279
with you bob we have someone who asked

609
00:26:35,190 --> 00:26:33,120
are you getting much time on the space

610
00:26:37,590 --> 00:26:35,200
coast are you getting to see many

611
00:26:39,750 --> 00:26:37,600
launches and how is it working

612
00:26:42,470 --> 00:26:39,760
for nasa in dc as opposed to here at

613
00:26:43,830 --> 00:26:42,480

kennedy space center well first off i i

614
00:26:46,549 --> 00:26:43,840
have to say

615
00:26:48,710 --> 00:26:46,559
we have an amazing team across nasa

616
00:26:51,350 --> 00:26:48,720
every center and

617
00:26:52,870 --> 00:26:51,360
and the leadership team now i am so

618
00:26:54,789 --> 00:26:52,880
pleased to be able to work for our

619
00:26:56,950 --> 00:26:54,799
administrator senator nelson and our

620
00:26:59,029 --> 00:26:56,960
deputy administrator pamela and i will

621
00:27:00,470 --> 00:26:59,039
tell folks be nice to the people that

622
00:27:02,390 --> 00:27:00,480
work for you because one day you might

623
00:27:03,750 --> 00:27:02,400
be working for them

624
00:27:05,350 --> 00:27:03,760
because when i was chief of the

625
00:27:07,909 --> 00:27:05,360
astronaut office

626
00:27:10,710 --> 00:27:07,919
and pam melroy used to work for me and

627
00:27:13,990 --> 00:27:10,720
uh no but i i mean it's it's a great

628
00:27:16,870 --> 00:27:14,000
team and i just really really enjoy uh

629
00:27:18,789 --> 00:27:16,880
working at nasa headquarters and and all

630
00:27:21,350 --> 00:27:18,799
the people that i get to interface with

631
00:27:23,830 --> 00:27:21,360
and it's our mission and what we have to

632
00:27:26,389 --> 00:27:23,840
do and it's just a it's everything that

633
00:27:28,549 --> 00:27:26,399
i've done throughout my career at nasa

634
00:27:30,630 --> 00:27:28,559
at a different level and to still be a

635
00:27:33,830 --> 00:27:30,640
part of it and to be able to help our

636
00:27:35,909 --> 00:27:33,840
nation's space program be successful i i

637
00:27:37,909 --> 00:27:35,919
absolutely am enjoying it now do i miss

638
00:27:40,310 --> 00:27:37,919

my friends down here on the space coast

639
00:27:42,950 --> 00:27:40,320
and in houston and it's dennis space

640
00:27:44,870 --> 00:27:42,960
center and across nasa absolutely but i

641
00:27:46,870 --> 00:27:44,880
get home on a regular basis and i get to

642
00:27:48,149 --> 00:27:46,880
see if you i love it when we have

643
00:27:51,029 --> 00:27:48,159
something like this where i can come

644
00:27:52,149 --> 00:27:51,039
home and my family uh still i have a son

645
00:27:54,470 --> 00:27:52,159
that retired from the marine corps and

646
00:27:55,750 --> 00:27:54,480
his family lives here in florida and so

647
00:27:57,430 --> 00:27:55,760
i love getting to see them on the

648
00:27:59,510 --> 00:27:57,440
weekend go to church and out to brunch

649
00:28:02,230 --> 00:27:59,520
and stuff so when i can get home it's

650
00:28:04,789 --> 00:28:02,240
really fun so yeah i'm doing a little a

651
00:28:07,510 --> 00:28:04,799
little both but i absolutely enjoy my

652
00:28:09,510 --> 00:28:07,520
job up in washington i i think

653
00:28:11,669 --> 00:28:09,520
i think we're doing well for nasa and i

654
00:28:13,510 --> 00:28:11,679
just want to see us be successful i want

655
00:28:16,389 --> 00:28:13,520
to see us get back to the moon and on to

656
00:28:18,470 --> 00:28:16,399
mars i want to see our our uh

657
00:28:20,630 --> 00:28:18,480
human space flight program successful

658
00:28:22,310 --> 00:28:20,640
let's keep working on iss

659
00:28:24,149 --> 00:28:22,320
and i'm sorry i'm getting carried away

660
00:28:26,630 --> 00:28:24,159
here i gotta i got one more thing i

661
00:28:28,789 --> 00:28:26,640
gotta say yeah so i get to go everywhere

662
00:28:31,029 --> 00:28:28,799
as a nasa associate administrator and

663
00:28:33,430 --> 00:28:31,039

i'm not responsible just for human space

664
00:28:35,830 --> 00:28:33,440
flight or or science missions space

665
00:28:37,590 --> 00:28:35,840
flight like i was when i was here and i

666
00:28:39,669 --> 00:28:37,600
get aero i used to be a test spot so i

667
00:28:42,549 --> 00:28:39,679
get that we're flying the x-57 and the

668
00:28:45,110 --> 00:28:42,559
x-59 this year two x-planes one electric

669
00:28:47,590 --> 00:28:45,120
one uh low boom supersonic aircraft for

670
00:28:51,190 --> 00:28:47,600
research that's really cool x-planes

671
00:28:53,430 --> 00:28:51,200
again at nasa and i was at the the

672
00:28:55,669 --> 00:28:53,440
space telescope institute in the control

673
00:28:56,950 --> 00:28:55,679
center for james webb oh my god how cool

674
00:29:00,070 --> 00:28:56,960
was that and

675
00:29:01,750 --> 00:29:00,080
and so it's all calibrated it's all

676
00:29:03,830 --> 00:29:01,760
cooled down they're getting ready to

677
00:29:05,590 --> 00:29:03,840
declare first light and i got to see

678
00:29:09,029 --> 00:29:05,600
pictures nobody else has seen and it's

679
00:29:11,029 --> 00:29:09,039
awesome it is so cool i cannot wait

680
00:29:12,710 --> 00:29:11,039
congratulations to our james webb team

681
00:29:14,710 --> 00:29:12,720
because they put a lot of work and a lot

682
00:29:16,870 --> 00:29:14,720
of time to get it and it's nice to see

683
00:29:18,789 --> 00:29:16,880
them so successful

684
00:29:21,750 --> 00:29:18,799
this next question is going to go to you

685
00:29:24,149 --> 00:29:21,760
jesse on facebook wants to know mike

686
00:29:27,669 --> 00:29:24,159
will the landing on starliner be similar

687
00:29:29,269 --> 00:29:27,679
to a soyuz landing will it be on land

688
00:29:31,430 --> 00:29:29,279

yes so

689
00:29:33,510 --> 00:29:31,440
landing means on land and i guess if it

690
00:29:36,310 --> 00:29:33,520
lands in the water we say splashdown

691
00:29:39,110 --> 00:29:36,320
right so starliner is built for landing

692
00:29:41,029 --> 00:29:39,120
and we're gonna and the nice thing about

693
00:29:43,269 --> 00:29:41,039
about the united states is we have uh

694
00:29:46,070 --> 00:29:43,279
these great expanses in our in our uh

695
00:29:48,149 --> 00:29:46,080
west of of our country so uh right now

696
00:29:51,510 --> 00:29:48,159
starliner's main landing spot is at the

697
00:29:53,269 --> 00:29:51,520
white sands uh space harbor or wish um

698
00:29:55,909 --> 00:29:53,279
and uh but there's other different

699
00:29:58,549 --> 00:29:55,919
places like dugway and wilcox and

700
00:29:59,909 --> 00:29:58,559
other places for the starliner deland

701
00:30:01,590 --> 00:29:59,919
but it's going to land on the ground and

702
00:30:03,590 --> 00:30:01,600
what i really like about starliner it

703
00:30:05,909 --> 00:30:03,600
has airbags we learned this maybe from

704
00:30:10,310 --> 00:30:05,919
the the mars program or something so on

705
00:30:12,389 --> 00:30:10,320
soyuz when we landed uh um we we had

706
00:30:14,230 --> 00:30:12,399
this retro rocket engine and it still

707
00:30:16,310 --> 00:30:14,240
does and it slows things down a little

708
00:30:17,990 --> 00:30:16,320
bit but it's still a kind of a hard

709
00:30:19,830 --> 00:30:18,000
landing but you know most people walk

710
00:30:22,789 --> 00:30:19,840
away from it just fine right now i think

711
00:30:24,710 --> 00:30:22,799
we all do um and then and of course on

712
00:30:27,430 --> 00:30:24,720
the space shuttle uh even especially

713
00:30:29,590 --> 00:30:27,440

when bob was flying

714
00:30:31,430 --> 00:30:29,600
yeah it was a very smooth it's a smooth

715
00:30:32,870 --> 00:30:31,440
landing and and uh near the end of the

716
00:30:34,470 --> 00:30:32,880
program it was mainly here at the

717
00:30:36,789 --> 00:30:34,480
kennedy space center right at the

718
00:30:38,789 --> 00:30:36,799
shuttle landing facility but we're on on

719
00:30:41,029 --> 00:30:38,799
starliner this the airbags they they

720
00:30:42,549 --> 00:30:41,039
open up they know they they inflate i

721
00:30:44,630 --> 00:30:42,559
don't know somewhere around six or seven

722
00:30:47,510 --> 00:30:44,640
thousand feet honey uh you know it's on

723
00:30:49,029 --> 00:30:47,520
our cue card we monitor it and override

724
00:30:50,950 --> 00:30:49,039
it if we have to but those airbags are

725
00:30:53,590 --> 00:30:50,960
going to come out and it's really we saw

726
00:30:55,590 --> 00:30:53,600
the first landing of of starliner a few

727
00:30:57,269 --> 00:30:55,600
years ago and it just it's just amazing

728
00:30:59,509 --> 00:30:57,279
so we're looking forward to a very soft

729
00:31:01,110 --> 00:30:59,519
landing with with starliner and it's

730
00:31:03,590 --> 00:31:01,120
really a cool design those airbags are

731
00:31:06,870 --> 00:31:03,600
built by ilc dover and it's it's kind of

732
00:31:08,950 --> 00:31:06,880
like two bags in one so they're big bags

733
00:31:11,350 --> 00:31:08,960
and when when it first hits there's like

734
00:31:13,029 --> 00:31:11,360
a blowout panel and so it collapses it

735
00:31:15,269 --> 00:31:13,039
blows out and the air collapses and then

736
00:31:17,110 --> 00:31:15,279
the second bag so it's a it's a double

737
00:31:19,430 --> 00:31:17,120
cushion as it comes down under those

738
00:31:20,789 --> 00:31:19,440

parachutes and yeah it looked pretty

739
00:31:21,909 --> 00:31:20,799
cool yeah when we saw when we were

740
00:31:23,990 --> 00:31:21,919
watching it it looked like it was

741
00:31:25,430 --> 00:31:24,000
landing on marshmallows it's just

742
00:31:27,350 --> 00:31:25,440
you know it just stopped right there

743
00:31:30,070 --> 00:31:27,360
looked super nice yeah i want to land on

744
00:31:32,310 --> 00:31:30,080
starliner i'll do that yeah and and

745
00:31:34,070 --> 00:31:32,320
rosie is going to get us some data yes

746
00:31:36,070 --> 00:31:34,080
that way we know it's safe for the

747
00:31:38,630 --> 00:31:36,080
future crews

748
00:31:40,230 --> 00:31:38,640
so speaking of uh making this safer

749
00:31:41,990 --> 00:31:40,240
future cruise we have a question that

750
00:31:44,070 --> 00:31:42,000
came in through social how long did it

751
00:31:45,750 --> 00:31:44,080
take you to learn to work with starliner

752
00:31:47,669 --> 00:31:45,760
getting ready for this flight test

753
00:31:49,990 --> 00:31:47,679
that's going to lead the way for crude

754
00:31:51,590 --> 00:31:50,000
flight tests later on this year so both

755
00:31:53,190 --> 00:31:51,600
mike and i have been working on this

756
00:31:56,230 --> 00:31:53,200
program for quite some time somewhere

757
00:31:58,310 --> 00:31:56,240
around 2014 2015 we started

758
00:31:59,830 --> 00:31:58,320
this contract was laid out and we

759
00:32:01,669 --> 00:31:59,840
started learning about the spacecraft

760
00:32:04,070 --> 00:32:01,679
but those spacecraft both this one and

761
00:32:05,669 --> 00:32:04,080
dragon were under development and so we

762
00:32:07,669 --> 00:32:05,679
would all go out to both

763
00:32:09,430 --> 00:32:07,679

companies and work with them to

764
00:32:11,430 --> 00:32:09,440
understand what it takes to actually put

765
00:32:13,430 --> 00:32:11,440
humans inside those spacecraft so both

766
00:32:16,630 --> 00:32:13,440
of us have been learning both spacecraft

767
00:32:18,789 --> 00:32:16,640
as as development for quite some time

768
00:32:21,909 --> 00:32:18,799
been sort of focused on starliner since

769
00:32:23,750 --> 00:32:21,919
about 2018 2020 time frame and so over

770
00:32:26,470 --> 00:32:23,760
the last couple years we've really dove

771
00:32:28,630 --> 00:32:26,480
into the development of the spacecraft

772
00:32:30,470 --> 00:32:28,640
everything that has to do with humans

773
00:32:32,630 --> 00:32:30,480
obviously we talked about

774
00:32:34,549 --> 00:32:32,640
parachutes and landing bags but you know

775
00:32:36,549 --> 00:32:34,559
and launches of course the seats we've

776
00:32:39,269 --> 00:32:36,559
talked about already the interface with

777
00:32:41,350 --> 00:32:39,279
the with the computers and the software

778
00:32:43,430 --> 00:32:41,360
involved that whole thing we've both

779
00:32:45,430 --> 00:32:43,440
been working on that as well as barry

780
00:32:47,430 --> 00:32:45,440
wilmore who we mentioned earlier butch

781
00:32:48,870 --> 00:32:47,440
for quite some time so um it's a little

782
00:32:50,470 --> 00:32:48,880
bit different than training for a space

783
00:32:53,029 --> 00:32:50,480
flight like when we both were flying

784
00:32:54,549 --> 00:32:53,039
soyuz and shuttle that program those

785
00:32:57,190 --> 00:32:54,559
programs had already been developed and

786
00:32:58,950 --> 00:32:57,200
we were in a specific training flow this

787
00:33:00,470 --> 00:32:58,960
has sort of been open-ended a little bit

788
00:33:02,230 --> 00:33:00,480

just because it's the first time that

789
00:33:04,630 --> 00:33:02,240
we're getting these spacecraft ready to

790
00:33:06,950 --> 00:33:04,640
fly so it's more working with the

791
00:33:08,789 --> 00:33:06,960
engineers versus having a trainer train

792
00:33:11,269 --> 00:33:08,799
you how to fly the spacecraft but it's

793
00:33:14,149 --> 00:33:11,279
been great senior astronauts we both

794
00:33:16,630 --> 00:33:14,159
flew on on soyuz and shuttle and we we

795
00:33:19,750 --> 00:33:16,640
know them uh well is that we're able to

796
00:33:21,990 --> 00:33:19,760
help nasa and help our our our industry

797
00:33:24,070 --> 00:33:22,000
partners at boeing and spacex to really

798
00:33:26,710 --> 00:33:24,080
give them some perspective that very few

799
00:33:28,310 --> 00:33:26,720
people on the planet uh have had and we

800
00:33:30,630 --> 00:33:28,320
can help them make things better so that

801
00:33:32,230 --> 00:33:30,640
we have safer flights and more reliable

802
00:33:33,830 --> 00:33:32,240
flights to the international space

803
00:33:36,230 --> 00:33:33,840
station and beyond i mean we're helping

804
00:33:37,590 --> 00:33:36,240
build a an economy a low earth orbit

805
00:33:38,630 --> 00:33:37,600
economy

806
00:33:40,310 --> 00:33:38,640
so that

807
00:33:42,389 --> 00:33:40,320
more people could fly in space and not

808
00:33:44,230 --> 00:33:42,399
all of them have to be nasa government

809
00:33:46,389 --> 00:33:44,240
astronauts and so that's uh i think

810
00:33:48,310 --> 00:33:46,399
that's uh sunny and i and and butch

811
00:33:50,630 --> 00:33:48,320
giving back to the giving back to the

812
00:33:53,750 --> 00:33:50,640
team giving back to nasa by helping make

813
00:33:55,750 --> 00:33:53,760

things better for the future absolutely

814
00:33:57,750 --> 00:33:55,760
it's really hard work what these guys

815
00:34:00,870 --> 00:33:57,760
are doing developmental flight test is

816
00:34:02,630 --> 00:34:00,880
just it's a constant you know iteration

817
00:34:04,230 --> 00:34:02,640
of making corrections working with the

818
00:34:06,310 --> 00:34:04,240
team making sure that the corrections

819
00:34:08,470 --> 00:34:06,320
got entered correctly and a lot of it

820
00:34:10,629 --> 00:34:08,480
comes down to software testing how much

821
00:34:11,909 --> 00:34:10,639
time have you guys spent just testing

822
00:34:13,589 --> 00:34:11,919
the software to make sure that

823
00:34:15,190 --> 00:34:13,599
everything's working right yeah you know

824
00:34:16,470 --> 00:34:15,200
i think we sometimes think of it as oh

825
00:34:17,909 --> 00:34:16,480
we'll do a sim and we'll see that it'll

826
00:34:19,589 --> 00:34:17,919
all go right but every time we get in

827
00:34:21,270 --> 00:34:19,599
the spacecraft and we go through a

828
00:34:22,710 --> 00:34:21,280
simulation with the control team they're

829
00:34:24,710 --> 00:34:22,720
also learning because they have their

830
00:34:26,550 --> 00:34:24,720
displays as well from that software we

831
00:34:28,470 --> 00:34:26,560
always find something new which is

832
00:34:31,349 --> 00:34:28,480
typical for this type of

833
00:34:32,950 --> 00:34:31,359
unique program and so i think it's been

834
00:34:34,629 --> 00:34:32,960
a couple years at least that we've been

835
00:34:37,349 --> 00:34:34,639
able to take a look at the software more

836
00:34:39,909 --> 00:34:37,359
recently we have um had able to look at

837
00:34:42,389 --> 00:34:39,919
the crude flight software this one will

838
00:34:44,230 --> 00:34:42,399

be oft will be specific for a non-crewed

839
00:34:45,909 --> 00:34:44,240
flight software obviously because the

840
00:34:47,510 --> 00:34:45,919
crews inside and will do some things

841
00:34:49,589 --> 00:34:47,520
this spacecraft has to do everything

842
00:34:50,869 --> 00:34:49,599
itself with the control team

843
00:34:53,030 --> 00:34:50,879
but we had the opportunity to look at

844
00:34:54,629 --> 00:34:53,040
our software which is an iteration

845
00:34:56,470 --> 00:34:54,639
further than this one and it's coming

846
00:34:58,230 --> 00:34:56,480
along really well but it doesn't mean it

847
00:35:00,150 --> 00:34:58,240
hasn't been with a lot of hard work a

848
00:35:01,829 --> 00:35:00,160
lot of people looking at this place

849
00:35:03,750 --> 00:35:01,839
trying to figure out what actually works

850
00:35:05,589 --> 00:35:03,760
what doesn't work uh how we can make it

851
00:35:07,109 --> 00:35:05,599
better to make it more understandable

852
00:35:08,950 --> 00:35:07,119
for the for the situational awareness

853
00:35:11,030 --> 00:35:08,960
for the crew on board so it's been a

854
00:35:13,190 --> 00:35:11,040
long time a lot of work coming together

855
00:35:14,550 --> 00:35:13,200
this isn't unique to the starliner we

856
00:35:17,349 --> 00:35:14,560
went through the same thing with the

857
00:35:20,310 --> 00:35:17,359
boeing uh or with the spacex uh crew

858
00:35:22,950 --> 00:35:20,320
dragon uh space station we spent hours

859
00:35:25,109 --> 00:35:22,960
testing in the lab and then and

860
00:35:27,109 --> 00:35:25,119
then we spent hours testing in florida

861
00:35:29,270 --> 00:35:27,119
with the real flight hardware uh to make

862
00:35:31,510 --> 00:35:29,280
sure it worked uh this is why we're

863
00:35:33,589 --> 00:35:31,520

testing right now with the space launch

864
00:35:35,109 --> 00:35:33,599
system and we have to go through a

865
00:35:37,910 --> 00:35:35,119
complete wet dress rehearsal we've

866
00:35:39,510 --> 00:35:37,920
tested the simulations in the launch

867
00:35:41,750 --> 00:35:39,520
control center in the firing room with

868
00:35:44,710 --> 00:35:41,760
the team but now we have the real flight

869
00:35:47,589 --> 00:35:44,720
hardware and we want to test that entire

870
00:35:49,109 --> 00:35:47,599
sequence down to t0 without actually

871
00:35:51,030 --> 00:35:49,119
lifting off to make sure that we

872
00:35:52,790 --> 00:35:51,040
understand all the systems and the

873
00:35:55,109 --> 00:35:52,800
software so that when we do launch

874
00:35:57,750 --> 00:35:55,119
everything works smoothly so yeah we

875
00:35:59,670 --> 00:35:57,760
astronauts spend a lot of time testing

876
00:36:01,430 --> 00:35:59,680
so back to the question of what we

877
00:36:03,430 --> 00:36:01,440
should do for the second graders well

878
00:36:06,710 --> 00:36:03,440
yeah know how to program computers that

879
00:36:11,589 --> 00:36:09,589
so how long will starliner stay uh talk

880
00:36:13,910 --> 00:36:11,599
to the iss and what is the main

881
00:36:15,750 --> 00:36:13,920
objective while it's there

882
00:36:17,349 --> 00:36:15,760
so starliner should only stay docked for

883
00:36:19,030 --> 00:36:17,359
about five years

884
00:36:20,710 --> 00:36:19,040
for this one for this one

885
00:36:22,230 --> 00:36:20,720
okay thank you for the correction only

886
00:36:24,150 --> 00:36:22,240
for about five days the main things that

887
00:36:26,310 --> 00:36:24,160
we want to see out of this mission is of

888
00:36:28,550 --> 00:36:26,320

course the combined work with ula the

889
00:36:30,230 --> 00:36:28,560
launch um and it going through its

890
00:36:31,750 --> 00:36:30,240
rendezvous profile to get up to the

891
00:36:33,829 --> 00:36:31,760
international space station there's some

892
00:36:35,910 --> 00:36:33,839
systems there that we're testing for

893
00:36:37,430 --> 00:36:35,920
rendezvous so that the spacecraft will

894
00:36:40,630 --> 00:36:37,440
see the international space station be

895
00:36:42,790 --> 00:36:40,640
able to locate it find it dock to it

896
00:36:44,310 --> 00:36:42,800
then we're going to power it down and

897
00:36:46,069 --> 00:36:44,320
the crew inside on the international

898
00:36:47,750 --> 00:36:46,079
space station will be able to go inside

899
00:36:49,750 --> 00:36:47,760
it get retrieve the cargo that we talked

900
00:36:50,710 --> 00:36:49,760
about and do a couple checks one of them

901
00:36:52,550 --> 00:36:50,720
would be

902
00:36:54,150 --> 00:36:52,560
voice checks just making sure the

903
00:36:55,990 --> 00:36:54,160
spacecraft when it's docked can talk to

904
00:36:58,310 --> 00:36:56,000
the space station somebody inside and

905
00:37:00,069 --> 00:36:58,320
also can talk back here to uh mission

906
00:37:01,190 --> 00:37:00,079
control station interfaces are really

907
00:37:03,349 --> 00:37:01,200
important it's really important to make

908
00:37:05,430 --> 00:37:03,359
sure that that that that action is is

909
00:37:07,109 --> 00:37:05,440
going to work fine and then of course

910
00:37:09,510 --> 00:37:07,119
see it undock go through that whole

911
00:37:12,630 --> 00:37:09,520
profile it will fly partially around the

912
00:37:14,630 --> 00:37:12,640
space station and then do its uh entry

913
00:37:16,470 --> 00:37:14,640

descent entry and then landing once

914
00:37:18,069 --> 00:37:16,480
again so parachutes and airbags pair

915
00:37:20,630 --> 00:37:18,079
shoots and bear airbags very important

916
00:37:22,790 --> 00:37:20,640
to knock on wood so yeah so it's a it's

917
00:37:24,630 --> 00:37:22,800
just that whole end-to-end test of the

918
00:37:26,950 --> 00:37:24,640
spacecraft particularly the rendezvous

919
00:37:29,190 --> 00:37:26,960
is something that we hadn't seen on oft

920
00:37:31,030 --> 00:37:29,200
the first oft so that'll be really

921
00:37:32,550 --> 00:37:31,040
exciting for us to see yeah automated

922
00:37:34,150 --> 00:37:32,560
rendezvous and docking is going to be

923
00:37:36,710 --> 00:37:34,160
critical we didn't get to do that on the

924
00:37:39,109 --> 00:37:36,720
first oft and

925
00:37:42,310 --> 00:37:39,119
part of that is this vision system they

926
00:37:44,470 --> 00:37:42,320
have vesta that's able to actually

927
00:37:46,550 --> 00:37:44,480
provide information to the computers on

928
00:37:48,069 --> 00:37:46,560
board the guidance and control computers

929
00:37:50,150 --> 00:37:48,079
to accurately dock with the space

930
00:37:52,310 --> 00:37:50,160
station so ensuring that all that works

931
00:37:54,790 --> 00:37:52,320
is designed is going to be critical

932
00:37:57,109 --> 00:37:54,800
yeah we'll be watching we'll be watching

933
00:37:58,550 --> 00:37:57,119
hopefully uh uh our friends out there

934
00:38:01,109 --> 00:37:58,560
will be watching too it's an exciting

935
00:38:03,430 --> 00:38:01,119
mission to the sky eyes to the sky

936
00:38:04,950 --> 00:38:03,440
so as we pick up our

937
00:38:07,270 --> 00:38:04,960
launch cadence here from kennedy and

938
00:38:09,349 --> 00:38:07,280

we're seeing an increase of these crude

939
00:38:11,030 --> 00:38:09,359
operational rotation missions on the iss

940
00:38:12,550 --> 00:38:11,040
that's continuing to enable the science

941
00:38:14,790 --> 00:38:12,560
and the important work that's being done

942
00:38:16,390 --> 00:38:14,800
on orbit we have a question from alex

943
00:38:18,710 --> 00:38:16,400
who wants to know if both the crew

944
00:38:20,069 --> 00:38:18,720
dragon in starliner spacecraft can be

945
00:38:22,230 --> 00:38:20,079
docked to the international space

946
00:38:23,270 --> 00:38:22,240
station at the same time

947
00:38:26,069 --> 00:38:23,280
yes

948
00:38:28,710 --> 00:38:26,079
we have two docking ports that are

949
00:38:29,990 --> 00:38:28,720
that work for the commercial crew

950
00:38:34,390 --> 00:38:30,000
spacecraft

951
00:38:36,550 --> 00:38:34,400
uh we have one at the forward part of

952
00:38:38,950 --> 00:38:36,560
the of the space station we call it node

953
00:38:41,670 --> 00:38:38,960
two forward and then we have one at the

954
00:38:44,550 --> 00:38:41,680
tippy top of the uh node two called node

955
00:38:46,550 --> 00:38:44,560
two zenith and uh so we can have right

956
00:38:48,790 --> 00:38:46,560
now there's only two docking ports that

957
00:38:51,349 --> 00:38:48,800
can handle um that can handle the

958
00:38:53,109 --> 00:38:51,359
docking we have another two ports that

959
00:38:55,030 --> 00:38:53,119
can handle birthing so if we bring up a

960
00:38:55,990 --> 00:38:55,040
cargo ship that that doesn't have people

961
00:38:57,430 --> 00:38:56,000
on board

962
00:38:59,670 --> 00:38:57,440
and that one that we have to kind of

963
00:39:01,270 --> 00:38:59,680

grab with the with the robot arm we can

964
00:39:03,589 --> 00:39:01,280
birth it so we have two docking ports

965
00:39:05,270 --> 00:39:03,599
two birthing ports and uh the space

966
00:39:07,109 --> 00:39:05,280
station's constantly evolving and i

967
00:39:08,950 --> 00:39:07,119
think in the future they'll be even a

968
00:39:10,630 --> 00:39:08,960
different configuration hey for those

969
00:39:13,109 --> 00:39:10,640
that understand explain the difference

970
00:39:15,750 --> 00:39:13,119
between docking and birthing yeah so a

971
00:39:16,790 --> 00:39:15,760
docking actually is an active

972
00:39:18,470 --> 00:39:16,800
um

973
00:39:21,270 --> 00:39:18,480
active uh

974
00:39:24,069 --> 00:39:21,280
um event where a spacecraft two

975
00:39:25,990 --> 00:39:24,079
spacecraft meet each other and uh and

976
00:39:29,670 --> 00:39:26,000
and so there's uh either people or

977
00:39:31,910 --> 00:39:29,680
automation involved and so uh so the

978
00:39:34,550 --> 00:39:31,920
starliner or the dragon will come and

979
00:39:37,750 --> 00:39:34,560
automatically find the space station and

980
00:39:40,230 --> 00:39:37,760
and and dock to it birthing we actually

981
00:39:42,230 --> 00:39:40,240
we have a different uh um a technique

982
00:39:44,390 --> 00:39:42,240
where we can where the spacecraft comes

983
00:39:47,030 --> 00:39:44,400
up and stays about 30 feet away 10

984
00:39:49,030 --> 00:39:47,040
meters and then the space station crew

985
00:39:52,069 --> 00:39:49,040
reaches out with the canada arm number

986
00:39:54,150 --> 00:39:52,079
two and grabs it and brings it in so

987
00:39:56,870 --> 00:39:54,160
it's not active by the spacecraft it's

988
00:39:58,390 --> 00:39:56,880

active by the space station crew pulling

989
00:39:59,109 --> 00:39:58,400
it in

990
00:40:01,190 --> 00:39:59,119
so

991
00:40:02,310 --> 00:40:01,200
robotics you guys have how how does the

992
00:40:03,670 --> 00:40:02,320
arm fly

993
00:40:05,910 --> 00:40:03,680
the arm is awesome

994
00:40:07,430 --> 00:40:05,920
you know it's it's pretty accurate same

995
00:40:09,190 --> 00:40:07,440
type of controllers that we have you

996
00:40:11,030 --> 00:40:09,200
know like we have more software more

997
00:40:13,109 --> 00:40:11,040
software more programming that we've had

998
00:40:14,390 --> 00:40:13,119
like in the shuttle or an um like it has

999
00:40:16,950 --> 00:40:14,400
a rotational hand control or a

1000
00:40:19,589 --> 00:40:16,960
translational hand controller um

1001
00:40:22,309 --> 00:40:19,599
we practice this quite a bit a number of

1002
00:40:23,750 --> 00:40:22,319
times to it's spacecraft that come up to

1003
00:40:25,589 --> 00:40:23,760
the space station like mike has

1004
00:40:27,750 --> 00:40:25,599
described and hover there they're

1005
00:40:29,270 --> 00:40:27,760
generally been pretty steady however

1006
00:40:31,270 --> 00:40:29,280
they have dead bands and they can move

1007
00:40:34,069 --> 00:40:31,280
around a little bit so as you drive the

1008
00:40:36,230 --> 00:40:34,079
robotic arm into a pin essentially it's

1009
00:40:37,990 --> 00:40:36,240
a moving target it's a moving target

1010
00:40:40,390 --> 00:40:38,000
there's a pin and the robotic arm comes

1011
00:40:41,750 --> 00:40:40,400
and flies over the pin and then can grab

1012
00:40:43,750 --> 00:40:41,760
onto it

1013
00:40:45,109 --> 00:40:43,760

it's pretty accurate how you can just

1014
00:40:46,550 --> 00:40:45,119
fly it right in there you might have to

1015
00:40:49,270 --> 00:40:46,560
control it just a little bit because of

1016
00:40:51,109 --> 00:40:49,280
those dead bands that i talked about but

1017
00:40:52,630 --> 00:40:51,119
it's it's pretty repeatable obviously

1018
00:40:54,790 --> 00:40:52,640
we've done it a number of times and

1019
00:40:56,230 --> 00:40:54,800
that's how we get our cargo that's how

1020
00:40:58,710 --> 00:40:56,240
we get

1021
00:41:00,470 --> 00:40:58,720
you know we also use those spacecraft as

1022
00:41:02,309 --> 00:41:00,480
uh disposal so we were able to put our

1023
00:41:04,069 --> 00:41:02,319
trash in those spacecraft and get rid of

1024
00:41:05,829 --> 00:41:04,079
our trash on the space station so it's

1025
00:41:07,510 --> 00:41:05,839
been a repeated thing so it flies the

1026
00:41:09,349 --> 00:41:07,520
canadian arm flies great actually you

1027
00:41:10,950 --> 00:41:09,359
know we we used it a number of times we

1028
00:41:13,030 --> 00:41:10,960
had to use it a number of times to put

1029
00:41:14,790 --> 00:41:13,040
the space station together so not only

1030
00:41:17,190 --> 00:41:14,800
these spacecraft that came up but

1031
00:41:19,910 --> 00:41:17,200
throughout the last two decades we used

1032
00:41:21,190 --> 00:41:19,920
it canada has been two two arms right

1033
00:41:23,109 --> 00:41:21,200
one on the shuttle the shuttle arm

1034
00:41:25,510 --> 00:41:23,119
canada arm one and then canada arm two

1035
00:41:27,589 --> 00:41:25,520
and i did i i started on two and then i

1036
00:41:29,510 --> 00:41:27,599
went back to one and uh so which one's

1037
00:41:31,030 --> 00:41:29,520
flies better i've flown the one on the

1038
00:41:32,870 --> 00:41:31,040

shuttle how's how's it compared to the

1039
00:41:34,470 --> 00:41:32,880
one i've only flown the simulator so i

1040
00:41:36,870 --> 00:41:34,480
what i really thought was really cool

1041
00:41:38,390 --> 00:41:36,880
about the shuttle-based canadarm1 you

1042
00:41:39,910 --> 00:41:38,400
could see what you're doing everything

1043
00:41:41,750 --> 00:41:39,920
was right there in real because the

1044
00:41:44,309 --> 00:41:41,760
shuttle windows were so good and what

1045
00:41:46,309 --> 00:41:44,319
they teach us and again i wasn't up

1046
00:41:48,069 --> 00:41:46,319
there for cupola for too much

1047
00:41:50,230 --> 00:41:48,079
but when you're flying canadarm2 it's

1048
00:41:51,829 --> 00:41:50,240
really you're focusing on your on your

1049
00:41:53,750 --> 00:41:51,839
displays and monitors and you're not

1050
00:41:57,430 --> 00:41:53,760
like looking out the window as much so

1051
00:41:59,670 --> 00:41:57,440
they're both fantastic uh canadarm2 is a

1052
00:42:01,109 --> 00:41:59,680
more capable it's bigger and stronger

1053
00:42:02,870 --> 00:42:01,119
but you can't see what you're doing

1054
00:42:04,950 --> 00:42:02,880
sometimes as much as you can i was so

1055
00:42:06,710 --> 00:42:04,960
impressed with the the shuttle yeah but

1056
00:42:07,910 --> 00:42:06,720
canadarm2 has some really unique

1057
00:42:09,910 --> 00:42:07,920
characteristics because it's seven

1058
00:42:11,829 --> 00:42:09,920
degrees of freedom so you can you can

1059
00:42:13,990 --> 00:42:11,839
move it all around like the one on the

1060
00:42:15,589 --> 00:42:14,000
shuttle it's based it was stuck so you

1061
00:42:17,670 --> 00:42:15,599
can only move it so much

1062
00:42:19,030 --> 00:42:17,680
that second arm is has tons of

1063
00:42:21,750 --> 00:42:19,040

capabilities could get you in trouble

1064
00:42:23,270 --> 00:42:21,760
you have to be a little bit careful

1065
00:42:24,470 --> 00:42:23,280
well we've actually had a lot of

1066
00:42:26,950 --> 00:42:24,480
interest

1067
00:42:29,270 --> 00:42:26,960
regarding life on orbit and what it

1068
00:42:30,550 --> 00:42:29,280
feels like to live and work

1069
00:42:33,190 --> 00:42:30,560
without a

1070
00:42:35,430 --> 00:42:33,200
with a zero gravity environment and so

1071
00:42:37,030 --> 00:42:35,440
one of our uh one of our submitters

1072
00:42:39,190 --> 00:42:37,040
wanted to know what do you do to minify

1073
00:42:40,950 --> 00:42:39,200
minimize the effects of microgravity on

1074
00:42:43,190 --> 00:42:40,960
your body and then suddenly specifically

1075
00:42:46,470 --> 00:42:43,200
justin wants to know what it was like

1076
00:42:47,990 --> 00:42:46,480
running a marathon on orbit my gosh that

1077
00:42:49,750 --> 00:42:48,000
was a little below in headwork as we

1078
00:42:50,870 --> 00:42:49,760
call it in the aviation world i i can't

1079
00:42:52,870 --> 00:42:50,880
believe i did that that was sort of

1080
00:42:54,870 --> 00:42:52,880
stupid anyway i signed up to do it and

1081
00:42:56,470 --> 00:42:54,880
so i i follow through on what i sign up

1082
00:42:58,710 --> 00:42:56,480
to do right so i

1083
00:43:01,109 --> 00:42:58,720
you're only 17 500 miles an hour i'm

1084
00:43:02,790 --> 00:43:01,119
done you're done right in one step

1085
00:43:03,829 --> 00:43:02,800
yeah i wasn't i'm not as smart as mike

1086
00:43:06,230 --> 00:43:03,839
over here i should have thought that

1087
00:43:07,430 --> 00:43:06,240
that one out a little bit better but um

1088
00:43:08,870 --> 00:43:07,440

so you know obviously we have a

1089
00:43:10,950 --> 00:43:08,880
treadmill on board because i was able to

1090
00:43:12,470 --> 00:43:10,960
run a marathon you wear a harness around

1091
00:43:14,309 --> 00:43:12,480
you and essentially has bungees that

1092
00:43:15,589 --> 00:43:14,319
connects you away yeah so yeah the

1093
00:43:17,030 --> 00:43:15,599
bungees connect you and every time you

1094
00:43:19,270 --> 00:43:17,040
take a step up it pulls you right back

1095
00:43:21,109 --> 00:43:19,280
down so you can regulate your weight if

1096
00:43:23,510 --> 00:43:21,119
you want to be a little skinnier you

1097
00:43:24,790 --> 00:43:23,520
don't make that bungee pull as far

1098
00:43:26,950 --> 00:43:24,800
all that to say

1099
00:43:28,950 --> 00:43:26,960
we tried to get to our natural weight or

1100
00:43:30,550 --> 00:43:28,960
normal weight by the time you end your

1101
00:43:32,069 --> 00:43:30,560
mission because you want to come back to

1102
00:43:33,750 --> 00:43:32,079
earth and be able to walk around and run

1103
00:43:36,230 --> 00:43:33,760
around and stuff when you get back we

1104
00:43:39,030 --> 00:43:36,240
also have a bicycle up there it doesn't

1105
00:43:40,470 --> 00:43:39,040
have a seat it's uh it has two uh pedals

1106
00:43:42,790 --> 00:43:40,480
where you click your feet in and then

1107
00:43:44,470 --> 00:43:42,800
you can you can ride a bicycle just like

1108
00:43:45,510 --> 00:43:44,480
you do here on earth

1109
00:43:47,510 --> 00:43:45,520
it's

1110
00:43:49,190 --> 00:43:47,520
you can also

1111
00:43:50,470 --> 00:43:49,200
change the amount of resistance that is

1112
00:43:52,790 --> 00:43:50,480
on it so you can make it harder and

1113
00:43:54,470 --> 00:43:52,800

harder we can you can program in hills

1114
00:43:57,270 --> 00:43:54,480
and stuff so it could really give you a

1115
00:43:59,510 --> 00:43:57,280
good cardiovascular workout and thirdly

1116
00:44:01,349 --> 00:43:59,520
we have the advanced resistive exercise

1117
00:44:02,470 --> 00:44:01,359
equipment and that is essentially mike

1118
00:44:05,750 --> 00:44:02,480
put it together

1119
00:44:07,430 --> 00:44:05,760
a weight machine a weight machine with a

1120
00:44:09,750 --> 00:44:07,440
bar which is really nice so you can

1121
00:44:11,349 --> 00:44:09,760
actually do like squats and deadlifts

1122
00:44:12,950 --> 00:44:11,359
and though that's very important to

1123
00:44:15,109 --> 00:44:12,960
maintain your bone density particularly

1124
00:44:17,270 --> 00:44:15,119
like in your hips and pelvis area and

1125
00:44:19,430 --> 00:44:17,280
and your legs and your ankles and so all

1126
00:44:21,109 --> 00:44:19,440
that keeps us in pretty good shape both

1127
00:44:22,790 --> 00:44:21,119
of us has have flown long duration

1128
00:44:23,589 --> 00:44:22,800
missions and we've come back been able

1129
00:44:27,190 --> 00:44:23,599
to

1130
00:44:29,270 --> 00:44:27,200
them a big hug when we got back and i

1131
00:44:31,109 --> 00:44:29,280
think that's a huge accomplishment um

1132
00:44:33,190 --> 00:44:31,119
considering when we had long-duration

1133
00:44:34,870 --> 00:44:33,200
folks in the past and other programs

1134
00:44:36,790 --> 00:44:34,880
that didn't have that equipment up there

1135
00:44:38,230 --> 00:44:36,800
and came back and had a little had to

1136
00:44:39,750 --> 00:44:38,240
spend a little bit more time in rehab

1137
00:44:41,750 --> 00:44:39,760
than than we had

1138
00:44:43,589 --> 00:44:41,760

so what they're not saying is that uh

1139
00:44:45,829 --> 00:44:43,599
the astronauts on the space station

1140
00:44:48,550 --> 00:44:45,839
unlike the shuttle we didn't have as

1141
00:44:49,589 --> 00:44:48,560
many devices or have to exercise as long

1142
00:44:51,589 --> 00:44:49,599
because we didn't have these long

1143
00:44:53,829 --> 00:44:51,599
duration missions they have mandatory

1144
00:44:57,030 --> 00:44:53,839
exercise two and a half hours a day

1145
00:44:59,270 --> 00:44:57,040
and what we found is

1146
00:45:00,790 --> 00:44:59,280
the loss of calcium in your bones when

1147
00:45:02,550 --> 00:45:00,800
you get in space when you get in space

1148
00:45:04,309 --> 00:45:02,560
your brain says i don't need a skeletal

1149
00:45:06,870 --> 00:45:04,319
structure to support my muscle mass

1150
00:45:08,630 --> 00:45:06,880
anymore like you do on earth and so you

1151
00:45:10,870 --> 00:45:08,640
actually shed calcium and it's very

1152
00:45:13,670 --> 00:45:10,880
similar to osteoporosis for women on

1153
00:45:15,910 --> 00:45:13,680
earth and you can take drugs but it's

1154
00:45:18,710 --> 00:45:15,920
not the same and what we've learned on

1155
00:45:20,390 --> 00:45:18,720
in space on space station is to combat

1156
00:45:22,069 --> 00:45:20,400
that loss of calcium in your bones to

1157
00:45:23,990 --> 00:45:22,079
keep your bones strong you need to run

1158
00:45:26,550 --> 00:45:24,000
on the treadmill you need that impact to

1159
00:45:28,309 --> 00:45:26,560
the bones but also the strength training

1160
00:45:30,470 --> 00:45:28,319
you need strong muscles and that also

1161
00:45:33,270 --> 00:45:30,480
keeps your bones from

1162
00:45:34,710 --> 00:45:33,280
degrading so it's a combination and two

1163
00:45:37,430 --> 00:45:34,720

and a half hours a day really important

1164
00:45:39,030 --> 00:45:37,440
right yeah it's but it's nice also

1165
00:45:41,190 --> 00:45:39,040
don't we all wish in our schedule here

1166
00:45:42,790 --> 00:45:41,200
today we had two and a half hours but it

1167
00:45:44,790 --> 00:45:42,800
really is necessary and i think there's

1168
00:45:46,790 --> 00:45:44,800
a you know there's a psychological uh a

1169
00:45:48,630 --> 00:45:46,800
part of that too it's just nice to shut

1170
00:45:50,230 --> 00:45:48,640
your brain off from the scientific work

1171
00:45:52,309 --> 00:45:50,240
and the environment you're in and just

1172
00:45:54,390 --> 00:45:52,319
go work out and space station is so big

1173
00:45:56,550 --> 00:45:54,400
so we have these really big exercise

1174
00:45:58,390 --> 00:45:56,560
devices aboard space station and as we

1175
00:45:59,349 --> 00:45:58,400
go to moon and mars

1176
00:46:01,109 --> 00:45:59,359
it's going

1177
00:46:02,309 --> 00:46:01,119
uh in gateway when we're orbiting the

1178
00:46:05,109 --> 00:46:02,319
moon so we're still weightless so we

1179
00:46:07,109 --> 00:46:05,119
don't even get the 16g of of the moon um

1180
00:46:08,550 --> 00:46:07,119
you know these exercise devices there's

1181
00:46:11,430 --> 00:46:08,560
i think a whole team at nasa that's

1182
00:46:12,950 --> 00:46:11,440
working on future exercise devices based

1183
00:46:15,190 --> 00:46:12,960
on what we know i want to go back to

1184
00:46:17,349 --> 00:46:15,200
what you said about stand physically fit

1185
00:46:19,510 --> 00:46:17,359
so you don't need a big gym to stay

1186
00:46:22,309 --> 00:46:19,520
physically fit wherever you go you can

1187
00:46:24,150 --> 00:46:22,319
walk walking is great for you and you

1188
00:46:26,069 --> 00:46:24,160

can do like i do and throw some bungee

1189
00:46:27,589 --> 00:46:26,079
cords in your backpack they take up no

1190
00:46:29,109 --> 00:46:27,599
room at all and by

1191
00:46:31,109 --> 00:46:29,119
how many bungees you have just hooking

1192
00:46:33,109 --> 00:46:31,119
it up to a doorknob you can get

1193
00:46:35,270 --> 00:46:33,119
exerciser and that's all the weight

1194
00:46:37,349 --> 00:46:35,280
machine is on the space station is a

1195
00:46:38,790 --> 00:46:37,359
bungee cord it's just essentially you're

1196
00:46:40,870 --> 00:46:38,800
just changing the strength of the

1197
00:46:42,069 --> 00:46:40,880
bungees

1198
00:46:43,510 --> 00:46:42,079
we're gonna have a bunch of second

1199
00:46:45,030 --> 00:46:43,520
graders going home asking their mom to

1200
00:46:47,829 --> 00:46:45,040
buy him some bungee cords after this

1201
00:46:49,589 --> 00:46:47,839
broadcast today programming course

1202
00:46:51,510 --> 00:46:49,599
programming course well i want to thank

1203
00:46:52,790 --> 00:46:51,520
you bob sonny mike thank you so much for

1204
00:46:55,030 --> 00:46:52,800
being here today and giving us some

1205
00:46:57,030 --> 00:46:55,040
insight not just of this mission but to

1206
00:46:58,870 --> 00:46:57,040
life at nasa and to life on board space

1207
00:47:00,870 --> 00:46:58,880
station it's invaluable and we really

1208
00:47:02,230 --> 00:47:00,880
appreciate the opportunity and to

1209
00:47:04,230 --> 00:47:02,240
everybody who's watching we'd like to

1210
00:47:06,630 --> 00:47:04,240
remind you that boeing's orbital flight

1211
00:47:10,150 --> 00:47:06,640
test is scheduled for tomorrow thursday

1212
00:47:11,990 --> 00:47:10,160
may 19th at 6 54 pm from cape canaveral

1213
00:47:13,349 --> 00:47:12,000

space for station we hope you'll tune in

1214
00:47:15,270 --> 00:47:13,359
and watch this

1215
00:47:17,990 --> 00:47:15,280
moment as we certify another vehicle

1216
00:47:20,549 --> 00:47:18,000
that will bring us one step closer uh to

1217
00:47:22,549 --> 00:47:20,559
having a redundant safe affordable