
13

1
00:06:16,550 --> 00:02:42,860
[Music]

2
00:06:18,150 --> 00:06:16,560
good afternoon and welcome to nasa's

3
00:06:20,070 --> 00:06:18,160
johnson space center for today's

4
00:06:21,990 --> 00:06:20,080
briefing to preview the upcoming series

5
00:06:25,110 --> 00:06:22,000
of spacewalks at the international space

6
00:06:26,870 --> 00:06:25,120
station and the status of spacex crew

7
00:06:28,309 --> 00:06:26,880
dragon which arrived at the station on

8
00:06:30,309 --> 00:06:28,319
may 31st

9
00:06:32,629 --> 00:06:30,319
joining me in studio today is a panel of

10
00:06:34,790 --> 00:06:32,639
experts ready to give those updates to

11
00:06:37,670 --> 00:06:34,800
my right is international space station

12
00:06:39,670 --> 00:06:37,680
deputy program manager kenny todd

13
00:06:41,749 --> 00:06:39,680

to his right is commercial crew program

14
00:06:43,830 --> 00:06:41,759
manager steve stitch

15
00:06:46,390 --> 00:06:43,840
and joining us from an adjacent studio

16
00:06:47,909 --> 00:06:46,400
to maintain social distancing is

17
00:06:49,830 --> 00:06:47,919
international space station flight

18
00:06:53,830 --> 00:06:49,840
director alison bollinger

19
00:06:56,950 --> 00:06:55,270
we're going to be taking questions

20
00:07:00,469 --> 00:06:56,960
through our phone bridge today and via

21
00:07:01,990 --> 00:07:00,479
social media using the hashtag ask nasa

22
00:07:04,870 --> 00:07:02,000
just a reminder if you're ready to have

23
00:07:06,710 --> 00:07:04,880
your question asked please press star 1

24
00:07:08,230 --> 00:07:06,720
to have your question answered and if

25
00:07:10,629 --> 00:07:08,240
your question has already been answered

26
00:07:11,990 --> 00:07:10,639
be sure to press star 2. before we get

27
00:07:13,670 --> 00:07:12,000
started taking those questions we're

28
00:07:16,150 --> 00:07:13,680
going to open it up here in the room for

29
00:07:17,510 --> 00:07:16,160
opening comments kenny take it away

30
00:07:19,589 --> 00:07:17,520
thanks courtney

31
00:07:21,670 --> 00:07:19,599
well uh uh you're used to seeing a few

32
00:07:23,749 --> 00:07:21,680
more people in the room here

33
00:07:26,629 --> 00:07:23,759
and that's unfortunate so i hope

34
00:07:27,990 --> 00:07:26,639
everybody out there is doing doing well

35
00:07:30,950 --> 00:07:28,000
certainly very excited to be here

36
00:07:32,790 --> 00:07:30,960
talking to you today about these evas

37
00:07:34,950 --> 00:07:32,800
hopefully most of you will remember

38
00:07:37,589 --> 00:07:34,960

several weeks ago when when

39
00:07:39,189 --> 00:07:37,599
the demo 2 crew got to orbit and people

40
00:07:40,710 --> 00:07:39,199
were asking well what are you going to

41
00:07:41,909 --> 00:07:40,720
going to do with them that was one of

42
00:07:44,070 --> 00:07:41,919
the first things out of my mouth is

43
00:07:46,469 --> 00:07:44,080
we're going to try to see if we can get

44
00:07:47,430 --> 00:07:46,479
some epa's done while these guys are on

45
00:07:50,230 --> 00:07:47,440
board

46
00:07:52,790 --> 00:07:50,240
certainly bob binkin a very accomplished

47
00:07:55,029 --> 00:07:52,800
space walker along with chris cassidy uh

48
00:07:56,629 --> 00:07:55,039
part of our current increment 63 crew

49
00:07:58,469 --> 00:07:56,639
and so we would we wanted to take

50
00:07:59,430 --> 00:07:58,479
advantage of that

51
00:08:03,589 --> 00:07:59,440
steve

52
00:08:05,510 --> 00:08:03,599
quite a bit of time together over the

53
00:08:06,710 --> 00:08:05,520
last couple of days and as recently as

54
00:08:08,150 --> 00:08:06,720
this morning

55
00:08:10,150 --> 00:08:08,160
continuing to talk about the forward

56
00:08:11,749 --> 00:08:10,160
plan for the demo 2 crew

57
00:08:13,189 --> 00:08:11,759
when they're they're going to return

58
00:08:15,430 --> 00:08:13,199
what our thinking is

59
00:08:18,309 --> 00:08:15,440
and how that might fold into our overall

60
00:08:20,550 --> 00:08:18,319
eva plan um again we'd like to get as

61
00:08:22,070 --> 00:08:20,560
many of these evas done as we can we we

62
00:08:25,589 --> 00:08:22,080
think it's somewhere between four and

63
00:08:28,070 --> 00:08:25,599

six to get both of these power channels

64
00:08:29,749 --> 00:08:28,080
swapped in terms of their batteries and

65
00:08:31,830 --> 00:08:29,759
so we're laying in a plan that will

66
00:08:33,190 --> 00:08:31,840
allow us to do that we got a couple of

67
00:08:35,029 --> 00:08:33,200
checkpoints along the way that we're

68
00:08:37,350 --> 00:08:35,039
going to going to be using to make sure

69
00:08:38,949 --> 00:08:37,360
that the the two programs are staying in

70
00:08:41,509 --> 00:08:38,959
sync relative to

71
00:08:43,750 --> 00:08:41,519
to the overall status with the with the

72
00:08:45,030 --> 00:08:43,760
crew dragon so that's uh that's the

73
00:08:47,030 --> 00:08:45,040
direction we're heading right now i'm

74
00:08:48,870 --> 00:08:47,040
really excited um

75
00:08:51,190 --> 00:08:48,880
this is a little bit of uh

76
00:08:53,110 --> 00:08:51,200
wash rinse repeat for me i think i've

77
00:08:55,190 --> 00:08:53,120
done this briefing on batteries about

78
00:08:56,949 --> 00:08:55,200
about four times it seems like because

79
00:08:58,150 --> 00:08:56,959
indeed this is the last

80
00:09:00,310 --> 00:08:58,160
set of channels that we're going to be

81
00:09:03,750 --> 00:09:00,320
doing these lithium ion battery swap

82
00:09:05,509 --> 00:09:03,760
outs and so uh for me it's it's great uh

83
00:09:06,710 --> 00:09:05,519
certainly satisfying to be at this point

84
00:09:08,310 --> 00:09:06,720
where we're where we're going to be

85
00:09:10,150 --> 00:09:08,320
finishing up these batteries and and

86
00:09:12,470 --> 00:09:10,160
putting station in a much better

87
00:09:15,110 --> 00:09:12,480
configuration long term uh these

88
00:09:17,190 --> 00:09:15,120

batteries uh have life uh you know 20

89
00:09:19,350 --> 00:09:17,200
plus years and so uh

90
00:09:22,230 --> 00:09:19,360
i think it's safe to say barring any

91
00:09:24,070 --> 00:09:22,240
unforeseen type of failures will will be

92
00:09:25,829 --> 00:09:24,080
good on batteries for a number of years

93
00:09:27,350 --> 00:09:25,839
to come from from a space station

94
00:09:29,990 --> 00:09:27,360
program standpoint and i think that

95
00:09:31,670 --> 00:09:30,000
bodes well for all of our users and and

96
00:09:34,310 --> 00:09:31,680
certainly all the systems that are

97
00:09:35,990 --> 00:09:34,320
currently on board the station

98
00:09:38,470 --> 00:09:36,000
as far as uh

99
00:09:41,590 --> 00:09:38,480
what's going on with vehicle traffic um

100
00:09:44,550 --> 00:09:41,600
we currently have the htv uh htv number

101
00:09:47,509 --> 00:09:44,560
nine uh currently on space station our

102
00:09:49,910 --> 00:09:47,519
plan was originally to uh to set that uh

103
00:09:52,389 --> 00:09:49,920
that particular htv free on the 20th of

104
00:09:54,070 --> 00:09:52,399
july but in order to enhance our

105
00:09:55,990 --> 00:09:54,080
position when it comes to trying to get

106
00:09:57,670 --> 00:09:56,000
as many ebas done as we can we've worked

107
00:09:59,829 --> 00:09:57,680
with our jax colleagues to move that

108
00:10:01,590 --> 00:09:59,839
departure date a little bit to the right

109
00:10:03,190 --> 00:10:01,600
so we'll do that sometime out in august

110
00:10:05,670 --> 00:10:03,200
we're still in the process of trying to

111
00:10:07,430 --> 00:10:05,680
determine exactly what that date is

112
00:10:09,509 --> 00:10:07,440
again along in concert with the

113
00:10:11,910 --> 00:10:09,519

commercial crew program steve stitch and

114
00:10:14,230 --> 00:10:11,920
his team to make sure that that we've

115
00:10:16,630 --> 00:10:14,240
got everything sequenced right and that

116
00:10:19,269 --> 00:10:16,640
we don't to put too much on the crew in

117
00:10:22,310 --> 00:10:19,279
one short period of time so anyway

118
00:10:24,790 --> 00:10:22,320
that's all still a plan and work so

119
00:10:26,310 --> 00:10:24,800
from there that'll take us uh towards

120
00:10:28,230 --> 00:10:26,320
the end of the increment

121
00:10:30,150 --> 00:10:28,240
which at this point will uh we'll wrap

122
00:10:32,470 --> 00:10:30,160
up around the middle of october time

123
00:10:34,150 --> 00:10:32,480
frame when anatoly

124
00:10:35,509 --> 00:10:34,160
and chris and yvonne

125
00:10:37,910 --> 00:10:35,519
return

126
00:10:40,150 --> 00:10:37,920
they will uh they will at that point

127
00:10:43,190 --> 00:10:40,160
leave the the the spacecraft in the in

128
00:10:45,430 --> 00:10:43,200
the capable hands of kate rubins and her

129
00:10:47,030 --> 00:10:45,440
russian crewmates and they'll take us on

130
00:10:49,829 --> 00:10:47,040
through through the end of the year and

131
00:10:51,509 --> 00:10:49,839
out into next year so anyway right now

132
00:10:53,350 --> 00:10:51,519
really excited about getting these evas

133
00:10:54,389 --> 00:10:53,360
going uh we'll we'll get going this

134
00:10:56,069 --> 00:10:54,399
friday

135
00:10:58,150 --> 00:10:56,079
after that we'll do the second eva on

136
00:10:59,910 --> 00:10:58,160
the on the first of july

137
00:11:02,389 --> 00:10:59,920
in the event that that we need a third

138
00:11:05,110 --> 00:11:02,399

eva uh just because these evas tend to

139
00:11:07,190 --> 00:11:05,120
run a little bit long uh if we have to

140
00:11:09,590 --> 00:11:07,200
roll over into a third eva we'll do that

141
00:11:11,590 --> 00:11:09,600
uh somewhere around the sixth of july

142
00:11:13,590 --> 00:11:11,600
and then and then as far as the second

143
00:11:15,670 --> 00:11:13,600
channel goes um

144
00:11:17,430 --> 00:11:15,680
we'll uh we're still trying to nail down

145
00:11:18,870 --> 00:11:17,440
those dates but hope to get going on

146
00:11:21,509 --> 00:11:18,880
that second channel around the middle of

147
00:11:24,470 --> 00:11:21,519
july so we'll we'll pass those dates on

148
00:11:25,590 --> 00:11:24,480
to you as as quick as we as as we pound

149
00:11:27,190 --> 00:11:25,600
those flat

150
00:11:28,630 --> 00:11:27,200
and with that i'll i'll hand it over

151
00:11:30,470 --> 00:11:28,640
steve

152
00:11:32,949 --> 00:11:30,480
thank you kenny it's uh it's great to be

153
00:11:35,750 --> 00:11:32,959
here today it's exciting to be uh

154
00:11:36,870 --> 00:11:35,760
supporting the space station uh and your

155
00:11:38,949 --> 00:11:36,880
mission

156
00:11:41,190 --> 00:11:38,959
um just give you a little update on the

157
00:11:43,190 --> 00:11:41,200
demo two uh test flight and how things

158
00:11:45,110 --> 00:11:43,200
have been going kind of hard to believe

159
00:11:46,949 --> 00:11:45,120
endeavour's been docked now for three

160
00:11:48,470 --> 00:11:46,959
and a half weeks so it seemed like it

161
00:11:50,310 --> 00:11:48,480
was just yesterday we launched and

162
00:11:51,670 --> 00:11:50,320
docked but we've been at station now for

163
00:11:53,990 --> 00:11:51,680

three and a half weeks

164
00:11:55,910 --> 00:11:54,000
the vehicle is doing extremely well

165
00:11:57,509 --> 00:11:55,920
as we put it through its paces we've

166
00:11:58,710 --> 00:11:57,519
been spending a lot of time watching how

167
00:12:01,430 --> 00:11:58,720
it performs

168
00:12:03,190 --> 00:12:01,440
uh thermally as we approach the period

169
00:12:05,350 --> 00:12:03,200
of time where the sun is a little bit

170
00:12:06,790 --> 00:12:05,360
brighter on the orbit and toward the

171
00:12:08,790 --> 00:12:06,800
high beta periods

172
00:12:09,990 --> 00:12:08,800
uh it's mainly in a quiescent state most

173
00:12:12,069 --> 00:12:10,000
of the time but we powered up every

174
00:12:13,590 --> 00:12:12,079
wednesday to check the systems to look

175
00:12:15,750 --> 00:12:13,600
at the solar ray performance in

176
00:12:16,949 --> 00:12:15,760
particular uh today when we power up

177
00:12:17,990 --> 00:12:16,959
we're going to do some prop system

178
00:12:19,269 --> 00:12:18,000
checkouts just to make sure that

179
00:12:21,670 --> 00:12:19,279
system's healthy

180
00:12:24,230 --> 00:12:21,680
we're learning a lot about the vehicle

181
00:12:26,310 --> 00:12:24,240
nothing that's uh of any concern

182
00:12:28,949 --> 00:12:26,320
learning how to manage uh the systems

183
00:12:30,150 --> 00:12:28,959
the heaters and thermal performance as

184
00:12:31,750 --> 00:12:30,160
we go through

185
00:12:33,110 --> 00:12:31,760
the changes in the orbit

186
00:12:35,670 --> 00:12:33,120
also we've been watching the power

187
00:12:37,829 --> 00:12:35,680
generation of dragon dragons generating

188
00:12:39,190 --> 00:12:37,839

more power than we expected that's going

189
00:12:41,590 --> 00:12:39,200
extremely well

190
00:12:42,710 --> 00:12:41,600
right now in terms of the predictions of

191
00:12:44,389 --> 00:12:42,720
if you remember when we talked

192
00:12:45,670 --> 00:12:44,399
pre-flight the solar arrays were kind of

193
00:12:47,190 --> 00:12:45,680
a limiting

194
00:12:48,629 --> 00:12:47,200
item for how long we could stay right

195
00:12:49,990 --> 00:12:48,639
now that's right on the predictions and

196
00:12:53,430 --> 00:12:50,000
so we should have

197
00:12:54,230 --> 00:12:53,440
about 114 or more days of capability

198
00:12:56,069 --> 00:12:54,240
uh

199
00:12:58,150 --> 00:12:56,079
did a lot of still while we're dock

200
00:12:59,110 --> 00:12:58,160
we're doing a lot of tests for this test

201
00:13:01,670 --> 00:12:59,120
flight

202
00:13:03,430 --> 00:13:01,680
we tested the safe haven capability

203
00:13:05,110 --> 00:13:03,440
that's the capability if the crew needs

204
00:13:07,030 --> 00:13:05,120
to go in dragon for some reason if they

205
00:13:08,790 --> 00:13:07,040
were a problem iss and stay

206
00:13:10,949 --> 00:13:08,800
for 24 hours

207
00:13:13,350 --> 00:13:10,959
without any supplies from the space

208
00:13:15,590 --> 00:13:13,360
station we tested that capability

209
00:13:17,110 --> 00:13:15,600
uh we've tested data exchange back and

210
00:13:18,069 --> 00:13:17,120
forth voice com

211
00:13:20,230 --> 00:13:18,079
between

212
00:13:21,910 --> 00:13:20,240
the space station and dragon the

213
00:13:23,750 --> 00:13:21,920

standard updates to the crew tablets and

214
00:13:25,670 --> 00:13:23,760
procedures we've tested all that and

215
00:13:27,990 --> 00:13:25,680
then coming up here probably after the

216
00:13:29,990 --> 00:13:28,000
july 4th holiday we'll have

217
00:13:32,230 --> 00:13:30,000
a testing of the habitability on board

218
00:13:34,629 --> 00:13:32,240
the dragon as we

219
00:13:37,190 --> 00:13:34,639
look ahead toward four crew capability

220
00:13:39,670 --> 00:13:37,200
we'll bring the crew over and

221
00:13:41,269 --> 00:13:39,680
look at how we might sleep in dragon and

222
00:13:42,710 --> 00:13:41,279
how we might use the other systems with

223
00:13:44,710 --> 00:13:42,720
four crew and so it's an important

224
00:13:46,790 --> 00:13:44,720
demonstration for us

225
00:13:48,870 --> 00:13:46,800
um you know we're looking at landing in

226
00:13:50,790 --> 00:13:48,880
the early august time frame we've been

227
00:13:53,670 --> 00:13:50,800
working hand-in-hand with kenny to lay

228
00:13:54,870 --> 00:13:53,680
out these evas so the first set of

229
00:13:57,829 --> 00:13:54,880
opportunities would be in the early

230
00:13:59,350 --> 00:13:57,839
august time frame and really right now

231
00:14:01,269 --> 00:13:59,360
the way the ebays are shaping up we

232
00:14:02,949 --> 00:14:01,279
think we would land in the august time

233
00:14:04,230 --> 00:14:02,959
frame and so the earliest would be

234
00:14:05,990 --> 00:14:04,240
around the second of august and we're

235
00:14:08,310 --> 00:14:06,000
working those opportunities with with

236
00:14:09,990 --> 00:14:08,320
the space station program

237
00:14:11,910 --> 00:14:10,000
uh just a little bit of a program status

238
00:14:14,069 --> 00:14:11,920

you know the next vehicle uh we are

239
00:14:15,670 --> 00:14:14,079
shifting in commercial crew

240
00:14:16,470 --> 00:14:15,680
kind of in the middle of this flight

241
00:14:18,710 --> 00:14:16,480
from

242
00:14:21,030 --> 00:14:18,720
the test flight mentality to

243
00:14:22,550 --> 00:14:21,040
getting a more normal capability to

244
00:14:25,269 --> 00:14:22,560
support space station increments and so

245
00:14:27,430 --> 00:14:25,279
that next vehicle the crew one vehicle

246
00:14:28,870 --> 00:14:27,440
is right now at the hawthorne facility

247
00:14:30,310 --> 00:14:28,880
in california

248
00:14:32,710 --> 00:14:30,320
it's undergoing checkouts of the

249
00:14:35,189 --> 00:14:32,720
propulsion system so there's a series of

250
00:14:36,629 --> 00:14:35,199
leak checks and valve checks that happen

251
00:14:37,910 --> 00:14:36,639
uh that should be going on through the

252
00:14:40,310 --> 00:14:37,920
end of june

253
00:14:44,150 --> 00:14:40,320
uh the trunk part of the dragon will go

254
00:14:46,310 --> 00:14:44,160
into acoustic testing uh later this week

255
00:14:49,030 --> 00:14:46,320
and then uh we should ship both the

256
00:14:50,550 --> 00:14:49,040
trunk and the dragon to ksc

257
00:14:52,389 --> 00:14:50,560
uh by the end of next month by the end

258
00:14:54,389 --> 00:14:52,399
of july they should be at ksc to support

259
00:14:56,470 --> 00:14:54,399
crew one

260
00:14:58,629 --> 00:14:56,480
of course that vehicle the crew in one

261
00:15:00,470 --> 00:14:58,639
vehicle has more capability than than

262
00:15:02,550 --> 00:15:00,480
the current dragon on orbit it'll have

263
00:15:04,949 --> 00:15:02,560

the capability to dock at the zenith

264
00:15:06,710 --> 00:15:04,959
port on the top of the space station and

265
00:15:08,310 --> 00:15:06,720
also to relocate ports and a few other

266
00:15:09,990 --> 00:15:08,320
capabilities

267
00:15:12,069 --> 00:15:10,000
uh the launch vehicles coming along

268
00:15:14,470 --> 00:15:12,079
right now we're shipping the the first

269
00:15:18,470 --> 00:15:14,480
stage for that crew one flight

270
00:15:20,470 --> 00:15:18,480
uh from uh mcgregor texas uh down to ksc

271
00:15:22,790 --> 00:15:20,480
and then uh later and that should happen

272
00:15:24,870 --> 00:15:22,800
this week as well and then then uh next

273
00:15:27,430 --> 00:15:24,880
month we should test the second stage

274
00:15:28,949 --> 00:15:27,440
for crew one uh out at mcgregor texas

275
00:15:30,710 --> 00:15:28,959
and then that will ship down to ksc as

276
00:15:33,749 --> 00:15:30,720
well so we'll be in good position

277
00:15:34,629 --> 00:15:33,759
for a crew one launch uh uh later this

278
00:15:36,470 --> 00:15:34,639
year

279
00:15:39,030 --> 00:15:36,480
we do have been working very carefully

280
00:15:40,470 --> 00:15:39,040
the schedule between the demo2 landing

281
00:15:42,629 --> 00:15:40,480
and crew one launch and right now we

282
00:15:45,430 --> 00:15:42,639
think we need about six weeks of time

283
00:15:47,829 --> 00:15:45,440
to review all the data uh from the the

284
00:15:49,670 --> 00:15:47,839
landing and the undocking and then go

285
00:15:51,110 --> 00:15:49,680
through the review process to get to the

286
00:15:52,230 --> 00:15:51,120
crude one launch so there's kind of a

287
00:15:53,189 --> 00:15:52,240
six-week

288
00:15:55,509 --> 00:15:53,199

uh

289
00:15:56,949 --> 00:15:55,519
iron bar if you will between the demo

290
00:15:58,150 --> 00:15:56,959
two landing and the crew one launch and

291
00:16:01,269 --> 00:15:58,160
that's going to be a factor as we look

292
00:16:02,870 --> 00:16:01,279
at launch dates later on for crew one

293
00:16:04,629 --> 00:16:02,880
in terms of boeing right now they're

294
00:16:07,430 --> 00:16:04,639
targeting for a launch at the end of

295
00:16:10,550 --> 00:16:07,440
this year uh made a lot of changes to

296
00:16:12,870 --> 00:16:10,560
the vehicle for the second oft flight

297
00:16:14,389 --> 00:16:12,880
and updating the software is really the

298
00:16:16,150 --> 00:16:14,399
pacing item and the testing that's

299
00:16:18,230 --> 00:16:16,160
required for that we had a great review

300
00:16:21,350 --> 00:16:18,240
with boeing on friday and that vehicle

301
00:16:23,430 --> 00:16:21,360
is progressing well also at ksc

302
00:16:25,030 --> 00:16:23,440
overall the ccp team is doing a great

303
00:16:27,590 --> 00:16:25,040
job we're now transitioning to this

304
00:16:28,629 --> 00:16:27,600
multi-mission phase to support iss

305
00:16:30,710 --> 00:16:28,639
and we look forward to working with

306
00:16:32,470 --> 00:16:30,720
kenny on many more missions including

307
00:16:37,509 --> 00:16:32,480
this one and now i'll turn it over to

308
00:16:41,829 --> 00:16:39,590
all right thank you steve so i'd like to

309
00:16:44,230 --> 00:16:41,839
echo kenny's comments and express how

310
00:16:46,310 --> 00:16:44,240
excited our team is to be part of this

311
00:16:47,749 --> 00:16:46,320
fourth and final upgrade of lithium-ion

312
00:16:50,069 --> 00:16:47,759
batteries aboard the international space

313
00:16:51,430 --> 00:16:50,079

station so also echoing kenny's comments

314
00:16:53,350 --> 00:16:51,440
it's going to feel a lot like a rinse

315
00:16:55,829 --> 00:16:53,360
and repeat if you were here for the p6

316
00:16:57,910 --> 00:16:55,839
evas that we did in october of last year

317
00:16:59,590 --> 00:16:57,920
and january of this year but if you'll

318
00:17:00,949 --> 00:16:59,600
humor me for a few minutes since this

319
00:17:02,870 --> 00:17:00,959
this is the last time we'll be briefing

320
00:17:04,390 --> 00:17:02,880
these battery evas we'll take a quick

321
00:17:06,230 --> 00:17:04,400
walk down memory lane

322
00:17:08,470 --> 00:17:06,240
so we first started the lithium-ion

323
00:17:11,510 --> 00:17:08,480
battery upgrades on the s4 truss back in

324
00:17:14,470 --> 00:17:11,520
2017 and then we followed on with the p4

325
00:17:16,230 --> 00:17:14,480
truss in 2019 and what's different about

326
00:17:17,829 --> 00:17:16,240
those evas and when we started moving

327
00:17:19,029 --> 00:17:17,839
farther outboard is due to the close

328
00:17:20,789 --> 00:17:19,039
proximity

329
00:17:23,029 --> 00:17:20,799
to the center line of the space station

330
00:17:24,789 --> 00:17:23,039
we were able to use spm or the special

331
00:17:26,870 --> 00:17:24,799
purpose dexterous manipulator to do a

332
00:17:28,549 --> 00:17:26,880
majority of the heavy lifting in terms

333
00:17:30,789 --> 00:17:28,559
of the lithium-ion versus nickel

334
00:17:33,029 --> 00:17:30,799
hydrogen battery swaps so for each of

335
00:17:35,830 --> 00:17:33,039
those elements we only needed one eva

336
00:17:37,669 --> 00:17:35,840
per channel or two evas total to finish

337
00:17:39,590 --> 00:17:37,679
up what batteries spdm couldn't reach

338
00:17:41,669 --> 00:17:39,600

and then to install the adapter plate

339
00:17:43,029 --> 00:17:41,679
and its associated electrical connector

340
00:17:45,669 --> 00:17:43,039
that completes the circuit between the

341
00:17:48,950 --> 00:17:45,679
lithium-ion battery and the the bcdu

342
00:17:50,630 --> 00:17:48,960
pair or battery charge discharge unit

343
00:17:53,270 --> 00:17:50,640
so with all that in mind once we started

344
00:17:55,350 --> 00:17:53,280
moving farther outboard on the p6 truss

345
00:17:57,110 --> 00:17:55,360
spdm isn't able to reach out that far so

346
00:17:59,990 --> 00:17:57,120
we had to do all the heavy lifting by

347
00:18:01,190 --> 00:18:00,000
hand by gloved hand if you will so on p6

348
00:18:02,950 --> 00:18:01,200
if you'll remember when we started to

349
00:18:05,590 --> 00:18:02,960
step into these evas in october the

350
00:18:07,350 --> 00:18:05,600
original plan was for a five eva series

351
00:18:09,110 --> 00:18:07,360
it would take them two and a half evas

352
00:18:11,029 --> 00:18:09,120
to do the first channel two and a half

353
00:18:12,870 --> 00:18:11,039
evas to do the second channel they were

354
00:18:14,870 --> 00:18:12,880
able to find some efficiencies real time

355
00:18:17,029 --> 00:18:14,880
as they were doing these evas to get

356
00:18:19,350 --> 00:18:17,039
those down within the four eva box and

357
00:18:22,549 --> 00:18:19,360
so we're using their legwork work as the

358
00:18:23,750 --> 00:18:22,559
foundation for our four eva series so as

359
00:18:26,310 --> 00:18:23,760
kenny mentioned we're first going to

360
00:18:28,150 --> 00:18:26,320
start out on friday and then on july 1st

361
00:18:30,630 --> 00:18:28,160
to do the one bravo channel so we'll

362
00:18:32,710 --> 00:18:30,640
have two evas associated with one bravo

363
00:18:35,669 --> 00:18:32,720

and then we'll have two evas associated

364
00:18:37,669 --> 00:18:35,679
with with three bravo at a later date

365
00:18:39,669 --> 00:18:37,679
so i mentioned we fit within the eva box

366
00:18:41,909 --> 00:18:39,679
we just barely fit within the four eva

367
00:18:43,190 --> 00:18:41,919
box and so for our first eva we'll be

368
00:18:45,190 --> 00:18:43,200
running a little bit longer than our

369
00:18:47,270 --> 00:18:45,200
standard six and a half hours that eva

370
00:18:49,990 --> 00:18:47,280
will be six hours and 40 minutes and our

371
00:18:52,230 --> 00:18:50,000
fourth eva or the second three bravo eva

372
00:18:53,990 --> 00:18:52,240
will be about six hours and 50 minutes

373
00:18:55,590 --> 00:18:54,000
so these evas will be traditionally

374
00:18:57,909 --> 00:18:55,600
longer than the six and a half hours

375
00:18:59,990 --> 00:18:57,919
that we normally schedule these evas but

376
00:19:01,510 --> 00:19:00,000
the benefit we have that kind of ace up

377
00:19:03,110 --> 00:19:01,520
our sleeve if you will is the crew that

378
00:19:05,510 --> 00:19:03,120
we're sending out the door to do these

379
00:19:07,750 --> 00:19:05,520
evas so we're utilizing the iss

380
00:19:09,909 --> 00:19:07,760
commander chris cassidy as well as the

381
00:19:12,630 --> 00:19:09,919
demo two crew member bob bankin and

382
00:19:14,390 --> 00:19:12,640
these guys come to us with 12 evas of

383
00:19:17,029 --> 00:19:14,400
experience under their belt each having

384
00:19:19,830 --> 00:19:17,039
spent over 30 hours outside the safe

385
00:19:21,909 --> 00:19:19,840
confines of the iss inside an emu or

386
00:19:24,070 --> 00:19:21,919
extravehicular mobility unit servicing

387
00:19:25,669 --> 00:19:24,080
the space station the added experience

388
00:19:27,390 --> 00:19:25,679

that chris brings to the table is

389
00:19:30,789 --> 00:19:27,400
actually on his first shuttle mission

390
00:19:33,510 --> 00:19:30,799
sts-127 back in 2009 he performed some

391
00:19:35,430 --> 00:19:33,520
battery evas out on the p6 side of the

392
00:19:37,430 --> 00:19:35,440
truss and in that case that was just

393
00:19:38,950 --> 00:19:37,440
upgrading or just swapping out nickel

394
00:19:40,549 --> 00:19:38,960
hydrogen batteries for fresh nickel

395
00:19:42,630 --> 00:19:40,559
hydrogen batteries but it's a great

396
00:19:45,669 --> 00:19:42,640
benefit that that chris comes to us

397
00:19:47,750 --> 00:19:45,679
already having this battery experience

398
00:19:48,710 --> 00:19:47,760
in his tool kit if you will so with the

399
00:19:52,070 --> 00:19:48,720
with the

400
00:19:53,830 --> 00:19:52,080
crew members fingers crossed that we'll

401
00:19:55,430 --> 00:19:53,840
be able to complete these evas and the

402
00:19:57,190 --> 00:19:55,440
four evas we have planned and not

403
00:19:59,590 --> 00:19:57,200
required the additional two evas that

404
00:20:01,190 --> 00:19:59,600
kenny alluded to so inside the space

405
00:20:03,270 --> 00:20:01,200
station getting the guys ready to go out

406
00:20:05,750 --> 00:20:03,280
the door we have doug hurley and

407
00:20:07,669 --> 00:20:05,760
cosmonaut yvonne wagner serving the role

408
00:20:09,350 --> 00:20:07,679
as suit iv which is helping getting the

409
00:20:11,510 --> 00:20:09,360
crew members suited up and then getting

410
00:20:13,590 --> 00:20:11,520
them outside the door so yvonne will be

411
00:20:15,990 --> 00:20:13,600
playing the role of primary or prime

412
00:20:17,590 --> 00:20:16,000
suit iv for the first eva with doug

413
00:20:19,909 --> 00:20:17,600

providing assistance and then they'll

414
00:20:22,070 --> 00:20:19,919
swap roles for all the remaining evas

415
00:20:23,669 --> 00:20:22,080
where doug will be the prime suit iv and

416
00:20:25,510 --> 00:20:23,679
yvonne will be providing the second set

417
00:20:27,590 --> 00:20:25,520
of hands when needed for things like

418
00:20:29,029 --> 00:20:27,600
safer donning the simplified aid for eva

419
00:20:31,669 --> 00:20:29,039
rescue where it really helps to have

420
00:20:33,510 --> 00:20:31,679
that second set of hands in the airlock

421
00:20:35,510 --> 00:20:33,520
by having yvonne play the role of prime

422
00:20:37,190 --> 00:20:35,520
suit iv for the first eva this allows

423
00:20:39,190 --> 00:20:37,200
doug to also

424
00:20:41,909 --> 00:20:39,200
focus on getting ready for his role as

425
00:20:44,149 --> 00:20:41,919
m1 or the lead robotics officer so

426
00:20:45,590 --> 00:20:44,159
doug's role will be to hold will be to

427
00:20:48,549 --> 00:20:45,600
maneuver the uh

428
00:20:50,549 --> 00:20:48,559
the ep so the ep is the exposed platform

429
00:20:52,630 --> 00:20:50,559
that launched on htv 9 just about a

430
00:20:55,110 --> 00:20:52,640
month ago so doug will hold using the

431
00:20:56,789 --> 00:20:55,120
ssrms will hold the ep in position out

432
00:20:58,950 --> 00:20:56,799
at the integrated equipment assembly on

433
00:21:01,029 --> 00:20:58,960
the iea to allow chris to work on

434
00:21:02,870 --> 00:21:01,039
removing the new lithium-ion batteries

435
00:21:04,710 --> 00:21:02,880
associated adapter plates and stowing

436
00:21:06,149 --> 00:21:04,720
the old batteries so doug doug's

437
00:21:08,149 --> 00:21:06,159
maneuvers with the armor fairly

438
00:21:10,310 --> 00:21:08,159

straightforward just moving the ep back

439
00:21:12,390 --> 00:21:10,320
and forth or possibly backing it out and

440
00:21:14,390 --> 00:21:12,400
rotating it to expose a different side

441
00:21:16,310 --> 00:21:14,400
of the ep to chris so since the

442
00:21:18,870 --> 00:21:16,320
maneuvers are fairly straightforward the

443
00:21:20,870 --> 00:21:18,880
camera views are good and and doug's

444
00:21:23,029 --> 00:21:20,880
work is is pretty straightforward we're

445
00:21:25,110 --> 00:21:23,039
able to utilize a ground m2 so

446
00:21:27,110 --> 00:21:25,120
traditionally we'll have an onboard

447
00:21:28,870 --> 00:21:27,120
second set of eyes looking over the

448
00:21:30,549 --> 00:21:28,880
robotics operator's shoulders to make

449
00:21:31,990 --> 00:21:30,559
sure things are going swimmingly but

450
00:21:33,669 --> 00:21:32,000
since as i mentioned things are fairly

451
00:21:34,950 --> 00:21:33,679
straightforward and also the fact that

452
00:21:36,789 --> 00:21:34,960
we don't have a crew member riding on

453
00:21:38,549 --> 00:21:36,799
the arm we'll be using our robotics

454
00:21:40,549 --> 00:21:38,559
officer here in houston to serve the

455
00:21:42,149 --> 00:21:40,559
role of m2

456
00:21:43,669 --> 00:21:42,159
so onboard the space station the

457
00:21:45,590 --> 00:21:43,679
preparations for the spacewalk are

458
00:21:47,190 --> 00:21:45,600
marching right along the teams have

459
00:21:49,830 --> 00:21:47,200
spent tens of hours getting ready for

460
00:21:51,430 --> 00:21:49,840
these spacewalks so we allowed doug and

461
00:21:52,950 --> 00:21:51,440
bob to get their space legs under them

462
00:21:55,110 --> 00:21:52,960
for only about a week before we put them

463
00:21:56,870 --> 00:21:55,120

to work getting ready for these evas so

464
00:21:59,590 --> 00:21:56,880
they've spent numerous hours working on

465
00:22:00,950 --> 00:21:59,600
tool inspections tool configurations

466
00:22:02,789 --> 00:22:00,960
suit readiness

467
00:22:04,310 --> 00:22:02,799
procedure reviews space to ground

468
00:22:05,990 --> 00:22:04,320
conferences with the team here in

469
00:22:07,669 --> 00:22:06,000
houston and then most of that work

470
00:22:09,590 --> 00:22:07,679
culminated into the on orbit fit

471
00:22:11,190 --> 00:22:09,600
verification just yesterday so that

472
00:22:13,510 --> 00:22:11,200
allowed doug and yvonne to get some

473
00:22:15,750 --> 00:22:13,520
practice hands-on practice with a real

474
00:22:17,510 --> 00:22:15,760
live emu to help get bob and chris

475
00:22:19,590 --> 00:22:17,520
suited up it allowed bob and chris to

476
00:22:20,630 --> 00:22:19,600
verify that their suits fit like a glove

477
00:22:21,990 --> 00:22:20,640
well at least the glove part of the

478
00:22:24,390 --> 00:22:22,000
suits fit like a glove and the rest of

479
00:22:26,230 --> 00:22:24,400
the suit fits adequately so that allowed

480
00:22:28,230 --> 00:22:26,240
them to get a practice and bob and chris

481
00:22:29,990 --> 00:22:28,240
both gave a thumbs up that their suits

482
00:22:31,909 --> 00:22:30,000
are great and ready to go and this will

483
00:22:33,669 --> 00:22:31,919
allow chris uh sorry

484
00:22:35,430 --> 00:22:33,679
doug and yvonne to be as efficient as

485
00:22:37,830 --> 00:22:35,440
possible getting them out the door on

486
00:22:39,029 --> 00:22:37,840
friday so just as many hours on board

487
00:22:41,350 --> 00:22:39,039
the space station have been spent

488
00:22:43,110 --> 00:22:41,360

getting ready for this eva just as many

489
00:22:44,950 --> 00:22:43,120
if not more i'm sure hours on the ground

490
00:22:46,470 --> 00:22:44,960
have also been spent getting ready i

491
00:22:48,230 --> 00:22:46,480
alluded to some of the robotics work

492
00:22:50,149 --> 00:22:48,240
that we've done thus far when htv

493
00:22:51,830 --> 00:22:50,159
arrived just about a month ago we

494
00:22:54,549 --> 00:22:51,840
quickly got to work swapping out the

495
00:22:56,630 --> 00:22:54,559
xposed platforms so we still had htv

496
00:22:59,110 --> 00:22:56,640
eights ep with the old nickel hydrogen

497
00:23:01,350 --> 00:22:59,120
batteries from p6 stowed on the mobile

498
00:23:03,029 --> 00:23:01,360
transporter so robotically we were able

499
00:23:05,350 --> 00:23:03,039
to remove that one

500
00:23:07,430 --> 00:23:05,360
release the new exposed platform from

501
00:23:09,190 --> 00:23:07,440
htv install it on the poa put the old

502
00:23:11,669 --> 00:23:09,200
one back in htv and now things are good

503
00:23:13,669 --> 00:23:11,679
to go then we were also able to use spdm

504
00:23:15,430 --> 00:23:13,679
to go ahead and release the higher

505
00:23:17,590 --> 00:23:15,440
torque that the new lithium ion

506
00:23:19,590 --> 00:23:17,600
batteries were set to during launch so

507
00:23:21,430 --> 00:23:19,600
spdm helped us out there we have

508
00:23:23,430 --> 00:23:21,440
translated the mobile transporter out to

509
00:23:24,470 --> 00:23:23,440
work site one just this morning so it's

510
00:23:27,190 --> 00:23:24,480
all the way out on the end of the

511
00:23:29,430 --> 00:23:27,200
starboard truss ready for our our evas

512
00:23:32,070 --> 00:23:29,440
and just in about an hour from now we'll

513
00:23:34,070 --> 00:23:32,080

work on grappling that ep from the poa

514
00:23:35,510 --> 00:23:34,080
and then moving it out to position out

515
00:23:37,270 --> 00:23:35,520
on s6

516
00:23:40,549 --> 00:23:37,280
as far as readying the power channel for

517
00:23:41,990 --> 00:23:40,559
the for the rnr on friday so yesterday

518
00:23:44,070 --> 00:23:42,000
morning we did what we call a seamless

519
00:23:46,710 --> 00:23:44,080
power channel handover where we tied the

520
00:23:48,470 --> 00:23:46,720
one bravo loads to one alpha so the one

521
00:23:50,149 --> 00:23:48,480
alpha channel is now carrying not only

522
00:23:52,470 --> 00:23:50,159
its downstream loads but also all the

523
00:23:54,149 --> 00:23:52,480
loads associated with one bravo that

524
00:23:56,630 --> 00:23:54,159
then allowed flight controllers on the

525
00:23:58,710 --> 00:23:56,640
ground to start the 50 hour discharge of

526
00:24:00,710 --> 00:23:58,720
the sickle six nickel hydrogen batteries

527
00:24:02,789 --> 00:24:00,720
that will start the removal of on friday

528
00:24:04,149 --> 00:24:02,799
so we're well into that 50 hours things

529
00:24:05,750 --> 00:24:04,159
are looking great so this will make sure

530
00:24:08,310 --> 00:24:05,760
that the batteries are fully drained for

531
00:24:10,149 --> 00:24:08,320
the crew to safely release them on

532
00:24:11,750 --> 00:24:10,159
friday so leading the teams on the

533
00:24:13,110 --> 00:24:11,760
ground we'll have royce renfrew will be

534
00:24:15,110 --> 00:24:13,120
the lead flight director for the one

535
00:24:17,669 --> 00:24:15,120
bravo evas and i will be the lead flight

536
00:24:19,510 --> 00:24:17,679
director for the three bravo evas and to

537
00:24:22,950 --> 00:24:19,520
my right socially distanced

538
00:24:25,350 --> 00:24:22,960

appropriately is my lead eva officer dr

539
00:24:28,470 --> 00:24:25,360
dr sandra moore so sandy will be giving

540
00:24:31,110 --> 00:24:28,480
more of the specific details on the evas

541
00:24:34,070 --> 00:24:31,120
yes and thank you allison um as also

542
00:24:36,710 --> 00:24:34,080
mentioned i am the eva officer for the

543
00:24:39,350 --> 00:24:36,720
three bravo channel my colleague

544
00:24:41,350 --> 00:24:39,360
jacqueline cagey will be the lead eva

545
00:24:43,430 --> 00:24:41,360
officer for the one bravo channel she

546
00:24:45,029 --> 00:24:43,440
will be working under the guidance and

547
00:24:49,029 --> 00:24:45,039
leadership of flight director royce

548
00:24:51,430 --> 00:24:49,039
renfro and alongside of ground iv capcom

549
00:24:52,789 --> 00:24:51,440
astronaut jasmine mogbeli

550
00:24:55,350 --> 00:24:52,799
i'll be working under the guidance and

551
00:24:57,750 --> 00:24:55,360
leadership of allison um

552
00:25:00,710 --> 00:24:57,760
bollinger and alongside the astronaut

553
00:25:03,269 --> 00:25:00,720
ground ivy capcom josh kootchik on board

554
00:25:06,149 --> 00:25:03,279
we have our extra vehicular crew members

555
00:25:08,390 --> 00:25:06,159
chris cassidy and bob bankin chris will

556
00:25:10,149 --> 00:25:08,400
wear the extra vehicular

557
00:25:12,310 --> 00:25:10,159
ev-1 stripes

558
00:25:13,590 --> 00:25:12,320
for the first two evas and much like the

559
00:25:15,990 --> 00:25:13,600
ground teams

560
00:25:17,830 --> 00:25:16,000
what they will swap roles and bob bankin

561
00:25:19,350 --> 00:25:17,840
will wear the red stripes for the second

562
00:25:21,750 --> 00:25:19,360
evas

563
00:25:23,510 --> 00:25:21,760

as mentioned doug douglas hurley and

564
00:25:25,990 --> 00:25:23,520
yvonne wagner will help us out

565
00:25:27,510 --> 00:25:26,000
performing the suit iv operations and

566
00:25:29,990 --> 00:25:27,520
doug will remain with us throughout the

567
00:25:32,549 --> 00:25:30,000
day performing the robotics operations

568
00:25:35,190 --> 00:25:32,559
necessary for eba

569
00:25:37,750 --> 00:25:35,200
eva day for us for our crew is a very

570
00:25:39,750 --> 00:25:37,760
long day for example this friday our

571
00:25:42,390 --> 00:25:39,760
crew members will begin very early

572
00:25:44,789 --> 00:25:42,400
around 1 30 a.m houston time they'll

573
00:25:47,350 --> 00:25:44,799
begin their ev preparations

574
00:25:49,510 --> 00:25:47,360
around 4am they'll be jumping into their

575
00:25:52,070 --> 00:25:49,520
in-suit light exercise pre-breathe

576
00:25:53,830 --> 00:25:52,080
protocol this like the name suggests the

577
00:25:55,669 --> 00:25:53,840
crew jumps into their their suits and

578
00:25:56,870 --> 00:25:55,679
begins to breathe pure02 while

579
00:25:59,029 --> 00:25:56,880
performing

580
00:26:00,070 --> 00:25:59,039
some light exercise with short rest

581
00:26:02,390 --> 00:26:00,080
breaks

582
00:26:04,789 --> 00:26:02,400
that exercise equates to slightly moving

583
00:26:05,590 --> 00:26:04,799
their arms and legs and that allows us

584
00:26:07,669 --> 00:26:05,600
to

585
00:26:08,830 --> 00:26:07,679
jostle any nitrogen out of the system

586
00:26:10,549 --> 00:26:08,840
when

587
00:26:12,310 --> 00:26:10,559
possible

588
00:26:14,149 --> 00:26:12,320

from then once our pre-breathe is

589
00:26:16,710 --> 00:26:14,159
complete we'll put the crew in the quest

590
00:26:18,630 --> 00:26:16,720
airlock and we'll depress them down to

591
00:26:20,789 --> 00:26:18,640
to vacuum where we can begin our extra

592
00:26:22,310 --> 00:26:20,799
vehicular activities

593
00:26:23,990 --> 00:26:22,320
for us in particular we're going to head

594
00:26:25,669 --> 00:26:24,000
out as far as starboard as we can to the

595
00:26:28,070 --> 00:26:25,679
s6 worksites

596
00:26:29,669 --> 00:26:28,080
out on the integrated equipment assembly

597
00:26:31,590 --> 00:26:29,679
and we're going to be changing out some

598
00:26:33,269 --> 00:26:31,600
aging nickel hydrogen batteries with

599
00:26:37,110 --> 00:26:33,279
some brand new lithium-ion batteries

600
00:26:38,950 --> 00:26:37,120
that arrived on htv9 just recently

601
00:26:41,110 --> 00:26:38,960
two nickel hydrogen batteries equate to

602
00:26:42,390 --> 00:26:41,120
one lithium ion battery so we can change

603
00:26:44,310 --> 00:26:42,400
those out but we still have to complete

604
00:26:46,470 --> 00:26:44,320
that circuitry and to do that we'll

605
00:26:48,230 --> 00:26:46,480
install what we call an adapter plate

606
00:26:51,590 --> 00:26:48,240
when complete it also conveniently gives

607
00:26:53,110 --> 00:26:51,600
us a spot for a nickel hydrogen battery

608
00:26:54,870 --> 00:26:53,120
to be stowed

609
00:26:57,190 --> 00:26:54,880
we do have some animations to take you

610
00:26:59,269 --> 00:26:57,200
through the specifics of the eva

611
00:27:01,909 --> 00:26:59,279
due to the similarity and choreography

612
00:27:07,750 --> 00:27:01,919
we will only be playing animations for

613
00:27:11,830 --> 00:27:10,230

this eva begins the one bravo power

614
00:27:14,070 --> 00:27:11,840
channel upgrade

615
00:27:15,669 --> 00:27:14,080
chris wearing the red stripe egresses

616
00:27:17,669 --> 00:27:15,679
first

617
00:27:19,830 --> 00:27:17,679
he sets up their tether anchors away

618
00:27:21,510 --> 00:27:19,840
from the airlock to enable them to go

619
00:27:23,990 --> 00:27:21,520
farther outboard

620
00:27:27,430 --> 00:27:24,000
then bob wearing the white stripe grabs

621
00:27:29,510 --> 00:27:27,440
his foot restraint and follows outboard

622
00:27:31,190 --> 00:27:29,520
chris picks up his foot restraint on the

623
00:27:36,070 --> 00:27:31,200
cedar cart

624
00:27:39,590 --> 00:27:38,070
the external palette is held by the

625
00:27:41,990 --> 00:27:39,600
robotic arm

626
00:27:46,230 --> 00:27:42,000
and houses the new batteries launched

627
00:27:48,710 --> 00:27:46,240
from japan on hdv9 in may

628
00:27:51,430 --> 00:27:48,720
chris sets up his tools

629
00:27:53,990 --> 00:27:51,440
and prepares his work site

630
00:27:57,350 --> 00:27:54,000
bob translates to the s6 integrated

631
00:28:00,389 --> 00:27:57,360
electronics assembly or iea which will

632
00:28:02,710 --> 00:28:00,399
be his main work site throughout the eba

633
00:28:05,190 --> 00:28:02,720
the iea houses the batteries and

634
00:28:07,669 --> 00:28:05,200
hardware for the 1b solar arrays and

635
00:28:10,470 --> 00:28:07,679
power channel chris will join bob and

636
00:28:12,870 --> 00:28:10,480
they work together to finish setup

637
00:28:14,470 --> 00:28:12,880
first battery from slot number one is

638
00:28:16,389 --> 00:28:14,480

retrieved

639
00:28:17,510 --> 00:28:16,399
the crew needs to release torque with a

640
00:28:20,549 --> 00:28:17,520
ratchet

641
00:28:23,830 --> 00:28:20,559
then use the pistol grip tool or pgt to

642
00:28:27,269 --> 00:28:23,840
complete the release of the volts

643
00:28:29,350 --> 00:28:27,279
the large battery is removed

644
00:28:33,830 --> 00:28:29,360
and the crew worked together to move it

645
00:28:38,310 --> 00:28:36,310
chris ingresses the foot restraint

646
00:28:41,110 --> 00:28:38,320
and the crew work together to install

647
00:28:43,350 --> 00:28:41,120
the battery in empty slot x

648
00:28:46,470 --> 00:28:43,360
then the arm maneuvers to place chris in

649
00:28:49,830 --> 00:28:46,480
front of the first new battery in slot a

650
00:28:52,470 --> 00:28:49,840
after placing scoops to create handholds

651
00:28:54,710 --> 00:28:52,480
the crew will remove the battery and

652
00:29:03,190 --> 00:28:54,720
translate it back to the truss and

653
00:29:07,350 --> 00:29:05,029
throughout the evas bob will need to

654
00:29:09,750 --> 00:29:07,360
move his foot restraint to reach each

655
00:29:17,990 --> 00:29:09,760
battery

656
00:29:23,510 --> 00:29:20,630
at the ep chris is in a foot restraint

657
00:29:26,149 --> 00:29:23,520
and places the battery on his brt or

658
00:29:27,909 --> 00:29:26,159
body restraint tether chris will release

659
00:29:30,070 --> 00:29:27,919
the adapter plate launched underneath

660
00:29:31,830 --> 00:29:30,080
the battery like with the batteries he

661
00:29:34,230 --> 00:29:31,840
has to use the ratchet to release the

662
00:29:35,910 --> 00:29:34,240
high torque and then the ptt to fully

663
00:29:37,669 --> 00:29:35,920

release the bolt

664
00:29:39,350 --> 00:29:37,679
[Music]

665
00:29:40,050 --> 00:29:39,360
chris removes the adapter plate to

666
00:29:42,630 --> 00:29:40,060
handle bob

667
00:29:45,909 --> 00:29:42,640
[Music]

668
00:29:48,070 --> 00:29:45,919
bob translates back to the truss

669
00:29:49,350 --> 00:29:48,080
to install the adapter plate and open

670
00:29:51,350 --> 00:29:49,360
slot 2.

671
00:29:53,269 --> 00:29:51,360
at the same time chris is putting the

672
00:29:55,510 --> 00:29:53,279
old battery in the slot he had just

673
00:29:58,230 --> 00:29:55,520
emptied for disposal

674
00:30:00,070 --> 00:29:58,240
together on the iea they made a cable

675
00:30:02,789 --> 00:30:00,080
between the adapter plate and the new

676
00:30:04,950 --> 00:30:02,799
battery to complete the circuit

677
00:30:07,909 --> 00:30:04,960
with one of the three battery pairs

678
00:30:10,070 --> 00:30:07,919
complete they moved to slot 3 to remove

679
00:30:11,990 --> 00:30:10,080
the next old battery

680
00:30:14,549 --> 00:30:12,000
this battery will be stowed on the

681
00:30:17,830 --> 00:30:14,559
adapter plate and slot 2 where it is no

682
00:30:20,389 --> 00:30:17,840
longer needed to function

683
00:30:24,149 --> 00:30:20,399
bob and chris return to the pallet

684
00:30:28,789 --> 00:30:26,070
they repeat the steps to release the

685
00:30:28,799 --> 00:30:32,870
translate back to the truss

686
00:30:36,000 --> 00:30:35,190
and together install an empty slot

687
00:30:39,350 --> 00:30:36,010
number three

688
00:30:41,269 --> 00:30:39,360

[Music]

689
00:30:43,669 --> 00:30:41,279
at this point bob and chris begin

690
00:30:46,549 --> 00:30:43,679
cleanup on the first of the two one

691
00:30:49,350 --> 00:30:46,559
bravo battery channel evas

692
00:30:52,070 --> 00:30:49,360
they also prepare for the next eva

693
00:30:55,029 --> 00:30:52,080
including moving foot restraints

694
00:30:58,149 --> 00:30:55,039
securing tools and bags where they will

695
00:31:01,269 --> 00:30:58,159
be needed once the worksite is clean

696
00:31:05,990 --> 00:31:01,279
chris translates from the end of the s6

697
00:31:15,190 --> 00:31:07,909
pausing to reconfigure their safety

698
00:31:21,990 --> 00:31:18,470
bob follows for ingress

699
00:31:25,750 --> 00:31:22,000
completing power channel one bravo eva

700
00:31:34,149 --> 00:31:29,350
and onto three bravo eva2 the fourth eva

701
00:31:38,630 --> 00:31:35,990
three bravo eva 2 will begin at the

702
00:31:41,190 --> 00:31:38,640
quest airlock mr bob bankin ev1 will

703
00:31:43,430 --> 00:31:41,200
egress first mr chris cassidy ev2 will

704
00:31:45,029 --> 00:31:43,440
egress second with an oru bag

705
00:31:46,549 --> 00:31:45,039
after completing buddy checks bob will

706
00:31:48,470 --> 00:31:46,559
lead out to the work site crew will

707
00:31:51,430 --> 00:31:48,480
translate up the cetispure outboard of

708
00:31:53,509 --> 00:31:51,440
the solar output rotary joint to s6

709
00:31:55,430 --> 00:31:53,519
and drop a tether fairlead

710
00:31:57,269 --> 00:31:55,440
bubble then prep is iea foot restraint

711
00:31:59,029 --> 00:31:57,279
for battery operations chris will start

712
00:32:01,830 --> 00:31:59,039
his day at the external pallet foot

713
00:32:03,590 --> 00:32:01,840

restraint after verifying settings chris

714
00:32:05,590 --> 00:32:03,600
will stow an oru bag on the external

715
00:32:07,750 --> 00:32:05,600
pallet and prep a pistol grip tool with

716
00:32:10,149 --> 00:32:07,760
a 9-nits hex driver for future adapter

717
00:32:12,630 --> 00:32:10,159
plate operations meanwhile back at the

718
00:32:15,350 --> 00:32:12,640
iea bob is setting up 3 bravo for

719
00:32:17,990 --> 00:32:15,360
battery operations by relocating a pgt

720
00:32:20,389 --> 00:32:18,000
near battery 4. once complete chris will

721
00:32:21,990 --> 00:32:20,399
join bob on the iea chris will hand bob

722
00:32:24,230 --> 00:32:22,000
a ratchet wrench

723
00:32:27,269 --> 00:32:24,240
to break torque on nickel hydrogen

724
00:32:30,070 --> 00:32:27,279
battery number four once complete chris

725
00:32:32,549 --> 00:32:30,080
will hand bob a pgt with a 6 inch wobble

726
00:32:35,909 --> 00:32:32,559
and begin to fully release battery 4 by

727
00:32:37,990 --> 00:32:35,919
driving h1 followed by h2 bob will then

728
00:32:40,549 --> 00:32:38,000
release the old nickel hydrogen battery

729
00:32:42,230 --> 00:32:40,559
4 from soft dock and hand it to chris

730
00:32:43,830 --> 00:32:42,240
bob will egress the foot restraints and

731
00:32:45,269 --> 00:32:43,840
both crew will enter in battery floor to

732
00:32:47,110 --> 00:32:45,279
the external pallet

733
00:32:49,509 --> 00:32:47,120
at the ep chris will ingress the foot

734
00:32:51,909 --> 00:32:49,519
restraints and bob will hand crisp the

735
00:32:53,430 --> 00:32:51,919
battery and he will stow it on as brt

736
00:32:55,190 --> 00:32:53,440
bob will translate onto the external

737
00:32:57,190 --> 00:32:55,200
pallet and help chris release adapter

738
00:32:59,430 --> 00:32:57,200

plate echo

739
00:33:01,909 --> 00:32:59,440
using a ratchet wrench with hex driver

740
00:33:03,669 --> 00:33:01,919
cruel brake torque on both bolts

741
00:33:05,669 --> 00:33:03,679
bob will then hand crisp a pgt with a

742
00:33:08,149 --> 00:33:05,679
hex driver and he will continue to fully

743
00:33:09,750 --> 00:33:08,159
release the adapter plate by driving h1

744
00:33:10,470 --> 00:33:09,760
followed by h2

745
00:33:12,710 --> 00:33:10,480
once

746
00:33:14,789 --> 00:33:12,720
bob stows the pgt he will translate back

747
00:33:17,110 --> 00:33:14,799
to the truss

748
00:33:19,350 --> 00:33:17,120
chris will release adapter plate echo

749
00:33:21,190 --> 00:33:19,360
from soft dock and hand it to bob who

750
00:33:22,830 --> 00:33:21,200
will begin translation back to the three

751
00:33:25,350 --> 00:33:22,840
bravo

752
00:33:28,310 --> 00:33:25,360
iea chris will install the old nickel

753
00:33:31,110 --> 00:33:28,320
hydrogen battery 4 into slot echo by

754
00:33:32,710 --> 00:33:31,120
driving h2 with full torque

755
00:33:34,710 --> 00:33:32,720
chris will then retrieve two scoop

756
00:33:36,950 --> 00:33:34,720
handling aids and relocate them to

757
00:33:38,870 --> 00:33:36,960
lithium-ion battery charlie for future

758
00:33:40,870 --> 00:33:38,880
operations

759
00:33:41,909 --> 00:33:40,880
chris will then translate back to the

760
00:33:43,990 --> 00:33:41,919
trust

761
00:33:45,750 --> 00:33:44,000
once far enough away the canadian arm

762
00:33:48,149 --> 00:33:45,760
will reposition to expose battery

763
00:33:50,230 --> 00:33:48,159

charlie to crew for later operations

764
00:33:52,470 --> 00:33:50,240
back at the iaea bob ingressed the foot

765
00:33:54,789 --> 00:33:52,480
restraint and began to install the

766
00:33:56,789 --> 00:33:54,799
adapter plate echo into slot 4 during

767
00:33:57,830 --> 00:33:56,799
the time crystal return to the iea and

768
00:33:59,590 --> 00:33:57,840
relocate

769
00:34:02,549 --> 00:33:59,600
handling aids for the next battery

770
00:34:06,950 --> 00:34:04,070
once complete with the adapter plate

771
00:34:08,950 --> 00:34:06,960
bolts a connector will be installed from

772
00:34:10,710 --> 00:34:08,960
the adapter plate to the lithium-ion

773
00:34:13,109 --> 00:34:10,720
battery completing the circuitry for

774
00:34:14,710 --> 00:34:13,119
battery charging and discharging

775
00:34:16,550 --> 00:34:14,720
the crew will then break into the last

776
00:34:18,950 --> 00:34:16,560
pair of nickel hydrogen batteries on the

777
00:34:22,550 --> 00:34:18,960
iea torque will be broken on battery 6

778
00:34:26,149 --> 00:34:24,389
then both bolts will be fully released

779
00:34:27,510 --> 00:34:26,159
with the pgt

780
00:34:30,069 --> 00:34:27,520
h1

781
00:34:31,750 --> 00:34:30,079
followed by h2

782
00:34:33,030 --> 00:34:31,760
battery 6 will then be released from

783
00:34:35,589 --> 00:34:33,040
soft dock

784
00:34:37,349 --> 00:34:35,599
it to chris

785
00:34:39,510 --> 00:34:37,359
and bob will rotate his foot restraint

786
00:34:41,589 --> 00:34:39,520
over adapter plate echo and then soft

787
00:34:44,869 --> 00:34:41,599
dock the nickel hydrogen battery bobble

788
00:34:47,510 --> 00:34:44,879

drive h2 followed by h1 to secure

789
00:34:50,629 --> 00:34:47,520
battery 6 in its final stow position on

790
00:34:53,349 --> 00:34:50,639
top of adapter plate echo

791
00:34:55,589 --> 00:34:53,359
bob will then egress the apfr rotate and

792
00:34:57,670 --> 00:34:55,599
then relocate two handling aids and prep

793
00:34:59,270 --> 00:34:57,680
for battery five bubble then translate

794
00:35:00,870 --> 00:34:59,280
out to the external pallet just as chris

795
00:35:02,390 --> 00:35:00,880
with battery charlie during that time

796
00:35:03,990 --> 00:35:02,400
chris was working to release battery

797
00:35:05,589 --> 00:35:04,000
charlie from the external pallet he will

798
00:35:07,750 --> 00:35:05,599
hand battery charlie to bob and both

799
00:35:09,190 --> 00:35:07,760
will enter him back to the iea bob will

800
00:35:12,150 --> 00:35:09,200
ingress the foot restraints and install

801
00:35:15,109 --> 00:35:12,160
battery charlie into slot 6.

802
00:35:19,430 --> 00:35:15,119
bob will drive h2 followed by h1

803
00:35:21,030 --> 00:35:19,440
completing battery charlie install

804
00:35:22,950 --> 00:35:21,040
bubble egress and relocate and

805
00:35:24,550 --> 00:35:22,960
reposition the apfr for battery 5

806
00:35:26,790 --> 00:35:24,560
operations

807
00:35:28,310 --> 00:35:26,800
bob will re-ingress the apfr and chris

808
00:35:32,950 --> 00:35:28,320
will hand bob a ratchet wrench to break

809
00:35:38,870 --> 00:35:36,069
he will then fully release the bolts h1

810
00:35:41,670 --> 00:35:38,880
followed by h2 using a pgt with a six

811
00:35:45,270 --> 00:35:43,190
bubble then remove battery five from

812
00:35:47,750 --> 00:35:45,280
soft duck hand it to chris and both will

813
00:35:49,430 --> 00:35:47,760

enter him back to the external pallet at

814
00:35:51,349 --> 00:35:49,440
the ep chris will ingress the foot

815
00:35:53,190 --> 00:35:51,359
restraint and install the battery on his

816
00:35:55,030 --> 00:35:53,200
body restraint tether bubble translate

817
00:35:56,470 --> 00:35:55,040
back onto the external pallet to assist

818
00:35:58,069 --> 00:35:56,480
chris and releasing adapter plate

819
00:36:00,390 --> 00:35:58,079
charlie

820
00:36:02,390 --> 00:36:00,400
using a hex driver cruel brick torque

821
00:36:04,710 --> 00:36:02,400
and then use a pgt with the hex driver

822
00:36:06,710 --> 00:36:04,720
to fully release the adapter plate bob

823
00:36:08,870 --> 00:36:06,720
will reposition back to the truss

824
00:36:10,390 --> 00:36:08,880
chris will hand the adapter plate to bob

825
00:36:12,790 --> 00:36:10,400
and bob will begin translation back to

826
00:36:14,069 --> 00:36:12,800
the three bravo iea chris will remain

827
00:36:16,150 --> 00:36:14,079
behind and install the old nickel

828
00:36:17,670 --> 00:36:16,160
hydrogen battery five into slot echo

829
00:36:20,390 --> 00:36:17,680
chris will then clean up the two scoops

830
00:36:21,990 --> 00:36:20,400
and pgt and the medium our u-bag

831
00:36:24,150 --> 00:36:22,000
and then bundle it to the ep foot

832
00:36:25,910 --> 00:36:24,160
restraint back at the ia bob will

833
00:36:29,990 --> 00:36:25,920
ingress the foot restraint and install

834
00:36:33,510 --> 00:36:30,000
adapter plate charlie into slot 5

835
00:36:35,510 --> 00:36:33,520
fully driving h2 and h1 to torque with

836
00:36:36,870 --> 00:36:35,520
the pgt and hex driver

837
00:36:38,790 --> 00:36:36,880
once complete a connector will be

838
00:36:40,870 --> 00:36:38,800

installed from the adapter plate to the

839
00:36:42,710 --> 00:36:40,880
lithium-ion battery completing the three

840
00:36:44,710 --> 00:36:42,720
bravo circuitry for battery charging and

841
00:36:46,230 --> 00:36:44,720
discharging

842
00:36:48,790 --> 00:36:46,240
crew will then work together to clean up

843
00:36:50,630 --> 00:36:48,800
the iea four scoops and two gap spanner

844
00:36:52,710 --> 00:36:50,640
pairs will be gathered into the crew

845
00:36:55,510 --> 00:36:52,720
lock bag

846
00:36:57,190 --> 00:36:55,520
pgt will be stowed on bob's swing arm

847
00:37:00,069 --> 00:36:57,200
bubble then retrieve the crew like bag

848
00:37:02,230 --> 00:37:00,079
and bundle it to the iaea foot restraint

849
00:37:04,630 --> 00:37:02,240
both crew will grab foot restraints and

850
00:37:06,310 --> 00:37:04,640
stow them on their brts

851
00:37:10,870 --> 00:37:06,320
crew will be that then begin to

852
00:37:14,790 --> 00:37:12,310
bob will stop at the starboard cedar

853
00:37:16,069 --> 00:37:14,800
cart with five for final stowage of his

854
00:37:17,829 --> 00:37:16,079
full restraint

855
00:37:19,990 --> 00:37:17,839
chris will continue on

856
00:37:22,630 --> 00:37:20,000
and translate all the way to esp2 with

857
00:37:24,870 --> 00:37:22,640
four for his final location

858
00:37:27,109 --> 00:37:24,880
once complete chris will grab his oru

859
00:37:29,270 --> 00:37:27,119
bag head back toward the airlock but

860
00:37:31,589 --> 00:37:29,280
we'll continue up the seat of spur to

861
00:37:33,430 --> 00:37:31,599
grab a couple of adjustable tether

862
00:37:35,030 --> 00:37:33,440
fairleads these were used to keep the

863
00:37:36,710 --> 00:37:35,040

tether out of the way for ingress

864
00:37:39,030 --> 00:37:36,720
throughout the entire series of these

865
00:37:41,430 --> 00:37:39,040
battery evas

866
00:37:43,430 --> 00:37:41,440
crew will meet back up at the airlock

867
00:37:45,670 --> 00:37:43,440
stow their bags

868
00:37:47,270 --> 00:37:45,680
and ingress the airlock

869
00:37:52,230 --> 00:37:47,280
and this concludes the nominal tasks

870
00:37:55,430 --> 00:37:53,910
and thanks to our panel for opening it

871
00:37:57,270 --> 00:37:55,440
up today we're going to go ahead and

872
00:37:59,190 --> 00:37:57,280
open it up for questions now just a

873
00:38:01,430 --> 00:37:59,200
reminder if you're on the phone bridge

874
00:38:03,589 --> 00:38:01,440
be sure to press star 1 if you'd like

875
00:38:05,750 --> 00:38:03,599
your question answered and star 2 if

876
00:38:07,510 --> 00:38:05,760
your question has already been answered

877
00:38:09,589 --> 00:38:07,520
and if you're on social media be sure to

878
00:38:11,109 --> 00:38:09,599
submit your questions using the hashtag

879
00:38:12,950 --> 00:38:11,119
asknasa

880
00:38:15,670 --> 00:38:12,960
we'll take the first question from our

881
00:38:18,069 --> 00:38:15,680
phone bridge bill harwood with cbs bill

882
00:38:20,069 --> 00:38:18,079
are you there

883
00:38:21,670 --> 00:38:20,079
yes i'm here how do you hear me we hear

884
00:38:23,670 --> 00:38:21,680
you loud and clear

885
00:38:25,990 --> 00:38:23,680
thanks um my question and you you kind

886
00:38:28,150 --> 00:38:26,000
of alluded this earlier but uh looking

887
00:38:30,230 --> 00:38:28,160
at benkin and realizing he has a ton of

888
00:38:31,910 --> 00:38:30,240

eba experience did he get the same

889
00:38:32,790 --> 00:38:31,920
amount of training on the ground before

890
00:38:34,550 --> 00:38:32,800
launch

891
00:38:37,109 --> 00:38:34,560
that you would normally provide to an

892
00:38:39,430 --> 00:38:37,119
astronaut going into a battery swap eba

893
00:38:41,430 --> 00:38:39,440
in other words

894
00:38:43,030 --> 00:38:41,440
did he get a compressed schedule to get

895
00:38:45,190 --> 00:38:43,040
him ready for this and

896
00:38:49,670 --> 00:38:45,200
and how did it compare with anybody else

897
00:38:53,910 --> 00:38:51,829
i see uh the answer is yes he did get

898
00:38:56,150 --> 00:38:53,920
some training um in terms of the exact

899
00:38:58,310 --> 00:38:56,160
number of runs what the ratio is i

900
00:39:01,190 --> 00:38:58,320
probably have to let allison

901
00:39:04,150 --> 00:39:01,200
address that but we did we made a

902
00:39:06,470 --> 00:39:04,160
conscious effort to get uh both both bob

903
00:39:08,870 --> 00:39:06,480
and doug trained up knowing that uh

904
00:39:10,950 --> 00:39:08,880
doing these evas was a possibility but

905
00:39:13,109 --> 00:39:10,960
in terms of the specific ratio and how

906
00:39:14,390 --> 00:39:13,119
that that measures up to

907
00:39:16,310 --> 00:39:14,400
to what we would typically do for an

908
00:39:19,670 --> 00:39:16,320
increment crew i'd i'd have to let

909
00:39:21,270 --> 00:39:19,680
allison take and take a cut at that

910
00:39:22,550 --> 00:39:21,280
allison do you have anything to add

911
00:39:24,150 --> 00:39:22,560
we'll go ahead and have sandy answer it

912
00:39:26,310 --> 00:39:24,160
sorry

913
00:39:28,470 --> 00:39:26,320

uh yes uh so both our crew have had

914
00:39:30,550 --> 00:39:28,480
experience with batteries

915
00:39:33,109 --> 00:39:30,560
in the mbl recently they both have a

916
00:39:34,630 --> 00:39:33,119
plethora of evas under their belts

917
00:39:36,470 --> 00:39:34,640
so before going we did make sure that

918
00:39:38,870 --> 00:39:36,480
they they got a run at these batteries

919
00:39:41,430 --> 00:39:38,880
in the mbl chris in particular actually

920
00:39:43,589 --> 00:39:41,440
developed or helped develop the p6

921
00:39:45,990 --> 00:39:43,599
choreography so he knows it quite well

922
00:39:47,510 --> 00:39:46,000
and bob with his experience with eva's

923
00:39:48,950 --> 00:39:47,520
got to run it on the pool just recently

924
00:39:50,950 --> 00:39:48,960
right before launch

925
00:39:53,829 --> 00:39:50,960
so that they are ready and and ready to

926
00:39:58,870 --> 00:39:56,150
and our next question comes from social

927
00:40:00,950 --> 00:39:58,880
media rohan asks how long will doug

928
00:40:02,470 --> 00:40:00,960
hurley and bob bankins stay on the space

929
00:40:04,950 --> 00:40:02,480
station

930
00:40:06,710 --> 00:40:04,960
yeah i can address that we've

931
00:40:08,710 --> 00:40:06,720
again kenny and i have been meeting and

932
00:40:10,309 --> 00:40:08,720
working you know right now

933
00:40:12,150 --> 00:40:10,319
the way

934
00:40:14,150 --> 00:40:12,160
kenny has laid out the evas it looks

935
00:40:16,150 --> 00:40:14,160
like the first opportunity

936
00:40:17,589 --> 00:40:16,160
to undock and come home would be around

937
00:40:19,270 --> 00:40:17,599
august the second

938
00:40:21,829 --> 00:40:19,280

uh we'll just have to sort of see how

939
00:40:24,630 --> 00:40:21,839
the evas go and then we're really trying

940
00:40:26,790 --> 00:40:24,640
to set us up for uh allow that time

941
00:40:28,309 --> 00:40:26,800
frame in august to come home so

942
00:40:30,710 --> 00:40:28,319
so that's the first opportunity would be

943
00:40:32,150 --> 00:40:30,720
around august the second and uh

944
00:40:33,910 --> 00:40:32,160
keep we'll keep working with kenny and

945
00:40:35,589 --> 00:40:33,920
see how the ebas go

946
00:40:37,430 --> 00:40:35,599
i've been in this business quite some

947
00:40:39,349 --> 00:40:37,440
time and somehow you lay out a plan and

948
00:40:40,790 --> 00:40:39,359
things go according to plan sometimes

949
00:40:42,870 --> 00:40:40,800
they go off schedule but right now we're

950
00:40:44,230 --> 00:40:42,880
looking at around that august the second

951
00:40:45,910 --> 00:40:44,240
time frame

952
00:40:48,710 --> 00:40:45,920
all right and back to our phone bridge

953
00:40:50,630 --> 00:40:48,720
chelsea goad from space.com chelsea go

954
00:40:53,349 --> 00:40:50,640
ahead

955
00:40:55,190 --> 00:40:53,359
hi thanks so much for taking my question

956
00:40:56,790 --> 00:40:55,200
um i have just uh

957
00:40:59,910 --> 00:40:56,800
kind of a question and a half regarding

958
00:41:01,510 --> 00:40:59,920
crew dragon so you mentioned a number of

959
00:41:03,510 --> 00:41:01,520
tests that have so far been done with

960
00:41:06,550 --> 00:41:03,520
crew dragon on orbit

961
00:41:08,950 --> 00:41:06,560
and i'm curious what tests remain from

962
00:41:11,190 --> 00:41:08,960
now until the time when the craft is

963
00:41:12,950 --> 00:41:11,200

sent home and then kind of compounding

964
00:41:14,470 --> 00:41:12,960
on that question i'm curious if you

965
00:41:16,150 --> 00:41:14,480
could go into a little bit more detail

966
00:41:17,589 --> 00:41:16,160
about the solar panels um which you

967
00:41:19,190 --> 00:41:17,599
mentioned we're doing better than

968
00:41:20,870 --> 00:41:19,200
expected

969
00:41:23,190 --> 00:41:20,880
yeah sure so

970
00:41:25,910 --> 00:41:23,200
uh while we're docked the next big test

971
00:41:28,309 --> 00:41:25,920
that i spoke of was the habibility test

972
00:41:31,030 --> 00:41:28,319
so we'll bring uh four crew over into

973
00:41:33,030 --> 00:41:31,040
the into the dragon and really start to

974
00:41:34,630 --> 00:41:33,040
look at what does it look like in dragon

975
00:41:35,910 --> 00:41:34,640
with four crew

976
00:41:37,910 --> 00:41:35,920
of course we just have bob and doug

977
00:41:40,069 --> 00:41:37,920
there now they're going to do

978
00:41:41,670 --> 00:41:40,079
some things like a test of how they

979
00:41:43,030 --> 00:41:41,680
would sleep and position themselves for

980
00:41:45,670 --> 00:41:43,040
sleep

981
00:41:46,950 --> 00:41:45,680
some hygiene kind of task

982
00:41:49,030 --> 00:41:46,960
in an emergency how they would

983
00:41:51,270 --> 00:41:49,040
transition from a breathing mast into

984
00:41:53,030 --> 00:41:51,280
the spacesuit if they had to do that and

985
00:41:54,870 --> 00:41:53,040
some of those kind of activities are

986
00:41:57,270 --> 00:41:54,880
mainly what's planned in that test and

987
00:41:59,829 --> 00:41:57,280
then of course for us the big test

988
00:42:01,030 --> 00:41:59,839

remaining on this test flight is undock

989
00:42:03,430 --> 00:42:01,040
the orbit

990
00:42:05,430 --> 00:42:03,440
entry and landing and recovery of bob

991
00:42:06,390 --> 00:42:05,440
and doug for the first time you know we

992
00:42:09,349 --> 00:42:06,400
did the

993
00:42:11,349 --> 00:42:09,359
the entry and undock on on demo one with

994
00:42:13,270 --> 00:42:11,359
an uncrewed spacecraft

995
00:42:15,030 --> 00:42:13,280
that went extremely well the entry was

996
00:42:16,390 --> 00:42:15,040
was very nominal

997
00:42:17,990 --> 00:42:16,400
for us this time

998
00:42:19,510 --> 00:42:18,000
it includes bob and doug it includes

999
00:42:20,230 --> 00:42:19,520
some unique things

1000
00:42:26,069 --> 00:42:20,240
to

1001
00:42:28,470 --> 00:42:26,079
deep press event they have a suit on

1002
00:42:30,710 --> 00:42:28,480
there's an ac system that has to work

1003
00:42:32,950 --> 00:42:30,720
post landing and then the recovery

1004
00:42:35,109 --> 00:42:32,960
operation of getting the dragon vehicle

1005
00:42:37,750 --> 00:42:35,119
from the water back onto the ship that's

1006
00:42:40,470 --> 00:42:37,760
another big test coming up

1007
00:42:43,589 --> 00:42:40,480
um and then in terms of the solar arrays

1008
00:42:45,750 --> 00:42:43,599
uh you know these solar arrays um

1009
00:42:48,550 --> 00:42:45,760
we thought pre-emission they might have

1010
00:42:51,510 --> 00:42:48,560
a propensity to cycle

1011
00:42:53,589 --> 00:42:51,520
with thermal changes in temperature over

1012
00:42:55,670 --> 00:42:53,599
an orbit and so we thought they may

1013
00:42:57,510 --> 00:42:55,680

degrade at a certain rate right now what

1014
00:42:59,190 --> 00:42:57,520
we're seeing is they're they're really

1015
00:43:00,309 --> 00:42:59,200
degrading a little bit better than

1016
00:43:01,750 --> 00:43:00,319
prediction

1017
00:43:05,030 --> 00:43:01,760
and so that's what gives us the

1018
00:43:09,349 --> 00:43:05,040
capability to stay on orbit for uh

1019
00:43:11,109 --> 00:43:09,359
up to 119 days 114 days or so dock so so

1020
00:43:12,470 --> 00:43:11,119
they're doing well what we do is we

1021
00:43:14,870 --> 00:43:12,480
power the vehicle up and we power the

1022
00:43:17,349 --> 00:43:14,880
vehicle up we can see the generation of

1023
00:43:19,510 --> 00:43:17,359
the power from that array

1024
00:43:22,069 --> 00:43:19,520
every wednesday and then we can kind of

1025
00:43:24,790 --> 00:43:22,079
trend that over time and right now it's

1026
00:43:26,790 --> 00:43:24,800
looking very promising

1027
00:43:30,150 --> 00:43:26,800
and our next question comes from marsha

1028
00:43:31,990 --> 00:43:30,160
dunn with the associated press marcia

1029
00:43:35,030 --> 00:43:32,000
yes hello um

1030
00:43:38,390 --> 00:43:35,040
i'm wondering if the space walks slip

1031
00:43:40,870 --> 00:43:38,400
out a little farther would you delay

1032
00:43:42,470 --> 00:43:40,880
the crew dragon crew from coming back at

1033
00:43:44,870 --> 00:43:42,480
the beginning of august i mean would you

1034
00:43:47,589 --> 00:43:44,880
slip that for that reason alone

1035
00:43:49,349 --> 00:43:47,599
and would you be okay with doing three

1036
00:43:51,510 --> 00:43:49,359
out of the four spacewalks and just

1037
00:43:54,150 --> 00:43:51,520
leaving that last four spacewalk for

1038
00:43:55,750 --> 00:43:54,160

some future crew

1039
00:43:58,710 --> 00:43:55,760
well marcia um

1040
00:44:01,510 --> 00:43:58,720
the uh the i'll start with the the last

1041
00:44:04,790 --> 00:44:01,520
question first the edas themselves are

1042
00:44:07,109 --> 00:44:04,800
are basically um focused on on doing uh

1043
00:44:10,069 --> 00:44:07,119
two separate two separate battery

1044
00:44:11,670 --> 00:44:10,079
channels and and once you start off into

1045
00:44:13,030 --> 00:44:11,680
into swapping out the batteries for one

1046
00:44:13,750 --> 00:44:13,040
of the battery channels you really need

1047
00:44:15,990 --> 00:44:13,760
to

1048
00:44:17,750 --> 00:44:16,000
stay committed and get that channel back

1049
00:44:20,230 --> 00:44:17,760
up and running otherwise we're looking

1050
00:44:21,990 --> 00:44:20,240
at running for some amount of time so so

1051
00:44:25,430 --> 00:44:22,000
really we're in the neighborhood of an

1052
00:44:26,550 --> 00:44:25,440
even number of evas uh per per channel

1053
00:44:28,390 --> 00:44:26,560
or

1054
00:44:29,990 --> 00:44:28,400
hopefully totally somewhere around four

1055
00:44:31,510 --> 00:44:30,000
evas is what we're looking at if we end

1056
00:44:33,750 --> 00:44:31,520
up with a fifth that means we have to do

1057
00:44:36,390 --> 00:44:33,760
three on one channel and two on another

1058
00:44:38,630 --> 00:44:36,400
but the goal the goal is to once you

1059
00:44:41,030 --> 00:44:38,640
start out with with the first eva on a

1060
00:44:42,630 --> 00:44:41,040
channel you don't stop from an eva

1061
00:44:44,710 --> 00:44:42,640
perspective until you recover that

1062
00:44:46,630 --> 00:44:44,720
channel so so

1063
00:44:48,790 --> 00:44:46,640

we wouldn't probably put ourselves in a

1064
00:44:50,390 --> 00:44:48,800
position where we would go go into that

1065
00:44:53,270 --> 00:44:50,400
second channel knowing that we might

1066
00:44:54,870 --> 00:44:53,280
only only get the channel taken down and

1067
00:44:56,710 --> 00:44:54,880
and part of the part of the battery

1068
00:44:58,390 --> 00:44:56,720
swapped out we really do want to want to

1069
00:45:00,069 --> 00:44:58,400
do that second eba on that channel and

1070
00:45:01,750 --> 00:45:00,079
give ourselves a chance to get it get it

1071
00:45:04,870 --> 00:45:01,760
back up and running before

1072
00:45:07,430 --> 00:45:04,880
before bob and doug come home

1073
00:45:10,069 --> 00:45:07,440
as far as as delays the the plans that

1074
00:45:13,190 --> 00:45:10,079
we're looking at with steve

1075
00:45:15,030 --> 00:45:13,200
if we move the the evas a little further

1076
00:45:17,270 --> 00:45:15,040
out into july we still think there's a

1077
00:45:18,470 --> 00:45:17,280
path that gets us there to be done in

1078
00:45:20,390 --> 00:45:18,480
time

1079
00:45:22,470 --> 00:45:20,400
before the end of july that's that's the

1080
00:45:23,990 --> 00:45:22,480
challenge i've given to the team is

1081
00:45:25,990 --> 00:45:24,000
let's do everything we can do to try to

1082
00:45:27,990 --> 00:45:26,000
get these evas done in july and i think

1083
00:45:29,670 --> 00:45:28,000
we have we have multiple options that

1084
00:45:32,150 --> 00:45:29,680
allow us to do that

1085
00:45:33,829 --> 00:45:32,160
again with a little bit of margin so if

1086
00:45:35,750 --> 00:45:33,839
we if we get to the point where we've

1087
00:45:37,270 --> 00:45:35,760
completed one channel and before we

1088
00:45:39,430 --> 00:45:37,280

start the second channel we'll we'll

1089
00:45:40,710 --> 00:45:39,440
most certainly uh have a have a

1090
00:45:43,190 --> 00:45:40,720
discussion with the commercial crew

1091
00:45:44,630 --> 00:45:43,200
program the spacex team and and make

1092
00:45:46,309 --> 00:45:44,640
sure that we're all on the same page

1093
00:45:48,309 --> 00:45:46,319
that it's the right decision to go ahead

1094
00:45:49,750 --> 00:45:48,319
and go for that second channel that's uh

1095
00:45:51,750 --> 00:45:49,760
that's kind of been the path that we've

1096
00:45:54,069 --> 00:45:51,760
laid out and and we're not we won't

1097
00:45:55,589 --> 00:45:54,079
deviate from from that if we if we start

1098
00:45:56,870 --> 00:45:55,599
to slip slip things to the right a

1099
00:45:57,589 --> 00:45:56,880
little bit we're going to continue to

1100
00:45:59,430 --> 00:45:57,599
talk

1101
00:46:01,510 --> 00:45:59,440
and make sure that we're taking all the

1102
00:46:03,349 --> 00:46:01,520
factors into account before we'll we'll

1103
00:46:05,430 --> 00:46:03,359
allow the dragon to slip any further

1104
00:46:07,589 --> 00:46:05,440
into august

1105
00:46:09,750 --> 00:46:07,599
and our next question comes from social

1106
00:46:11,910 --> 00:46:09,760
media from archie why is there a

1107
00:46:13,990 --> 00:46:11,920
requirement of replacing lithium ion

1108
00:46:15,990 --> 00:46:14,000
batteries with nickel hydrogen batteries

1109
00:46:18,950 --> 00:46:16,000
instead of just replacing with new

1110
00:46:20,630 --> 00:46:18,960
lithium ion batteries

1111
00:46:22,470 --> 00:46:20,640
well uh what we're doing is we're going

1112
00:46:24,069 --> 00:46:22,480
to newer technology with the lithium ion

1113
00:46:25,510 --> 00:46:24,079

batteries are basically a newer

1114
00:46:28,790 --> 00:46:25,520
technology

1115
00:46:31,270 --> 00:46:28,800
with a smaller footprint you can you can

1116
00:46:33,829 --> 00:46:31,280
get way more storage capacity on orbit

1117
00:46:35,829 --> 00:46:33,839
which is the reason that that we we made

1118
00:46:37,349 --> 00:46:35,839
the leap in technology several years ago

1119
00:46:39,829 --> 00:46:37,359
to say let's go from nickel hydrogen to

1120
00:46:41,030 --> 00:46:39,839
lithium ion so over the past well four

1121
00:46:43,190 --> 00:46:41,040
years now

1122
00:46:44,870 --> 00:46:43,200
over four years we've been slowly

1123
00:46:46,870 --> 00:46:44,880
swapping out from the nickel hydrogens

1124
00:46:49,589 --> 00:46:46,880
to the lithium ion

1125
00:46:51,190 --> 00:46:49,599
one of the primary benefits is that the

1126
00:46:53,030 --> 00:46:51,200
the packaging for the lithium ion

1127
00:46:54,870 --> 00:46:53,040
batteries is much smaller and so

1128
00:46:57,589 --> 00:46:54,880
therefore we can launch

1129
00:47:00,790 --> 00:46:57,599
much more capability much more

1130
00:47:02,790 --> 00:47:00,800
capacity battery wise in the htvs and so

1131
00:47:05,030 --> 00:47:02,800
we don't need as many htv flights to get

1132
00:47:06,069 --> 00:47:05,040
these batteries to orbit so we can get

1133
00:47:08,550 --> 00:47:06,079
much more

1134
00:47:10,230 --> 00:47:08,560
energy capacity and we can do it with

1135
00:47:11,990 --> 00:47:10,240
less flights going to the international

1136
00:47:13,829 --> 00:47:12,000
space station uh carrying up these new

1137
00:47:16,230 --> 00:47:13,839
batteries so that's two of the biggest

1138
00:47:19,510 --> 00:47:16,240

reasons why and and and quite frankly

1139
00:47:21,910 --> 00:47:19,520
the uh the the longevity of the the new

1140
00:47:24,470 --> 00:47:21,920
technology batteries gets us out again

1141
00:47:26,549 --> 00:47:24,480
uh well out through the what will most

1142
00:47:29,190 --> 00:47:26,559
likely be the end of the program uh

1143
00:47:31,910 --> 00:47:29,200
whereas the nickel hydrogen's had a a

1144
00:47:34,069 --> 00:47:31,920
life of around six six to seven or eight

1145
00:47:35,910 --> 00:47:34,079
years and and so we'll we'll we'll be

1146
00:47:38,710 --> 00:47:35,920
much better off for the long term by by

1147
00:47:40,549 --> 00:47:38,720
having the lithium ion batteries

1148
00:47:42,710 --> 00:47:40,559
and back to our phone bridge stephen

1149
00:47:45,589 --> 00:47:42,720
clark with space flight now steven go

1150
00:47:49,750 --> 00:47:47,030
hi thank you for taking my question

1151
00:47:52,710 --> 00:47:49,760
stephen clark from space flight now

1152
00:47:54,870 --> 00:47:52,720
questions for steve stitch uh first of

1153
00:47:57,990 --> 00:47:54,880
all the habitability test planned around

1154
00:48:00,069 --> 00:47:58,000
the july 4th time frame uh will the four

1155
00:48:02,950 --> 00:48:00,079
crew members actually sleep overnight in

1156
00:48:04,309 --> 00:48:02,960
crew dragon or will they just assess

1157
00:48:06,870 --> 00:48:04,319
you know the sleeping births and

1158
00:48:09,190 --> 00:48:06,880
quarters uh you know during the day and

1159
00:48:11,750 --> 00:48:09,200
then return to station and also uh can

1160
00:48:13,589 --> 00:48:11,760
you talk about the various landing sites

1161
00:48:15,190 --> 00:48:13,599
and scenarios that are in play for the

1162
00:48:17,190 --> 00:48:15,200
return of demo two

1163
00:48:19,190 --> 00:48:17,200

i think you have a few landing sites in

1164
00:48:21,190 --> 00:48:19,200
the atlantic and then the gulf as a

1165
00:48:23,990 --> 00:48:21,200
backup can you talk about where each of

1166
00:48:25,430 --> 00:48:24,000
those are located and what your primary

1167
00:48:30,150 --> 00:48:25,440
return

1168
00:48:33,270 --> 00:48:30,160
on in early august thank you

1169
00:48:34,870 --> 00:48:33,280
yeah thanks steven for the question

1170
00:48:36,870 --> 00:48:34,880
right now there's no plan really to have

1171
00:48:38,470 --> 00:48:36,880
the crew sleep overnight um we can get

1172
00:48:40,710 --> 00:48:38,480
back and check but i'm pretty sure that

1173
00:48:42,309 --> 00:48:40,720
the plan is just to come in and and do

1174
00:48:44,230 --> 00:48:42,319
an assessment of sleeping and not sleep

1175
00:48:45,750 --> 00:48:44,240
overnight in dragon

1176
00:48:47,829 --> 00:48:45,760
from what we heard from bob and doug a

1177
00:48:49,589 --> 00:48:47,839
little bit and some debriefs the

1178
00:48:51,109 --> 00:48:49,599
sleeping was fine on the way up the one

1179
00:48:53,270 --> 00:48:51,119
night that they spent

1180
00:48:54,790 --> 00:48:53,280
there and dragon on the way

1181
00:48:57,430 --> 00:48:54,800
in terms of landing sites right now we

1182
00:48:59,349 --> 00:48:57,440
have three landing sites uh we have a

1183
00:49:01,030 --> 00:48:59,359
landing site um

1184
00:49:02,549 --> 00:49:01,040
on the east coast of florida off of

1185
00:49:05,829 --> 00:49:02,559
jacksonville

1186
00:49:07,829 --> 00:49:05,839
we have a site directly east of the cape

1187
00:49:10,390 --> 00:49:07,839
called the cape site and then we have a

1188
00:49:11,829 --> 00:49:10,400

site off of pensacola

1189
00:49:14,309 --> 00:49:11,839
we're in the process of looking at

1190
00:49:16,630 --> 00:49:14,319
adding some additional sites

1191
00:49:19,990 --> 00:49:16,640
one off of tallahassee

1192
00:49:22,470 --> 00:49:20,000
uh one off of tampa one off of daytona

1193
00:49:24,470 --> 00:49:22,480
beach and then panama city florida

1194
00:49:26,870 --> 00:49:24,480
uh we're also in the process of figuring

1195
00:49:29,910 --> 00:49:26,880
out you know early on we sort of thought

1196
00:49:31,589 --> 00:49:29,920
the prime would always be the cape site

1197
00:49:34,710 --> 00:49:31,599
it was a little bit better to transport

1198
00:49:37,270 --> 00:49:34,720
the crew back on shore and then

1199
00:49:38,790 --> 00:49:37,280
the backup would always be

1200
00:49:40,470 --> 00:49:38,800
pensacola

1201
00:49:42,390 --> 00:49:40,480
right now we're looking at just based on

1202
00:49:43,910 --> 00:49:42,400
the way the orbits line up we're trying

1203
00:49:45,430 --> 00:49:43,920
to come up with a strategy for which one

1204
00:49:47,030 --> 00:49:45,440
would be prime

1205
00:49:48,470 --> 00:49:47,040
it could be driven by weather you know

1206
00:49:50,549 --> 00:49:48,480
as we get into the august time frame you

1207
00:49:52,390 --> 00:49:50,559
start getting more tropical activity so

1208
00:49:53,990 --> 00:49:52,400
once we pick a landing date we may

1209
00:49:55,990 --> 00:49:54,000
choose one of those sites we'll always

1210
00:49:58,069 --> 00:49:56,000
have at least one backup site

1211
00:49:59,990 --> 00:49:58,079
once we undock so our rules tell us we

1212
00:50:01,589 --> 00:50:00,000
ought to have two go sites to undock and

1213
00:50:03,829 --> 00:50:01,599

so we're in the middle of coming up with

1214
00:50:05,109 --> 00:50:03,839
that strategy for how we lay out the

1215
00:50:08,309 --> 00:50:05,119
sites

1216
00:50:12,710 --> 00:50:11,109
and david mosher with business insider

1217
00:50:14,230 --> 00:50:12,720
david go ahead

1218
00:50:16,710 --> 00:50:14,240
uh thanks thank you for taking my

1219
00:50:18,309 --> 00:50:16,720
question steve this is for you um kind

1220
00:50:19,430 --> 00:50:18,319
of springing off that's that last thing

1221
00:50:20,309 --> 00:50:19,440
you just said

1222
00:50:22,390 --> 00:50:20,319
um

1223
00:50:25,030 --> 00:50:22,400
regarding demo two's return so the

1224
00:50:26,790 --> 00:50:25,040
undocking um i'm really curious what you

1225
00:50:28,950 --> 00:50:26,800
know if in an ideal scenario what the

1226
00:50:31,670 --> 00:50:28,960
timeline for return

1227
00:50:33,589 --> 00:50:31,680
to earth would look like in terms of

1228
00:50:35,990 --> 00:50:33,599
um you know what

1229
00:50:38,710 --> 00:50:36,000
when the burns are roughly how far apart

1230
00:50:41,190 --> 00:50:38,720
those are um yeah so from undocking to

1231
00:50:43,510 --> 00:50:41,200
landing in an ideal scenario at your

1232
00:50:45,670 --> 00:50:43,520
ideal landing location what does the

1233
00:50:47,750 --> 00:50:45,680
timing look like what are the uh how

1234
00:50:50,069 --> 00:50:47,760
many hours are between each phase like a

1235
00:50:51,589 --> 00:50:50,079
sort of a detailed uh

1236
00:50:53,670 --> 00:50:51,599
question maybe you don't have an answer

1237
00:50:55,190 --> 00:50:53,680
but if you do great thank you yeah i can

1238
00:50:57,589 --> 00:50:55,200

give you a little thumbnail sketch of

1239
00:50:59,829 --> 00:50:57,599
how it looks and it the the short answer

1240
00:51:01,910 --> 00:50:59,839
is it really depends and so

1241
00:51:04,069 --> 00:51:01,920
uh we'll obviously line up the uh the

1242
00:51:05,670 --> 00:51:04,079
undocking uh from space station the

1243
00:51:07,349 --> 00:51:05,680
actual undocking event with with the

1244
00:51:09,430 --> 00:51:07,359
crew sleep schedule of station and all

1245
00:51:11,750 --> 00:51:09,440
the the various constraints with space

1246
00:51:14,549 --> 00:51:11,760
station and then from that undock event

1247
00:51:16,710 --> 00:51:14,559
there's a series of burns that back away

1248
00:51:18,870 --> 00:51:16,720
uh from station and then we'll do a

1249
00:51:20,710 --> 00:51:18,880
sequence of maneuvers to get up and

1250
00:51:23,589 --> 00:51:20,720
around in clear station and then the

1251
00:51:26,390 --> 00:51:23,599
time frame from undock to actual landing

1252
00:51:28,710 --> 00:51:26,400
varies it depends on when that undock

1253
00:51:31,270 --> 00:51:28,720
point is and the landing sites and so it

1254
00:51:32,790 --> 00:51:31,280
varies anywhere from uh on the order of

1255
00:51:35,910 --> 00:51:32,800
six hours

1256
00:51:38,390 --> 00:51:35,920
to maybe a mid-range of 15 to 20 hours

1257
00:51:40,230 --> 00:51:38,400
and there's some other cases that uh

1258
00:51:42,309 --> 00:51:40,240
would get you out there in the 38 hours

1259
00:51:44,390 --> 00:51:42,319
from undock to landing it just sort of

1260
00:51:47,109 --> 00:51:44,400
depends on the sites

1261
00:51:49,510 --> 00:51:47,119
the vehicle has consumables for about

1262
00:51:51,349 --> 00:51:49,520
three days after we undock so we've got

1263
00:51:52,630 --> 00:51:51,359

plenty of capability once we undock and

1264
00:51:54,790 --> 00:51:52,640
so

1265
00:51:56,549 --> 00:51:54,800
it just depends on the sequence of sites

1266
00:52:01,109 --> 00:51:56,559
and the sequence we set up as to how

1267
00:52:04,950 --> 00:52:03,109
okay and our next question comes from

1268
00:52:12,309 --> 00:52:04,960
social media how do you clean a

1269
00:52:16,069 --> 00:52:15,030
and i can take that one if you like

1270
00:52:18,470 --> 00:52:16,079
so we

1271
00:52:20,309 --> 00:52:18,480
do quite a bit of work to clean a space

1272
00:52:23,030 --> 00:52:20,319
suit after a spacewalk

1273
00:52:25,190 --> 00:52:23,040
the crew will come in and they will

1274
00:52:25,990 --> 00:52:25,200
doff their spacesuits

1275
00:52:29,910 --> 00:52:26,000
the

1276
00:52:31,910 --> 00:52:29,920
role of getting to wipe it out it is a

1277
00:52:33,990 --> 00:52:31,920
bladder inside so kind of a plastic

1278
00:52:35,750 --> 00:52:34,000
bladder that you can actually wipe off

1279
00:52:37,829 --> 00:52:35,760
and get rid of any of the sweat or any

1280
00:52:40,150 --> 00:52:37,839
of the other fluids

1281
00:52:42,790 --> 00:52:40,160
in the spacesuit itself

1282
00:52:45,349 --> 00:52:42,800
and then the internal plus or the life

1283
00:52:47,510 --> 00:52:45,359
support system we do have to scrub after

1284
00:52:49,190 --> 00:52:47,520
a series of evas sometimes in the middle

1285
00:52:51,510 --> 00:52:49,200
if they're the longer ones we'll

1286
00:52:53,910 --> 00:52:51,520
actually scrub all the water out for any

1287
00:52:55,990 --> 00:52:53,920
tiny particulate and add iodine to make

1288
00:52:57,990 --> 00:52:56,000

sure we don't have any growth or any

1289
00:53:00,630 --> 00:52:58,000
anything inside the suit we call that a

1290
00:53:02,470 --> 00:53:00,640
loop scrub

1291
00:53:04,950 --> 00:53:02,480
and maybe another question for me for

1292
00:53:08,390 --> 00:53:04,960
you sandra from yandy how long does it

1293
00:53:11,430 --> 00:53:08,400
take to put on and take off a spacesuit

1294
00:53:13,589 --> 00:53:11,440
uh it's not terribly long but it can be

1295
00:53:15,270 --> 00:53:13,599
quite challenging and it's funny because

1296
00:53:16,230 --> 00:53:15,280
it's the inverse problem we have on the

1297
00:53:18,630 --> 00:53:16,240
ground

1298
00:53:20,549 --> 00:53:18,640
on orbit it's a little bit easier to get

1299
00:53:22,230 --> 00:53:20,559
in the spacesuits because there's no

1300
00:53:24,150 --> 00:53:22,240
gravity but then you have the opposite

1301
00:53:26,230 --> 00:53:24,160
problem trying to get out so it takes on

1302
00:53:28,470 --> 00:53:26,240
the order of five to ten minutes to don

1303
00:53:29,670 --> 00:53:28,480
and doff it itself now pre-breathe is

1304
00:53:31,430 --> 00:53:29,680
what takes the

1305
00:53:32,950 --> 00:53:31,440
longer pull because we do spend a lot of

1306
00:53:34,950 --> 00:53:32,960
time making sure that their bodies are

1307
00:53:36,630 --> 00:53:34,960
conditioned to go down to vacuum and so

1308
00:53:38,870 --> 00:53:36,640
that's the part that takes the long part

1309
00:53:40,870 --> 00:53:38,880
to don the suit itself is on the order

1310
00:53:41,990 --> 00:53:40,880
of about 10 minutes

1311
00:53:44,630 --> 00:53:42,000
but to watch them get out it's kind of

1312
00:53:46,069 --> 00:53:44,640
fun sometimes you'll see the the suit iv

1313
00:53:49,589 --> 00:53:46,079

kind of put their feet on them and

1314
00:53:51,510 --> 00:53:49,599
wiggle them out and so it's kind of fun

1315
00:53:52,790 --> 00:53:51,520
and one more question from social media

1316
00:53:54,950 --> 00:53:52,800
and this might be one that the both of

1317
00:53:55,990 --> 00:53:54,960
you here in this studio can answer how

1318
00:53:58,390 --> 00:53:56,000
happy have you been with the

1319
00:54:00,069 --> 00:53:58,400
collaboration between nasa and spacex on

1320
00:54:02,549 --> 00:54:00,079
this last mission

1321
00:54:04,790 --> 00:54:02,559
i i can start and let let kenny add i

1322
00:54:07,670 --> 00:54:04,800
mean spacex is an incredible partner

1323
00:54:09,750 --> 00:54:07,680
it's been an incredible team working

1324
00:54:13,030 --> 00:54:09,760
you know for many many years to get both

1325
00:54:13,910 --> 00:54:13,040
dragon and f9 falcon 9 ready to go

1326
00:54:23,190 --> 00:54:13,920
uh

1327
00:54:25,270 --> 00:54:23,200
incredible you know this is their first

1328
00:54:26,630 --> 00:54:25,280
crude mission but you can just tell how

1329
00:54:28,390 --> 00:54:26,640
much they've learned from all the cargo

1330
00:54:29,270 --> 00:54:28,400
flights as they embarked upon this crew

1331
00:54:30,870 --> 00:54:29,280
mission

1332
00:54:33,349 --> 00:54:30,880
and then just leading up to the launch

1333
00:54:34,710 --> 00:54:33,359
and the launch countdown operations just

1334
00:54:35,910 --> 00:54:34,720
incredible teamwork incredible

1335
00:54:37,670 --> 00:54:35,920
partnership

1336
00:54:39,349 --> 00:54:37,680
and then we're working ahead already on

1337
00:54:40,950 --> 00:54:39,359
crew one and then crew two and all the

1338
00:54:42,870 --> 00:54:40,960

future missions so it's just been

1339
00:54:44,309 --> 00:54:42,880
incredible uh also working with the

1340
00:54:45,750 --> 00:54:44,319
space station program i think we've got

1341
00:54:48,390 --> 00:54:45,760
a good three-way

1342
00:54:49,990 --> 00:54:48,400
uh team between space station

1343
00:54:51,109 --> 00:54:50,000
spacex and then the commercial crew

1344
00:54:54,390 --> 00:54:51,119
program

1345
00:54:55,910 --> 00:54:54,400
yeah a great word steve yes um you know

1346
00:54:58,710 --> 00:54:55,920
from a space station standpoint we've

1347
00:55:01,190 --> 00:54:58,720
been working with with spacex doing

1348
00:55:03,910 --> 00:55:01,200
dynamic operations for a number of years

1349
00:55:06,390 --> 00:55:03,920
now going on a decade here and uh

1350
00:55:07,829 --> 00:55:06,400
it's it's been kind of kind of cool to

1351
00:55:10,870 --> 00:55:07,839
because some of the folks that rolled

1352
00:55:13,270 --> 00:55:10,880
off of off of the cargo uh flights

1353
00:55:15,589 --> 00:55:13,280
actually came and went into the to the

1354
00:55:18,309 --> 00:55:15,599
ccp world and and worked with steve and

1355
00:55:20,870 --> 00:55:18,319
his his team and so it's been great to

1356
00:55:23,190 --> 00:55:20,880
get to contact reconnect with some of

1357
00:55:25,270 --> 00:55:23,200
those folks again and as we work through

1358
00:55:28,549 --> 00:55:25,280
all the the details of this particular

1359
00:55:29,750 --> 00:55:28,559
mission and it's clear that um you know

1360
00:55:31,510 --> 00:55:29,760
our early

1361
00:55:34,230 --> 00:55:31,520
early

1362
00:55:36,150 --> 00:55:34,240
working together uh has been beneficial

1363
00:55:37,829 --> 00:55:36,160

for all of us it really has helped pave

1364
00:55:40,870 --> 00:55:37,839
the way for what i think is a really

1365
00:55:43,030 --> 00:55:40,880
good partnership and uh and it's a it's

1366
00:55:44,630 --> 00:55:43,040
it's been a joy and and we've really

1367
00:55:46,390 --> 00:55:44,640
appreciated the opportunity to work with

1368
00:55:48,230 --> 00:55:46,400
with steve and his team and and

1369
00:55:50,309 --> 00:55:48,240
certainly with spacex and again we get

1370
00:55:51,990 --> 00:55:50,319
to renew some some connections that

1371
00:55:54,150 --> 00:55:52,000
we've lost track of over the last few

1372
00:55:55,510 --> 00:55:54,160
years so it's been really good

1373
00:55:57,190 --> 00:55:55,520
and that's all the time we have for

1374
00:55:59,030 --> 00:55:57,200
today i want to thank our panel of

1375
00:56:01,510 --> 00:55:59,040
experts for joining us today and of

1376
00:56:03,910 --> 00:56:01,520
course all of you who called in or asked

1377
00:56:06,549 --> 00:56:03,920
questions via social media be sure to

1378
00:56:09,750 --> 00:56:06,559
tune in to watch the spacewalk unfold

1379
00:56:12,390 --> 00:56:09,760
this friday friday june 26th on our live

1380
00:56:14,309 --> 00:56:12,400
coverage starting at 5 a.m central and

1381
00:56:25,350 --> 00:56:14,319
that'll wrap up our briefing for today