1
00:00:04,470 --> 00:00:01,869
as we continue to take a look at the

2
00:00:06,710 --> 00:00:04,480
sts-135 mission the final space shuttle

3
00:00:08,830 --> 00:00:06,720
flight joining me now is glenda brown

4
00:00:11,509 --> 00:00:08,840
she is the lead spacewalk officer for

5
00:00:13,110 --> 00:00:11,519
sts-135 and she has more details about

6
00:00:15,270 --> 00:00:13,120
the single spacewalk that will be

7
00:00:16,790 --> 00:00:15,280
involved with the mission glinda

8
00:00:18,310 --> 00:00:16,800
thanks josh

9
00:00:20,950 --> 00:00:18,320
okay i brought a whole bunch of

10
00:00:21,910 --> 00:00:20,960
information about our spacewalks on this

11
00:00:24,070 --> 00:00:21,920
mission

12
00:00:26,150 --> 00:00:24,080
and a little background on how we do the

13
00:00:28,310 --> 00:00:26,160

training uh give you a little bit more

14
00:00:30,790 --> 00:00:28,320
information on how we do space shuttle

15
00:00:32,709 --> 00:00:30,800
training in general

16
00:00:35,110 --> 00:00:32,719
for this mission we have one scheduled

17
00:00:37,590 --> 00:00:35,120
eva we are also preparing and have

18
00:00:40,549 --> 00:00:37,600
consumables to support one contingency

19
00:00:41,910 --> 00:00:40,559
eba for the international space station

20
00:00:43,990 --> 00:00:41,920
as well as enough

21
00:00:46,150 --> 00:00:44,000
consumables to support two space shuttle

22
00:00:47,910 --> 00:00:46,160
contingency evas if those would be

23
00:00:49,670 --> 00:00:47,920
required to return the

24
00:00:51,350 --> 00:00:49,680
vehicle safely to

25
00:00:52,709 --> 00:00:51,360
earth

26
00:00:55,029 --> 00:00:52,719
our space

27
00:00:59,270 --> 00:00:55,039
walkers for this mission will be mike

28
00:01:00,389 --> 00:00:59,280
fossum and ron garan they are the two

29
00:01:02,630 --> 00:01:00,399
crew members who are on the

30
00:01:05,189 --> 00:01:02,640
international space station at this time

31
00:01:08,149 --> 00:01:05,199
this will be the first time that we are

32
00:01:10,070 --> 00:01:08,159
using the space station crew members to

33
00:01:12,310 --> 00:01:10,080
do our space walks during a docked

34
00:01:14,789 --> 00:01:12,320
mission in the past we've had a time

35
00:01:16,710 --> 00:01:14,799
when we've rotated through one of the

36
00:01:18,310 --> 00:01:16,720
uh international space station crew

37
00:01:19,990 --> 00:01:18,320
members but this will be the first time

38
00:01:21,429 --> 00:01:20,000

we're using two of those

39
00:01:22,469 --> 00:01:21,439
as you heard in the briefings earlier

40
00:01:24,230 --> 00:01:22,479
today

41
00:01:25,429 --> 00:01:24,240
that is because of the challenge of only

42
00:01:26,870 --> 00:01:25,439
having four

43
00:01:29,590 --> 00:01:26,880
shuttle crew members on board we

44
00:01:31,830 --> 00:01:29,600
definitely have to share the work

45
00:01:34,149 --> 00:01:31,840
mike fossum has performed six evas in

46
00:01:36,550 --> 00:01:34,159
the past he has uh six

47
00:01:38,550 --> 00:01:36,560
i'm sorry 42 hours and one minute of

48
00:01:41,749 --> 00:01:38,560
spacewalk experience three of those

49
00:01:42,710 --> 00:01:41,759
spacewalks were on sts-121 with piers

50
00:01:45,590 --> 00:01:42,720
cellar

51
00:01:46,389 --> 00:01:45,600
and the remaining three of those were on

52
00:02:27,910 --> 00:01:46,399
a

53
00:02:29,910 --> 00:02:27,920
mission

54
00:02:31,509 --> 00:02:29,920
orbiter docked contingencies those

55
00:02:32,949 --> 00:02:31,519
contingencies that would happen while we

56
00:02:34,309 --> 00:02:32,959
were still docked to the international

57
00:02:36,710 --> 00:02:34,319
space station

58
00:02:38,630 --> 00:02:36,720
uh for the

59
00:02:40,869 --> 00:02:38,640
shuttle atlantis would be performed by

60
00:02:43,270 --> 00:02:40,879
rex walheim and

61
00:02:45,110 --> 00:02:43,280
mike fossum sandy magnus

62
00:02:46,790 --> 00:02:45,120
would be supporting with robotic arm

63
00:02:48,869 --> 00:02:46,800

support inside

64
00:02:50,710 --> 00:02:48,879
the orbiter contingency evas that would

65
00:02:51,990 --> 00:02:50,720
happen in the undock time frame or that

66
00:02:53,670 --> 00:02:52,000
time after we undock from the

67
00:02:55,830 --> 00:02:53,680
international space station would be

68
00:02:57,990 --> 00:02:55,840
performed by rex walheim and sandy

69
00:03:00,070 --> 00:02:58,000
magnus while sandy has a lot of

70
00:03:02,470 --> 00:03:00,080
experience on flying uh previous

71
00:03:03,910 --> 00:03:02,480
missions she is an eva rookie and this

72
00:03:06,949 --> 00:03:03,920
would be her first spacewalk if that

73
00:03:09,350 --> 00:03:06,959
were to be required

74
00:03:11,910 --> 00:03:09,360
so i've mentioned that we have a pretty

75
00:03:14,070 --> 00:03:11,920
heavy division of responsibilities in

76
00:03:16,390 --> 00:03:14,080
addition to mike fossum and ron garan

77
00:03:18,390 --> 00:03:16,400
doing the actual space walking rex

78
00:03:20,710 --> 00:03:18,400
walheim will be supporting them from

79
00:03:22,869 --> 00:03:20,720
inside the international space station

80
00:03:23,990 --> 00:03:22,879
as their inter-vehicular support

81
00:03:26,949 --> 00:03:24,000
astronaut

82
00:03:28,470 --> 00:03:26,959
he will be reading out all of the tasks

83
00:03:29,990 --> 00:03:28,480
for that eva

84
00:03:32,550 --> 00:03:30,000
the procedures reading them out of the

85
00:03:33,910 --> 00:03:32,560
book communicating with mission control

86
00:03:36,630 --> 00:03:33,920
and

87
00:03:38,390 --> 00:03:36,640
helping them get through their spacewalk

88
00:03:40,070 --> 00:03:38,400

because there are only four shuttle crew

89
00:03:42,470 --> 00:03:40,080
members available we needed to make sure

90
00:03:45,589 --> 00:03:42,480
that rex would be able to take a break

91
00:03:48,149 --> 00:03:45,599
when required and be able to be freed up

92
00:03:50,470 --> 00:03:48,159
to support any other shuttle operations

93
00:03:52,710 --> 00:03:50,480
during the eva if required so we've

94
00:03:55,589 --> 00:03:52,720
trained one of our new astronauts kate

95
00:03:58,070 --> 00:03:55,599
rubins to ask act as the

96
00:04:00,070 --> 00:03:58,080
ground iv

97
00:04:02,789 --> 00:04:00,080
she trained with us at the neutral

98
00:04:04,229 --> 00:04:02,799
buoyancy laboratory she uh watched all

99
00:04:05,589 --> 00:04:04,239
of the space walks and has been

100
00:04:07,190 --> 00:04:05,599
instrumental in helping us with the

101
00:04:08,949 --> 00:04:07,200
development there

102
00:04:11,030 --> 00:04:08,959
she was selected in the last astronaut

103
00:04:12,550 --> 00:04:11,040
class to be selected and we're happy to

104
00:04:15,270 --> 00:04:12,560
have her

105
00:04:16,949 --> 00:04:15,280
preparing with us chris ferguson is the

106
00:04:19,909 --> 00:04:16,959
commander for the mission and he will

107
00:04:21,909 --> 00:04:19,919
also be supporting us as the suit iv

108
00:04:24,790 --> 00:04:21,919
that's the inner vehicular

109
00:04:26,390 --> 00:04:24,800
officer or crew member that's on board

110
00:04:28,469 --> 00:04:26,400
that helps the crew members get into

111
00:04:30,710 --> 00:04:28,479
their spacesuits helps take them through

112
00:04:31,510 --> 00:04:30,720
the procedures during the time that they

113
00:04:34,070 --> 00:04:31,520

are

114
00:04:36,230 --> 00:04:34,080
getting prepped up to go outside he will

115
00:04:37,590 --> 00:04:36,240
also be supported by the japanese crew

116
00:04:40,950 --> 00:04:37,600
member on the international space

117
00:04:43,350 --> 00:04:40,960
station satoshi furukawa satoshi trained

118
00:04:45,030 --> 00:04:43,360
throughout his training experience with

119
00:04:46,310 --> 00:04:45,040
mike fossum here on the ground the two

120
00:04:48,230 --> 00:04:46,320
of them became

121
00:04:50,150 --> 00:04:48,240
quite close and worked very well

122
00:04:51,590 --> 00:04:50,160
together in getting prepared for the

123
00:04:53,350 --> 00:04:51,600
spacewalks

124
00:04:55,030 --> 00:04:53,360
they were also able to train with ron

125
00:04:56,550 --> 00:04:55,040
garan and i'll show you some video

126
00:04:58,310 --> 00:04:56,560
footage of that

127
00:04:59,749 --> 00:04:58,320
a little bit later

128
00:05:01,749 --> 00:04:59,759
sandy magnus

129
00:05:03,350 --> 00:05:01,759
and doug hurley the pilot for this

130
00:05:06,230 --> 00:05:03,360
mission will be operating the space

131
00:05:07,830 --> 00:05:06,240
station robot arm during the

132
00:05:09,909 --> 00:05:07,840
spacewalk

133
00:05:11,909 --> 00:05:09,919
sandy with the prime responsibility and

134
00:05:13,830 --> 00:05:11,919
doug trading out with her and also

135
00:05:16,390 --> 00:05:13,840
watching view camera views to make sure

136
00:05:17,830 --> 00:05:16,400
that the clearances are good between the

137
00:05:20,390 --> 00:05:17,840
modules of the international space

138
00:05:21,909 --> 00:05:20,400

station and the robot arm

139
00:05:23,830 --> 00:05:21,919
the experienced crew member that we will

140
00:05:27,590 --> 00:05:23,840
have with us in mission control to help

141
00:05:29,830 --> 00:05:27,600
out with voicing up any particular

142
00:05:31,909 --> 00:05:29,840
items that we may need corrections in

143
00:05:34,629 --> 00:05:31,919
the eva or helping us out with

144
00:05:38,390 --> 00:05:34,639
troubleshooting on board is steve bowen

145
00:05:39,830 --> 00:05:38,400
he last flew on scs-133

146
00:05:42,070 --> 00:05:39,840
on our ground team we have a lot of

147
00:05:44,150 --> 00:05:42,080
people supporting us uh supporting my

148
00:05:47,110 --> 00:05:44,160
consul in the mission control center

149
00:05:49,110 --> 00:05:47,120
darren welsh is the lead for eva task

150
00:05:50,390 --> 00:05:49,120
that means he develops the procedures

151
00:05:52,870 --> 00:05:50,400
helps with the training at the neutral

152
00:05:56,230 --> 00:05:52,880
buoyancy laboratory and so on he is

153
00:05:58,790 --> 00:05:56,240
assisted by charles goff and scott ray

154
00:06:02,150 --> 00:05:58,800
the eva systems officer lead for this

155
00:06:04,070 --> 00:06:02,160
mission is grant slusser he is

156
00:06:05,670 --> 00:06:04,080
slusser he is

157
00:06:07,430 --> 00:06:05,680
in charge of preparing all of the

158
00:06:10,390 --> 00:06:07,440
spacesuits and all of the procedures

159
00:06:13,350 --> 00:06:10,400
related to that as well as the airlock

160
00:06:14,629 --> 00:06:13,360
uh the quest airlock for support of eva

161
00:06:16,870 --> 00:06:14,639
operations

162
00:06:18,870 --> 00:06:16,880
he is supported by tamara york and ernie

163
00:06:20,550 --> 00:06:18,880

bell

164
00:06:21,830 --> 00:06:20,560
also supporting us for one of the

165
00:06:24,469 --> 00:06:21,840
payloads that i'll be talking about

166
00:06:26,390 --> 00:06:24,479
later the rrm is christy hansen she is

167
00:06:27,909 --> 00:06:26,400
the operations lead at governor space

168
00:06:30,870 --> 00:06:27,919
center for that

169
00:06:33,110 --> 00:06:30,880
payload

170
00:06:34,469 --> 00:06:33,120
the ormate missy experiment which i'll

171
00:06:35,749 --> 00:06:34,479
also discuss

172
00:06:37,670 --> 00:06:35,759
will be

173
00:06:39,990 --> 00:06:37,680
supported by rick caldwell here at

174
00:06:42,390 --> 00:06:40,000
johnson space center and the canadians

175
00:06:43,909 --> 00:06:42,400
have been extra helpful in supporting us

176
00:06:44,950 --> 00:06:43,919
with a troubleshooting of a grapple

177
00:06:47,590 --> 00:06:44,960
fixture

178
00:06:49,430 --> 00:06:47,600
they brought down tim dilts from canada

179
00:06:51,110 --> 00:06:49,440
and then cesar gonzalez will be here in

180
00:06:53,589 --> 00:06:51,120
the control center as well to provide

181
00:06:54,870 --> 00:06:53,599
assistance as required

182
00:06:57,029 --> 00:06:54,880
okay

183
00:06:59,110 --> 00:06:57,039
so to get into the evas

184
00:07:01,270 --> 00:06:59,120
i know we use a lot of compacted

185
00:07:03,270 --> 00:07:01,280
language here at nasa we use acronyms

186
00:07:04,790 --> 00:07:03,280
for a lot of things and so

187
00:07:06,710 --> 00:07:04,800
i thought i would define some of those

188
00:07:08,710 --> 00:07:06,720

right up front for you and make it a

189
00:07:11,189 --> 00:07:08,720
little easier for me to talk through the

190
00:07:14,070 --> 00:07:11,199
rest of the presentation

191
00:07:17,270 --> 00:07:14,080
the pump module that failed

192
00:07:18,629 --> 00:07:17,280
last year and was replaced

193
00:07:20,150 --> 00:07:18,639
last fall

194
00:07:22,469 --> 00:07:20,160
will be one item that we will be

195
00:07:25,510 --> 00:07:22,479
bringing home it is currently stowed on

196
00:07:27,029 --> 00:07:25,520
the external stowage platform number two

197
00:07:30,629 --> 00:07:27,039
esp-2

198
00:07:32,790 --> 00:07:30,639
and that platform is located in front of

199
00:07:35,029 --> 00:07:32,800
the quest airlock and just to the

200
00:07:38,150 --> 00:07:35,039
starboard side of the lab you'll see

201
00:07:40,469 --> 00:07:38,160
that in the videos later

202
00:07:42,070 --> 00:07:40,479
the pump module itself is on

203
00:07:45,589 --> 00:07:42,080
on a support

204
00:07:48,309 --> 00:07:45,599
platform which is called the lapa or the

205
00:07:50,150 --> 00:07:48,319
large adapter plate assembly

206
00:07:53,510 --> 00:07:50,160
you can think of it as a pallet that

207
00:07:56,070 --> 00:07:53,520
holds the pump module for transfer

208
00:07:58,469 --> 00:07:56,080
in order to be able to safely transfer

209
00:08:00,230 --> 00:07:58,479
that item to the payload bay

210
00:08:02,469 --> 00:08:00,240
it's stowed very close to the af

211
00:08:04,469 --> 00:08:02,479
bulkhead there's a primary bolt that

212
00:08:07,029 --> 00:08:04,479
drives four pins that holds it down into

213
00:08:09,189 --> 00:08:07,039

the payload bay and if those

214
00:08:10,869 --> 00:08:09,199
that primary system fails to operate we

215
00:08:12,469 --> 00:08:10,879
need to engage some contingency

216
00:08:14,869 --> 00:08:12,479
operation pins

217
00:08:17,110 --> 00:08:14,879
that are on the ass side of the payload

218
00:08:18,550 --> 00:08:17,120
very close to the app bulkhead in order

219
00:08:21,110 --> 00:08:18,560
to be able to reach those we've

220
00:08:22,950 --> 00:08:21,120
developed some special tools the new

221
00:08:25,749 --> 00:08:22,960
tools are called the continued

222
00:08:27,670 --> 00:08:25,759
contingency operations lapa tool

223
00:08:30,629 --> 00:08:27,680
lapa being that payload or the uh

224
00:08:32,790 --> 00:08:30,639
palette that i was describing

225
00:08:34,709 --> 00:08:32,800
and the acronym for that is colt so i'll

226
00:08:35,909 --> 00:08:34,719
be describing those as the colt tools

227
00:08:37,350 --> 00:08:35,919
you'll know that those are the

228
00:08:39,029 --> 00:08:37,360
contingency tools that i was talking

229
00:08:40,790 --> 00:08:39,039
about you can think of them

230
00:08:43,589 --> 00:08:40,800
as a

231
00:08:46,230 --> 00:08:43,599
very long right angle drive assembly

232
00:08:49,829 --> 00:08:48,310
let's see when we've completed

233
00:08:51,590 --> 00:08:49,839
operations with the pump module and

234
00:08:53,590 --> 00:08:51,600
transferred that to the payload bay we

235
00:08:55,590 --> 00:08:53,600
will be transferring the

236
00:08:57,829 --> 00:08:55,600
robotics refueling mission payload

237
00:09:00,150 --> 00:08:57,839
that's the rrm we'll be transferring

238
00:09:02,630 --> 00:09:00,160

that from the payload bay up to the

239
00:09:04,949 --> 00:09:02,640
special purpose dexterous manipulator or

240
00:09:05,910 --> 00:09:04,959
the dexter robotic hand

241
00:09:08,630 --> 00:09:05,920
that

242
00:09:10,870 --> 00:09:08,640
dexter will be positioned on the nader

243
00:09:12,470 --> 00:09:10,880
side of the u.s laboratory on a grapple

244
00:09:16,630 --> 00:09:12,480
fixture there

245
00:09:18,150 --> 00:09:16,640
the robotics refueling mission is a is

246
00:09:19,430 --> 00:09:18,160
developed at the goddard space flight

247
00:09:22,870 --> 00:09:19,440
center

248
00:09:24,470 --> 00:09:22,880
it will provide a demonstration platform

249
00:09:27,030 --> 00:09:24,480
for robotics operations on the

250
00:09:29,509 --> 00:09:27,040
international space station to practice

251
00:09:32,630 --> 00:09:29,519
satellite refueling

252
00:09:35,110 --> 00:09:32,640
as well as repair and servicing the idea

253
00:09:36,710 --> 00:09:35,120
would be that you could take a robotic

254
00:09:39,190 --> 00:09:36,720
mission something like the hubble space

255
00:09:41,430 --> 00:09:39,200
telescope to an existing satellite

256
00:09:42,550 --> 00:09:41,440
perform servicing operations on that

257
00:09:44,550 --> 00:09:42,560
satellite

258
00:09:46,150 --> 00:09:44,560
and it can also be used in the future

259
00:09:49,110 --> 00:09:46,160
for exploration

260
00:09:50,710 --> 00:09:49,120
and interplanetary work

261
00:09:53,190 --> 00:09:50,720
um

262
00:09:54,230 --> 00:09:53,200
following a robotics refueling mission

263
00:09:58,710 --> 00:09:54,240

transfer

264
00:10:01,590 --> 00:09:58,720
we'll move on to the ormate 3 rw that's

265
00:10:04,790 --> 00:10:01,600
the optical reflector materials experi

266
00:10:06,870 --> 00:10:04,800
experiment ram wake experiment

267
00:10:08,069 --> 00:10:06,880
and it is part of

268
00:10:13,350 --> 00:10:08,079
the

269
00:10:16,150 --> 00:10:13,360
international space station experiment

270
00:10:18,310 --> 00:10:16,160
that whole system of experiment packages

271
00:10:20,870 --> 00:10:18,320
are stowed on the experiment package

272
00:10:23,350 --> 00:10:20,880
assembly or the expa and all of that

273
00:10:25,590 --> 00:10:23,360
equipment is out on the external

274
00:10:28,069 --> 00:10:25,600
logistics carrier number two which is

275
00:10:31,990 --> 00:10:28,079
all the way out starboard and zenith on

276
00:10:35,389 --> 00:10:33,670
from there we'll move on to some of our

277
00:10:38,710 --> 00:10:35,399
newer tasks on

278
00:10:40,870 --> 00:10:38,720
sts-134 they installed a grapple fixture

279
00:10:42,550 --> 00:10:40,880
called a power and data grapple fixture

280
00:10:45,430 --> 00:10:42,560
or pdgf

281
00:10:48,150 --> 00:10:45,440
onto the zarya element and we refer to

282
00:10:50,630 --> 00:10:48,160
that as the fgb

283
00:10:53,750 --> 00:10:50,640
that grapple fixture will allow us to

284
00:10:56,069 --> 00:10:53,760
have uh robotic arm access

285
00:10:57,509 --> 00:10:56,079
to all of the russian elements for the

286
00:10:59,190 --> 00:10:57,519
first time

287
00:11:00,949 --> 00:10:59,200
and while they were installing that

288
00:11:02,230 --> 00:11:00,959

grapple fixture they noticed that there

289
00:11:04,150 --> 00:11:02,240
was a

290
00:11:06,230 --> 00:11:04,160
small wire that had gotten into one of

291
00:11:07,910 --> 00:11:06,240
the latch doors on that grapple fixture

292
00:11:10,710 --> 00:11:07,920
and we'll be performing troubleshooting

293
00:11:12,710 --> 00:11:10,720
to remove that small wire i'll talk more

294
00:11:15,269 --> 00:11:12,720
about that later

295
00:11:16,550 --> 00:11:15,279
finally the pressurized mating adapter

296
00:11:18,550 --> 00:11:16,560
number three

297
00:11:20,470 --> 00:11:18,560
is planned for future use for the

298
00:11:22,470 --> 00:11:20,480
universal docking system that's being

299
00:11:25,190 --> 00:11:22,480
developed to dock

300
00:11:26,630 --> 00:11:25,200
additional uh commercial vehicles to the

301
00:11:30,230 --> 00:11:26,640
international space station and

302
00:11:32,389 --> 00:11:30,240
eventually used further in exploration

303
00:11:34,310 --> 00:11:32,399
that pressurized mating adapter is

304
00:11:36,389 --> 00:11:34,320
exposed to space right now and gets a

305
00:11:39,350 --> 00:11:36,399
lot of sun on that

306
00:11:41,829 --> 00:11:39,360
that interface and we are bringing up a

307
00:11:43,750 --> 00:11:41,839
thermal cover to cover that interface to

308
00:11:45,430 --> 00:11:43,760
help protect it until such time as the

309
00:11:46,710 --> 00:11:45,440
universal mating adapter can be

310
00:11:48,870 --> 00:11:46,720
developed and brought up to the

311
00:11:50,230 --> 00:11:48,880
international space station

312
00:11:54,389 --> 00:11:50,240
following that we have several

313
00:11:56,310 --> 00:11:54,399

get-aheads including the power

314
00:12:02,230 --> 00:11:56,320
i'm sorry the data connections are the

315
00:12:04,310 --> 00:12:02,240
rs 1553 uh cable connections from that

316
00:12:06,710 --> 00:12:04,320
power and data grapple fixture the pdgf

317
00:12:09,190 --> 00:12:06,720
that we installed onto the zarya

318
00:12:11,670 --> 00:12:09,200
that's the last cabling that needs to be

319
00:12:14,230 --> 00:12:11,680
completed before that

320
00:12:15,750 --> 00:12:14,240
platform becomes operational for a base

321
00:12:17,350 --> 00:12:15,760
as the

322
00:12:19,590 --> 00:12:17,360
robotic arm

323
00:12:21,590 --> 00:12:19,600
platform

324
00:12:23,509 --> 00:12:21,600
there are a few other items that we can

325
00:12:25,590 --> 00:12:23,519
if we have a short amount of time left

326
00:12:28,150 --> 00:12:25,600
at the end of the eva we can reconfigure

327
00:12:30,150 --> 00:12:28,160
the port cedar cart the cedar cart is

328
00:12:31,990 --> 00:12:30,160
our hand cart for

329
00:12:34,230 --> 00:12:32,000
moving up and down the

330
00:12:36,949 --> 00:12:34,240
cedar rails on the front of the the seat

331
00:12:39,110 --> 00:12:36,959
of mt rails on the front of the iss we

332
00:12:40,710 --> 00:12:39,120
carry equipment and crew members

333
00:12:43,269 --> 00:12:40,720
on that cedar cart

334
00:12:45,750 --> 00:12:43,279
it requires some reconfiguration

335
00:12:47,829 --> 00:12:45,760
there are also some peak shaped clamps

336
00:12:49,910 --> 00:12:47,839
that hold down the ammonia lines for the

337
00:12:51,829 --> 00:12:49,920
flex hose rotary coupler which is part

338
00:12:53,990 --> 00:12:51,839

of the cooling system

339
00:12:56,150 --> 00:12:54,000
we'll be removing those if we have time

340
00:12:58,710 --> 00:12:56,160
in preparation for maintenance on that

341
00:13:00,949 --> 00:12:58,720
item in the future as required

342
00:13:02,550 --> 00:13:00,959
finally we have over the course of time

343
00:13:04,230 --> 00:13:02,560
brought in a bunch of tools that were

344
00:13:06,710 --> 00:13:04,240
normally stowed outside in the tool

345
00:13:09,030 --> 00:13:06,720
boxes and we'll be taking those back out

346
00:13:10,790 --> 00:13:09,040
to the toolboxes and stowing them there

347
00:13:13,030 --> 00:13:10,800
as a part of that operation or

348
00:13:15,110 --> 00:13:13,040
potentially separately if we have just a

349
00:13:17,990 --> 00:13:15,120
few minutes we can retrieve a large

350
00:13:20,069 --> 00:13:18,000
cutter from the airlock toolbox

351
00:13:21,030 --> 00:13:20,079
the russians have asked us for you so

352
00:13:22,790 --> 00:13:21,040
that

353
00:13:24,790 --> 00:13:22,800
cutter on their next

354
00:13:26,629 --> 00:13:24,800
russian eva that's planned later this

355
00:13:28,470 --> 00:13:26,639
summer and i'm sure you'll hear all of

356
00:13:30,150 --> 00:13:28,480
the details on that when the briefings

357
00:13:33,509 --> 00:13:30,160
come forward

358
00:13:34,710 --> 00:13:33,519
when that is officially scheduled

359
00:13:37,030 --> 00:13:34,720
uh let's see

360
00:13:40,310 --> 00:13:37,040
finally i wanted to mention that we are

361
00:13:42,629 --> 00:13:40,320
going to use the light exercise

362
00:13:45,189 --> 00:13:42,639
uh i'm sorry the in-suit light exercise

363
00:13:46,829 --> 00:13:45,199

pre-breathe protocol on this mission uh

364
00:13:48,710 --> 00:13:46,839
it was used for the first time on

365
00:13:51,990 --> 00:13:48,720
sts-134 and now we're taking it

366
00:13:53,990 --> 00:13:52,000
operational on this mission

367
00:13:55,990 --> 00:13:54,000
and as you know the pre-breathe

368
00:13:57,590 --> 00:13:56,000
protocols that we describe

369
00:13:59,990 --> 00:13:57,600
are a

370
00:14:03,030 --> 00:14:00,000
series of procedures that we use using a

371
00:14:04,069 --> 00:14:03,040
100 100 oxygen environment

372
00:14:06,949 --> 00:14:04,079
um

373
00:14:07,990 --> 00:14:06,959
the crew member breathes 100 o2 while in

374
00:14:10,150 --> 00:14:08,000
this case

375
00:14:12,150 --> 00:14:10,160
performing some slight exercise to help

376
00:14:14,550 --> 00:14:12,160
purge the nitrogen from the tissues in

377
00:14:17,670 --> 00:14:14,560
their body uh to prevent the bends or

378
00:14:19,670 --> 00:14:17,680
decompression sickness during the eva

379
00:14:24,629 --> 00:14:19,680
okay and with that i think we're ready

380
00:14:28,829 --> 00:14:26,710
it takes all of the crew members working

381
00:14:31,590 --> 00:14:28,839
together to

382
00:14:34,230 --> 00:14:31,600
begin to perform all of these operations

383
00:14:36,710 --> 00:14:34,240
so if i could have the first video

384
00:14:39,030 --> 00:14:36,720
we'll start out at the neutral buoyancy

385
00:14:41,990 --> 00:14:39,040
laboratory here you see chris ferguson

386
00:14:44,550 --> 00:14:42,000
beginning to help mike fossum get suited

387
00:14:47,590 --> 00:14:44,560
up donning the pants or the lower torso

388
00:14:48,870 --> 00:14:47,600

assembly of his space suit

389
00:14:54,870 --> 00:14:48,880
that

390
00:14:56,629 --> 00:14:54,880
there isn't

391
00:14:59,430 --> 00:14:56,639
a portion of the suit that's causing a

392
00:15:00,870 --> 00:14:59,440
wrinkle to cause discomfort during the

393
00:15:04,389 --> 00:15:00,880
spacewalk

394
00:15:07,110 --> 00:15:04,399
also satoshi furukawa came out to these

395
00:15:09,430 --> 00:15:07,120
final training runs that happened during

396
00:15:11,189 --> 00:15:09,440
january and february you can see satoshi

397
00:15:13,430 --> 00:15:11,199
helping to don this

398
00:15:14,629 --> 00:15:13,440
space glove

399
00:15:18,150 --> 00:15:14,639
on to

400
00:15:19,990 --> 00:15:18,160
ron garan in this portion of the video

401
00:15:22,550 --> 00:15:20,000
the last part of getting ready to get

402
00:15:24,310 --> 00:15:22,560
into the nbl to do training or

403
00:15:26,470 --> 00:15:24,320
into the spacesuit to go out and do a

404
00:15:29,189 --> 00:15:26,480
spacewalk on orbit is putting the helmet

405
00:15:30,230 --> 00:15:29,199
on making sure that's latched making the

406
00:15:31,749 --> 00:15:30,240
final

407
00:15:33,749 --> 00:15:31,759
tool adjustments here you can see the

408
00:15:35,990 --> 00:15:33,759
pistol grip tool and the equipment

409
00:15:41,189 --> 00:15:36,000
tethers going on to the suit

410
00:15:46,230 --> 00:15:43,110
once the safety tethers are on the crew

411
00:15:48,870 --> 00:15:46,240
members go to ingress the nbl and

412
00:15:51,269 --> 00:15:48,880
perform operations there or the

413
00:15:53,430 --> 00:15:51,279

airlock to perform a spacewalk

414
00:15:55,189 --> 00:15:53,440
this is video of the virtual reality

415
00:15:57,590 --> 00:15:55,199
simulator over

416
00:15:59,670 --> 00:15:57,600
at building 9 on site here at jsc you

417
00:16:01,590 --> 00:15:59,680
can see rex getting the crew all

418
00:16:03,350 --> 00:16:01,600
together to

419
00:16:05,829 --> 00:16:03,360
perform their training here they're

420
00:16:08,629 --> 00:16:05,839
donning the goggles of the

421
00:16:11,110 --> 00:16:08,639
vr lab this allows them to actually see

422
00:16:13,350 --> 00:16:11,120
right into the computer program as if

423
00:16:16,710 --> 00:16:13,360
they were inside the program itself in

424
00:16:19,189 --> 00:16:16,720
the simulated environment

425
00:16:21,749 --> 00:16:19,199
sandy and doug will

426
00:16:23,910 --> 00:16:21,759
are shown here at the simulated robotics

427
00:16:25,990 --> 00:16:23,920
workstation they can practice all of the

428
00:16:27,910 --> 00:16:26,000
moves required here they're getting

429
00:16:28,949 --> 00:16:27,920
ready to bring the robotic arm into

430
00:16:31,509 --> 00:16:28,959
position

431
00:16:32,389 --> 00:16:31,519
as ron garan demonstrates

432
00:16:39,910 --> 00:16:32,399
the

433
00:16:41,990 --> 00:16:39,920
him to actually feel as if he were

434
00:16:44,710 --> 00:16:42,000
inside the computer generated program

435
00:16:47,350 --> 00:16:44,720
maneuvering the payloads around while

436
00:16:48,829 --> 00:16:47,360
doug and sandy drive the robotic arm

437
00:16:51,670 --> 00:16:48,839
into the correct

438
00:16:54,310 --> 00:16:51,680

positions you can also see in the

439
00:16:56,949 --> 00:16:54,320
upcoming segment here you go of the

440
00:17:00,550 --> 00:16:56,959
simulated environment of the cupola

441
00:17:02,550 --> 00:17:00,560
workstation along with the visuals of

442
00:17:05,350 --> 00:17:02,560
camera views that they have

443
00:17:07,270 --> 00:17:05,360
i mentioned that sandy and rex will be

444
00:17:09,590 --> 00:17:07,280
helping us out with orbiter contingency

445
00:17:11,270 --> 00:17:09,600
evas they were also instrumental in

446
00:17:13,510 --> 00:17:11,280
helping us with final development on the

447
00:17:15,270 --> 00:17:13,520
schedule dva here you see them out at

448
00:17:17,750 --> 00:17:15,280
the neutral buoyancy laboratory with

449
00:17:19,669 --> 00:17:17,760
darren welsh our task lead assembling

450
00:17:22,309 --> 00:17:19,679
all of the tools required for the

451
00:17:24,710 --> 00:17:22,319
spacewalk here they're getting their

452
00:17:27,110 --> 00:17:24,720
drink bags ready to put into the suits

453
00:17:29,750 --> 00:17:27,120
before they

454
00:17:32,150 --> 00:17:29,760
don their spacesuits to get in for their

455
00:17:34,789 --> 00:17:32,160
final training this is video of the

456
00:17:36,630 --> 00:17:34,799
final space shuttle

457
00:17:39,909 --> 00:17:36,640
neutral buoyancy laboratory training

458
00:17:43,110 --> 00:17:39,919
that occurred on june 13th every you can

459
00:17:45,029 --> 00:17:43,120
see everybody's really excited to be

460
00:17:47,190 --> 00:17:45,039
participating in this final training

461
00:17:49,750 --> 00:17:47,200
event here you can see chris helping

462
00:17:52,549 --> 00:17:49,760
sandy to get into her suit and attach

463
00:17:55,430 --> 00:17:52,559

the lower torso assembly to the hard

464
00:17:58,870 --> 00:17:55,440
upper torso portion of the space suit

465
00:18:04,710 --> 00:17:58,880
there's rex ready to do his final nbl

466
00:18:08,549 --> 00:18:06,470
and with that i think we can bring up

467
00:18:11,270 --> 00:18:08,559
our second video

468
00:18:15,510 --> 00:18:11,280
and this video will show us basically

469
00:18:18,630 --> 00:18:15,520
the simulated uh vr lab simulation of

470
00:18:24,150 --> 00:18:18,640
the entire spacewalk

471
00:18:27,830 --> 00:18:25,430
here we are at the completed

472
00:18:30,710 --> 00:18:27,840
international space station it is indeed

473
00:18:33,270 --> 00:18:30,720
a beautiful and lovely uh laboratory

474
00:18:34,310 --> 00:18:33,280
work environment with its uh

475
00:18:37,830 --> 00:18:34,320
power

476
00:18:40,230 --> 00:18:37,840
and cooling arrays deployed

477
00:18:41,909 --> 00:18:40,240
this is atlantis docked for its final

478
00:18:43,110 --> 00:18:41,919
mission on the international space

479
00:18:45,350 --> 00:18:43,120
station

480
00:18:48,150 --> 00:18:45,360
mike fossum will be gressing the airlock

481
00:18:49,430 --> 00:18:48,160
first wearing the red stripes and

482
00:18:52,870 --> 00:18:49,440
raw and guerin

483
00:18:54,390 --> 00:18:52,880
will be eb2 for the eva

484
00:18:56,630 --> 00:18:54,400
the first thing that mike will do is

485
00:18:59,270 --> 00:18:56,640
head up to the storage external stowage

486
00:19:01,110 --> 00:18:59,280
platform number two and uh

487
00:19:02,870 --> 00:19:01,120
position his crew lock bag so he can

488
00:19:04,470 --> 00:19:02,880

access the colt tools that i was telling

489
00:19:06,230 --> 00:19:04,480
you about earlier

490
00:19:08,230 --> 00:19:06,240
uh that's the location for the crew lock

491
00:19:10,870 --> 00:19:08,240
bag and then he'll be removing the gap

492
00:19:12,710 --> 00:19:10,880
spanner that spans the distance between

493
00:19:14,870 --> 00:19:12,720
the external stowage platform and the

494
00:19:17,110 --> 00:19:14,880
lab allowing for a little bit easier

495
00:19:18,950 --> 00:19:17,120
translation between those two elements

496
00:19:20,630 --> 00:19:18,960
when chrome crew members need to make

497
00:19:22,789 --> 00:19:20,640
that jump

498
00:19:25,909 --> 00:19:22,799
here's the location of the two colt

499
00:19:28,150 --> 00:19:25,919
tools on the back of the lapa or that

500
00:19:28,950 --> 00:19:28,160
pallet that the pump module is installed

501
00:19:37,029 --> 00:19:28,960
on

502
00:19:39,669 --> 00:19:37,039
robotic arm

503
00:19:42,549 --> 00:19:39,679
and then ingressing that foot restraint

504
00:19:45,110 --> 00:19:42,559
and getting into position to hold on to

505
00:19:46,950 --> 00:19:45,120
the handrails that are on the

506
00:19:49,110 --> 00:19:46,960
pallet portion of the pump module

507
00:19:50,549 --> 00:19:49,120
assembly

508
00:19:52,710 --> 00:19:50,559
mike will come over and drive the

509
00:19:54,150 --> 00:19:52,720
primary bolt to release it you can see

510
00:19:56,870 --> 00:19:54,160
here in the nbl

511
00:19:58,950 --> 00:19:56,880
the relative size of

512
00:20:00,310 --> 00:19:58,960
the pump module assembly relative to the

513
00:20:01,750 --> 00:20:00,320

crew member

514
00:20:04,549 --> 00:20:01,760
ron will move

515
00:20:06,710 --> 00:20:04,559
on the arm out over the starboard just a

516
00:20:09,750 --> 00:20:06,720
little bit over the other orus that are

517
00:20:11,669 --> 00:20:09,760
on the esp-2 and then rotate it around

518
00:20:13,510 --> 00:20:11,679
to begin getting it into position where

519
00:20:15,909 --> 00:20:13,520
it can be docked down into the payload

520
00:20:17,270 --> 00:20:15,919
bay you'll see another maneuver a little

521
00:20:19,270 --> 00:20:17,280
bit later

522
00:20:21,590 --> 00:20:19,280
once he's on his way to the payload bay

523
00:20:22,630 --> 00:20:21,600
mike packs up his tool bag and heads

524
00:20:23,750 --> 00:20:22,640
down

525
00:20:26,149 --> 00:20:23,760
show

526
00:20:28,230 --> 00:20:26,159
to the payload bay following the path

527
00:20:29,669 --> 00:20:28,240
shown flashing here in blue

528
00:20:32,710 --> 00:20:29,679
you'll notice it's kind of a tight

529
00:20:35,430 --> 00:20:32,720
translation path between the gem module

530
00:20:37,669 --> 00:20:35,440
and the mplm that's docked for the

531
00:20:39,830 --> 00:20:37,679
mission he'll maneuver down into the

532
00:20:41,750 --> 00:20:39,840
payload bay translating to the aft of

533
00:20:46,070 --> 00:20:41,760
the payload bay

534
00:20:48,630 --> 00:20:46,080
while ron comes on the robotic arm

535
00:20:51,590 --> 00:20:48,640
down into position carrying the

536
00:20:54,630 --> 00:20:51,600
our i'm sorry the pump module that pump

537
00:20:55,590 --> 00:20:54,640
module is about 1400 pounds he'll have

538
00:20:57,669 --> 00:20:55,600

to make

539
00:20:59,510 --> 00:20:57,679
one more flip of the payload before he

540
00:21:01,669 --> 00:20:59,520
can bring it down into the payload bay

541
00:21:04,390 --> 00:21:01,679
because as you can see the arm is going

542
00:21:06,630 --> 00:21:04,400
to turn him upside down

543
00:21:09,350 --> 00:21:06,640
in order to get into position to birth

544
00:21:11,350 --> 00:21:09,360
the pump module into the payload bay

545
00:21:13,110 --> 00:21:11,360
you can see that it is very close to the

546
00:21:15,830 --> 00:21:13,120
ath bulkhead of the payload bay

547
00:21:17,830 --> 00:21:15,840
especially here in the nbl video so mike

548
00:21:20,310 --> 00:21:17,840
will be keeping a close eye out to make

549
00:21:21,350 --> 00:21:20,320
sure that it's settling nicely in the

550
00:21:24,070 --> 00:21:21,360
back

551
00:21:25,990 --> 00:21:24,080
near the half bulkhead and down onto the

552
00:21:28,630 --> 00:21:26,000
adapter plate that's on the cross bay

553
00:21:30,710 --> 00:21:28,640
carrier of the payload bay

554
00:21:32,789 --> 00:21:30,720
once they complete

555
00:21:35,110 --> 00:21:32,799
installing the

556
00:21:37,270 --> 00:21:35,120
pump module into the payload bay they'll

557
00:21:39,510 --> 00:21:37,280
make a quick check to make sure that all

558
00:21:42,149 --> 00:21:39,520
of the multi-layer insulation on the

559
00:21:43,750 --> 00:21:42,159
pump module is in good configuration

560
00:21:45,510 --> 00:21:43,760
and then they're going to be trading out

561
00:21:47,990 --> 00:21:45,520
positions mike and ron both wanted to

562
00:21:49,750 --> 00:21:48,000
have a chance to share the workload

563
00:21:52,230 --> 00:21:49,760

and to have a chance to ride on the

564
00:21:54,149 --> 00:21:52,240
robot arm so

565
00:21:55,190 --> 00:21:54,159
ron will egress the arm and mike will

566
00:21:56,710 --> 00:21:55,200
get on

567
00:21:59,990 --> 00:21:56,720
and then maneuver down into the bottom

568
00:22:02,470 --> 00:22:00,000
of the payload bay to retrieve the rrm

569
00:22:05,510 --> 00:22:02,480
payload from underneath the cross bay

570
00:22:07,750 --> 00:22:05,520
carrier here you can see it at kennedy

571
00:22:09,990 --> 00:22:07,760
space center during processing you can

572
00:22:11,190 --> 00:22:10,000
see that it has all types of interfaces

573
00:22:12,549 --> 00:22:11,200
and tools

574
00:22:14,149 --> 00:22:12,559
on the payload

575
00:22:17,430 --> 00:22:14,159
to demonstrate

576
00:22:19,270 --> 00:22:17,440
various types of servicing once it gets

577
00:22:21,029 --> 00:22:19,280
out to its final location on the space

578
00:22:22,470 --> 00:22:21,039
station

579
00:22:25,270 --> 00:22:22,480
here you can see

580
00:22:26,390 --> 00:22:25,280
mike pulling it out from under the cross

581
00:22:28,310 --> 00:22:26,400
bay carrier

582
00:22:31,029 --> 00:22:28,320
with ron keeping a close eye on

583
00:22:33,430 --> 00:22:31,039
clearances since it's very close to the

584
00:22:34,630 --> 00:22:33,440
floor liner of the payload bay

585
00:22:36,390 --> 00:22:34,640
sandy and

586
00:22:38,149 --> 00:22:36,400
doug will be watching all the views that

587
00:22:39,990 --> 00:22:38,159
they have available to them as they

588
00:22:43,029 --> 00:22:40,000

monitor those clearances and fly the

589
00:22:44,870 --> 00:22:43,039
robot arm from the payload bay back over

590
00:22:48,470 --> 00:22:44,880
to the lab nader

591
00:22:50,710 --> 00:22:48,480
where the dexter arm is waiting to

592
00:22:52,549 --> 00:22:50,720
receive the

593
00:22:56,470 --> 00:22:52,559
rrm

594
00:22:58,230 --> 00:22:56,480
during the stage the dexter arm dexter

595
00:23:00,230 --> 00:22:58,240
and the space station robot arm will

596
00:23:01,909 --> 00:23:00,240
take that payload out to its final

597
00:23:04,870 --> 00:23:01,919
location

598
00:23:07,430 --> 00:23:04,880
once they're maneuvered over to the lab

599
00:23:10,549 --> 00:23:07,440
ron will translate back up out of the

600
00:23:12,549 --> 00:23:10,559
payload bay bring the tools with him

601
00:23:16,230 --> 00:23:12,559
and meet mike up at the

602
00:23:20,950 --> 00:23:16,240
lab on the dexter he'll assist with

603
00:23:23,830 --> 00:23:20,960
docking the rrm to the dexter

604
00:23:26,470 --> 00:23:23,840
and when that's complete they'll both be

605
00:23:28,470 --> 00:23:26,480
free to move on to their next task here

606
00:23:31,590 --> 00:23:28,480
you can see that same operation

607
00:23:33,510 --> 00:23:31,600
happening on a special

608
00:23:35,510 --> 00:23:33,520
mock-up in the neutral buoyancy

609
00:23:39,750 --> 00:23:35,520
laboratory because this operation would

610
00:23:41,350 --> 00:23:39,760
happen very low to the floor in the nbl

611
00:23:42,310 --> 00:23:41,360
we've

612
00:23:44,070 --> 00:23:42,320
actually

613
00:23:46,549 --> 00:23:44,080

put another mock up into the water to

614
00:23:50,310 --> 00:23:46,559
simulate the lab nader so they can do it

615
00:23:55,590 --> 00:23:53,590
mike will fly on the robot arm with

616
00:23:58,230 --> 00:23:55,600
sandy and doug driving the arm back over

617
00:24:00,870 --> 00:23:58,240
to the esp2 where he can clean up the

618
00:24:02,470 --> 00:24:00,880
arm putting the foot restraint back onto

619
00:24:05,750 --> 00:24:02,480
the esp-2

620
00:24:08,310 --> 00:24:05,760
uh removing the

621
00:24:11,110 --> 00:24:08,320
worksite adapter for the foot restraint

622
00:24:13,110 --> 00:24:11,120
and then cleaning up any other

623
00:24:16,310 --> 00:24:13,120
tools that they may have left

624
00:24:17,590 --> 00:24:16,320
on the esp-2 as well as reinstalling the

625
00:24:20,549 --> 00:24:17,600
gap spanner

626
00:24:22,070 --> 00:24:20,559
while he's cleaning up the ssrms ron

627
00:24:23,669 --> 00:24:22,080
will be making his way back to the

628
00:24:26,549 --> 00:24:23,679
airlock

629
00:24:28,149 --> 00:24:26,559
trading out one tool bag for another and

630
00:24:30,149 --> 00:24:28,159
picking up the

631
00:24:33,669 --> 00:24:30,159
oremate tool bag

632
00:24:35,590 --> 00:24:33,679
that uh tool bag also contains a camera

633
00:24:36,789 --> 00:24:35,600
that they'll be using while they're out

634
00:24:39,590 --> 00:24:36,799
on the

635
00:24:41,990 --> 00:24:39,600
uh external logistics carrier number two

636
00:24:44,310 --> 00:24:42,000
you can see his translation path here

637
00:24:48,149 --> 00:24:44,320
out to the s3 element

638
00:24:50,870 --> 00:24:48,159

uh he'll be translating up to the

639
00:24:53,190 --> 00:24:50,880
external logistics carrier

640
00:24:56,070 --> 00:24:53,200
number two he'll temp stow his crew lock

641
00:24:58,390 --> 00:24:56,080
bag and then get in position to install

642
00:25:01,029 --> 00:24:58,400
the oremate you'll also hear us

643
00:25:02,470 --> 00:25:01,039
referring to that payload as the

644
00:25:04,390 --> 00:25:02,480
mini missy

645
00:25:06,470 --> 00:25:04,400
you remove the

646
00:25:09,190 --> 00:25:06,480
cover from the

647
00:25:12,070 --> 00:25:09,200
experiment package and then

648
00:25:15,350 --> 00:25:12,080
take photos of the material samples that

649
00:25:17,190 --> 00:25:15,360
are on the payload itself here's a photo

650
00:25:19,029 --> 00:25:17,200
showing you all of the small little

651
00:25:20,310 --> 00:25:19,039
materials exposure

652
00:25:22,789 --> 00:25:20,320
samples

653
00:25:25,350 --> 00:25:22,799
all of those experiments will be used on

654
00:25:27,269 --> 00:25:25,360
future satellite applications as well as

655
00:25:29,510 --> 00:25:27,279
an exploration

656
00:25:31,350 --> 00:25:29,520
he'll also take photos from the other

657
00:25:34,390 --> 00:25:31,360
side of the lc2 to make sure he's got

658
00:25:36,149 --> 00:25:34,400
both photo both sides of the payload uh

659
00:25:38,390 --> 00:25:36,159
documented in their initial

660
00:25:40,950 --> 00:25:38,400
configuration that payload will be

661
00:25:43,269 --> 00:25:40,960
retrieved uh on a later mission uh late

662
00:25:45,029 --> 00:25:43,279
next year

663
00:25:46,149 --> 00:25:45,039

let's see

664
00:25:48,070 --> 00:25:46,159
from there we'll move on to our

665
00:25:51,590 --> 00:25:48,080
get-aheads and as i was describing

666
00:25:53,990 --> 00:25:51,600
earlier if we could have photo 3

667
00:25:56,070 --> 00:25:54,000
this shows the general location on the

668
00:25:59,110 --> 00:25:56,080
zarya

669
00:26:01,350 --> 00:25:59,120
of where the power and data grapple

670
00:26:03,909 --> 00:26:01,360
fixture or the pdgf was installed on

671
00:26:06,549 --> 00:26:03,919
sts-134

672
00:26:08,789 --> 00:26:06,559
you can see

673
00:26:11,269 --> 00:26:08,799
that the

674
00:26:12,630 --> 00:26:11,279
u.s segment is toward the left in this

675
00:26:14,310 --> 00:26:12,640
photo

676
00:26:16,789 --> 00:26:14,320
which is

677
00:26:18,789 --> 00:26:16,799
the pma1 and then the node all the way

678
00:26:20,630 --> 00:26:18,799
to the left and then the zarya is all

679
00:26:23,590 --> 00:26:20,640
the way down to the right

680
00:26:24,710 --> 00:26:23,600
in the next photo we'll show you

681
00:26:27,110 --> 00:26:24,720
what we're

682
00:26:29,430 --> 00:26:27,120
hoping to clear you can see that small

683
00:26:31,590 --> 00:26:29,440
white wire circled there

684
00:26:33,750 --> 00:26:31,600
those the little door that it's stuck in

685
00:26:36,070 --> 00:26:33,760
it's called a latch door that's where

686
00:26:40,630 --> 00:26:36,950
the

687
00:26:43,350 --> 00:26:40,640
space station robotic arm um

688
00:26:46,230 --> 00:26:43,360

uh the connectors but the power and data

689
00:26:48,630 --> 00:26:46,240
connectors from the robot arm move down

690
00:26:49,830 --> 00:26:48,640
and and mate with connectors behind this

691
00:26:51,269 --> 00:26:49,840
little door

692
00:26:54,789 --> 00:26:51,279
with that wire in the way we're

693
00:26:57,669 --> 00:26:54,799
concerned about potentially

694
00:26:59,590 --> 00:26:57,679
the door being stuck and

695
00:27:01,350 --> 00:26:59,600
causing difficulties for the robot arm

696
00:27:02,310 --> 00:27:01,360
so we'll we want to clear that out of

697
00:27:03,669 --> 00:27:02,320
the way

698
00:27:06,149 --> 00:27:03,679
if we can show

699
00:27:07,350 --> 00:27:06,159
the video i'll show you how we plan to

700
00:27:08,710 --> 00:27:07,360
do that

701
00:27:10,789 --> 00:27:08,720
as i mentioned we had some of the

702
00:27:13,190 --> 00:27:10,799
experts come down from

703
00:27:15,350 --> 00:27:13,200
canada and help us out with

704
00:27:17,510 --> 00:27:15,360
preparing this task

705
00:27:19,669 --> 00:27:17,520
and it turns out that clearing this

706
00:27:22,230 --> 00:27:19,679
little wire should be pretty simple

707
00:27:26,149 --> 00:27:22,240
there you see the wire and it actually

708
00:27:29,669 --> 00:27:26,159
is a piece of multi-layer insulation

709
00:27:32,789 --> 00:27:29,679
grounding wire that runs from the mli

710
00:27:34,870 --> 00:27:32,799
that's on the exterior of the housing of

711
00:27:37,110 --> 00:27:34,880
the pdgf you can see that all you have

712
00:27:40,070 --> 00:27:37,120
to do is pull away the

713
00:27:41,430 --> 00:27:40,080

the mli and then insert a

714
00:27:43,350 --> 00:27:41,440
crew hook

715
00:27:44,710 --> 00:27:43,360
from one of the equipment tethers

716
00:27:45,590 --> 00:27:44,720
into

717
00:27:57,269 --> 00:27:45,600
the

718
00:27:59,510 --> 00:27:57,279
grapple fixture where it should be

719
00:28:02,149 --> 00:27:59,520
and then tucking it down into

720
00:28:04,630 --> 00:28:02,159
position underneath the little velcro

721
00:28:06,710 --> 00:28:04,640
attachment tabs making sure that it's

722
00:28:10,789 --> 00:28:06,720
snug and down behind

723
00:28:14,230 --> 00:28:10,799
the velcro before re-securing the mli

724
00:28:15,990 --> 00:28:14,240
once the mli is re-secured

725
00:28:17,909 --> 00:28:16,000
we can remove the equipment hook and

726
00:28:19,909 --> 00:28:17,919
then we'll go back one more time to take

727
00:28:21,350 --> 00:28:19,919
a look into the connector

728
00:28:22,789 --> 00:28:21,360
making sure that there's no other

729
00:28:24,630 --> 00:28:22,799
foreign objects

730
00:28:27,990 --> 00:28:24,640
or any other things getting in the way

731
00:28:33,269 --> 00:28:30,389
while in the larger photo you can't see

732
00:28:34,789 --> 00:28:33,279
that the mli grounding wire is also

733
00:28:37,750 --> 00:28:34,799
behind one of the other doors there is

734
00:28:39,990 --> 00:28:37,760
another photo that we believe we've seen

735
00:28:41,669 --> 00:28:40,000
where that grounding wire has also crept

736
00:28:43,029 --> 00:28:41,679
up behind one of the other latch doors

737
00:28:45,350 --> 00:28:43,039
so we're going to perform the same

738
00:28:47,590 --> 00:28:45,360

operation on the second latch door and

739
00:28:51,830 --> 00:28:47,600
then check the two remaining latch doors

740
00:28:55,750 --> 00:28:53,669
okay

741
00:28:57,669 --> 00:28:55,760
after that we'll be going on to install

742
00:28:59,190 --> 00:28:57,679
the pressurized mating adapter cover

743
00:29:02,070 --> 00:28:59,200
that i was discussing

744
00:29:05,029 --> 00:29:02,080
so let's bring forward photo five and

745
00:29:07,990 --> 00:29:05,039
you can see where that's located pma3 is

746
00:29:10,549 --> 00:29:08,000
currently located on the port side of

747
00:29:13,029 --> 00:29:10,559
node three node three is attached to the

748
00:29:17,350 --> 00:29:13,039
port side of the node 1. so the whole

749
00:29:20,950 --> 00:29:17,360
element is as pointed out toward port

750
00:29:26,310 --> 00:29:23,430
sees a lot of sun in this orientation so

751
00:29:28,389 --> 00:29:26,320
if we can see the next photo you can see

752
00:29:29,510 --> 00:29:28,399
nbl video of

753
00:29:31,110 --> 00:29:29,520
the

754
00:29:33,350 --> 00:29:31,120
cover that we've developed it'll be

755
00:29:34,870 --> 00:29:33,360
carried to the worksite in a in a

756
00:29:37,029 --> 00:29:34,880
special bag

757
00:29:39,110 --> 00:29:37,039
carried out by the crew members and then

758
00:29:41,029 --> 00:29:39,120
installed using some velcro straps

759
00:29:43,110 --> 00:29:41,039
around the handrails on the what i'll

760
00:29:44,870 --> 00:29:43,120
call the snout of the

761
00:29:46,549 --> 00:29:44,880
pma

762
00:29:48,149 --> 00:29:46,559
finally

763
00:29:50,149 --> 00:29:48,159

we're hoping to get to at least one of

764
00:29:53,669 --> 00:29:50,159
the get-aheads and the first one on the

765
00:29:56,950 --> 00:29:53,679
list is the 1553 data cable so if we

766
00:29:58,549 --> 00:29:56,960
could see photo seven

767
00:30:00,070 --> 00:29:58,559
here you can see the grapple fixture

768
00:30:02,630 --> 00:30:00,080
kind of up in the

769
00:30:04,630 --> 00:30:02,640
upper right hand uh corner of the photo

770
00:30:06,950 --> 00:30:04,640
and then the yellow wire

771
00:30:08,870 --> 00:30:06,960
there represents it's actually two wires

772
00:30:11,990 --> 00:30:08,880
that are taped together

773
00:30:14,070 --> 00:30:12,000
providing the data connections for

774
00:30:15,590 --> 00:30:14,080
command and data to

775
00:30:17,750 --> 00:30:15,600
the pdgf

776
00:30:19,909 --> 00:30:17,760
platform for the space station robotic

777
00:30:23,110 --> 00:30:19,919
arm that could be used in the future to

778
00:30:26,470 --> 00:30:23,120
access the russian elements

779
00:30:28,310 --> 00:30:26,480
that's all i have and materials so josh

780
00:30:30,149 --> 00:30:28,320
i think okay take questions if there's

781
00:30:31,350 --> 00:30:30,159
time okay we'll take some questions from

782
00:30:33,669 --> 00:30:31,360
here in houston just wait until the

783
00:30:35,029 --> 00:30:33,679
microphone comes to you

784
00:30:45,669 --> 00:30:35,039
we'll start with gina down here down

785
00:30:50,950 --> 00:30:47,830
thank you mark caro for aviation week

786
00:30:53,990 --> 00:30:50,960
and i'm wondering about the the ammonia

787
00:30:56,149 --> 00:30:54,000
and the pump module is is it um

788
00:30:57,750 --> 00:30:56,159

evacuated at this point or will they

789
00:31:00,149 --> 00:30:57,760
have to take any

790
00:31:02,789 --> 00:31:00,159
additional measures to make sure that

791
00:31:04,870 --> 00:31:02,799
there's nothing escaping

792
00:31:08,070 --> 00:31:04,880
no we were really uh pleased that that

793
00:31:11,269 --> 00:31:08,080
was accomplished on the sts-133 mission

794
00:31:13,990 --> 00:31:11,279
they connected a um ammonia vent tool to

795
00:31:15,669 --> 00:31:14,000
the payload and our to the pump module

796
00:31:17,029 --> 00:31:15,679
invented all of that ammonia so there

797
00:31:21,509 --> 00:31:17,039
won't be any risk of ammonia

798
00:31:23,590 --> 00:31:22,549
okay

799
00:31:26,710 --> 00:31:23,600
thanks

800
00:31:29,269 --> 00:31:26,720
irene clouds with reuters um

801
00:31:31,110 --> 00:31:29,279
the station i'm sorry the shuttle crew

802
00:31:34,710 --> 00:31:31,120
members either one of them uh trained

803
00:31:37,110 --> 00:31:34,720
for the station eva if some reason

804
00:31:40,630 --> 00:31:37,120
um the two station evm crew members

805
00:31:42,710 --> 00:31:40,640
couldn't do the walk excuse me um yes as

806
00:31:43,830 --> 00:31:42,720
i mentioned they're training for um

807
00:31:45,509 --> 00:31:43,840
they've trained up for all of the

808
00:31:47,830 --> 00:31:45,519
orbiter contingencies and then since

809
00:31:50,549 --> 00:31:47,840
mike and ron had to leave houston early

810
00:31:52,950 --> 00:31:50,559
to go to the international space station

811
00:31:55,909 --> 00:31:52,960
we used them to help us develop those

812
00:31:57,909 --> 00:31:55,919
last tasks that came in after sts-134

813
00:31:59,750 --> 00:31:57,919

and then also the pump module i'm sorry

814
00:32:01,750 --> 00:31:59,760
the pma cover

815
00:32:03,350 --> 00:32:01,760
task that was developed very late they

816
00:32:04,950 --> 00:32:03,360
helped us out with all of that and

817
00:32:10,470 --> 00:32:04,960
they've gone all the way through that

818
00:32:16,070 --> 00:32:13,669
gina cinceri abc news i know after 134

819
00:32:18,310 --> 00:32:16,080
mike fink and drew feustel came back

820
00:32:20,149 --> 00:32:18,320
with some pretty serious hand damage i

821
00:32:21,909 --> 00:32:20,159
mean have you guys looked at that and is

822
00:32:24,389 --> 00:32:21,919
there anything you can do to alleviate

823
00:32:25,830 --> 00:32:24,399
that for future space walkers can you

824
00:32:27,590 --> 00:32:25,840
say again what the damage was next

825
00:32:30,470 --> 00:32:27,600
spacewalk can you say again what the

826
00:32:33,909 --> 00:32:30,480
damage was uh mike drew feustel came

827
00:32:37,590 --> 00:32:33,919
back with some serious hand damage okay

828
00:32:40,389 --> 00:32:37,600
um so that is damage that we see um

829
00:32:42,549 --> 00:32:40,399
i won't say frequently but occasionally

830
00:32:45,430 --> 00:32:42,559
it tends to be a very tight fit on the

831
00:32:47,430 --> 00:32:45,440
gloves and uh the the when you

832
00:32:50,710 --> 00:32:47,440
pressurize the gloves it makes them very

833
00:32:52,870 --> 00:32:50,720
hard so imagine having your hand in a in

834
00:32:55,190 --> 00:32:52,880
a very uh hard container as you're

835
00:32:56,710 --> 00:32:55,200
trying to work all the time so you end

836
00:32:59,190 --> 00:32:56,720
up

837
00:33:01,430 --> 00:32:59,200
almost bruising the tips of your fingers

838
00:33:04,149 --> 00:33:01,440

into the ends of the gloves particularly

839
00:33:06,389 --> 00:33:04,159
if they have a tight fit

840
00:33:08,549 --> 00:33:06,399
if you have a good overall glove fit

841
00:33:10,389 --> 00:33:08,559
that helps a lot

842
00:33:12,789 --> 00:33:10,399
another thing that some crew members do

843
00:33:14,389 --> 00:33:12,799
if they have a particularly tight fit or

844
00:33:17,269 --> 00:33:14,399
find that in training they're having

845
00:33:19,669 --> 00:33:17,279
these kinds of issues

846
00:33:21,750 --> 00:33:19,679
there is a an acrylic coating that they

847
00:33:23,909 --> 00:33:21,760
can put on their nails and that helps

848
00:33:26,789 --> 00:33:23,919
prevent some of that nail and fingertip

849
00:33:28,389 --> 00:33:26,799
damage we've also done that i am

850
00:33:30,630 --> 00:33:28,399
unfamiliar with

851
00:33:31,430 --> 00:33:30,640
i just don't recall if mike and ron do

852
00:33:33,190 --> 00:33:31,440
that

853
00:33:35,909 --> 00:33:33,200
both of them have done these space walks

854
00:33:38,149 --> 00:33:35,919
before and neither one had reported that

855
00:33:40,389 --> 00:33:38,159
kind of hand damage in the past so i'm

856
00:33:44,070 --> 00:33:40,399
not anticipating it but if we have it

857
00:33:48,710 --> 00:33:46,070
and i know you had a bit of a problem

858
00:33:51,830 --> 00:33:48,720
with some soap on

859
00:33:53,590 --> 00:33:51,840
drew's visor right that was fairly rare

860
00:33:56,470 --> 00:33:53,600
but can you keep that from happening

861
00:33:58,549 --> 00:33:56,480
again uh again that is a thing that we

862
00:34:00,789 --> 00:33:58,559
have seen in the past like you said it's

863
00:34:04,230 --> 00:34:00,799

been rare but even from the beginning of

864
00:34:07,430 --> 00:34:04,240
the program even back in apollo days um

865
00:34:08,790 --> 00:34:07,440
the best thing to use for anti-fog which

866
00:34:11,270 --> 00:34:08,800
is necessary you don't want to have

867
00:34:13,190 --> 00:34:11,280
fogging on your visor that would be

868
00:34:15,990 --> 00:34:13,200
that would be very dangerous

869
00:34:17,030 --> 00:34:16,000
so we use the anti-fog it is a type of

870
00:34:19,190 --> 00:34:17,040
soap

871
00:34:20,470 --> 00:34:19,200
we apply it and then very carefully buff

872
00:34:22,069 --> 00:34:20,480
it off again

873
00:34:24,069 --> 00:34:22,079
even with all that caution though

874
00:34:25,190 --> 00:34:24,079
occasionally you'll have just a little

875
00:34:28,069 --> 00:34:25,200
bit of it

876
00:34:31,349 --> 00:34:28,079
that gets trapped in maybe some moisture

877
00:34:34,230 --> 00:34:31,359
that's in the suit anyway and then in a

878
00:34:36,230 --> 00:34:34,240
water droplet somehow makes it from the

879
00:34:38,389 --> 00:34:36,240
visor to your eyes

880
00:34:40,310 --> 00:34:38,399
the way that we deal with that is just

881
00:34:42,790 --> 00:34:40,320
as we did you just have that crew member

882
00:34:44,869 --> 00:34:42,800
stand by waiting until the time when

883
00:34:47,030 --> 00:34:44,879
when that clears and just like soaking

884
00:34:49,349 --> 00:34:47,040
your eyes in the shower

885
00:34:51,349 --> 00:34:49,359
it does clear without water to wash it

886
00:34:55,990 --> 00:34:51,359
out it takes a little bit longer but

887
00:35:00,390 --> 00:34:58,069
denise childspace.com

888
00:35:02,069 --> 00:35:00,400

just judging by the animation it seems

889
00:35:04,150 --> 00:35:02,079
like a lot of the robotics is occurring

890
00:35:05,829 --> 00:35:04,160
in close quarters around some of the

891
00:35:07,430 --> 00:35:05,839
structures of the space station and the

892
00:35:09,430 --> 00:35:07,440
shuttle can you characterize the

893
00:35:11,190 --> 00:35:09,440
complexity of the robotics operations

894
00:35:13,109 --> 00:35:11,200
that doug hurley and sandra magnus will

895
00:35:14,550 --> 00:35:13,119
be involved in yeah well that's very

896
00:35:17,190 --> 00:35:14,560
true and

897
00:35:19,270 --> 00:35:17,200
we have an entire team of robotics

898
00:35:22,150 --> 00:35:19,280
operators here uh

899
00:35:23,430 --> 00:35:22,160
led up by troy mccracken he and his team

900
00:35:25,510 --> 00:35:23,440
have

901
00:35:27,670 --> 00:35:25,520
very carefully developed all of those

902
00:35:30,790 --> 00:35:27,680
operations to give the maximum clearance

903
00:35:32,470 --> 00:35:30,800
that they can between all of the modules

904
00:35:35,030 --> 00:35:32,480
then they very carefully train the crew

905
00:35:36,790 --> 00:35:35,040
members both at the vr lab as well as

906
00:35:39,349 --> 00:35:36,800
other simulators that are very high

907
00:35:41,670 --> 00:35:39,359
fidelity to make sure that they know

908
00:35:43,670 --> 00:35:41,680
which camera views to use to make sure

909
00:35:46,150 --> 00:35:43,680
that they've got good clearance and then

910
00:35:48,150 --> 00:35:46,160
as required they'll also call on the eba

911
00:35:49,750 --> 00:35:48,160
crew members to help monitor clearances

912
00:35:51,750 --> 00:35:49,760
for them

913
00:35:54,069 --> 00:35:51,760

this

914
00:35:55,829 --> 00:35:54,079
on some missions the robotics operations

915
00:35:58,390 --> 00:35:55,839
are more tight than others i would say

916
00:36:00,310 --> 00:35:58,400
this one this one is a little more

917
00:36:01,670 --> 00:36:00,320
challenging than some of them you don't

918
00:36:04,150 --> 00:36:01,680
see the big

919
00:36:06,550 --> 00:36:04,160
maneuvers through the wide open

920
00:36:09,430 --> 00:36:06,560
space between major elements that you do

921
00:36:14,310 --> 00:36:11,750
bill harvey cbs news how does life in

922
00:36:15,270 --> 00:36:14,320
the eva office change uh with the simply

923
00:36:17,190 --> 00:36:15,280
complete

924
00:36:19,510 --> 00:36:17,200
and with only a couple of evas a year i

925
00:36:20,950 --> 00:36:19,520
guess is the most you would expect well

926
00:36:22,790 --> 00:36:20,960
we're all uh

927
00:36:24,630 --> 00:36:22,800
we're all anticipating that things will

928
00:36:27,030 --> 00:36:24,640
change and we're curious about how

929
00:36:28,870 --> 00:36:27,040
that's going to work currently

930
00:36:30,870 --> 00:36:28,880
we lost several

931
00:36:33,030 --> 00:36:30,880
members of our team

932
00:36:35,270 --> 00:36:33,040
in the april layoffs

933
00:36:36,230 --> 00:36:35,280
and we'll lose another

934
00:36:37,670 --> 00:36:36,240
five

935
00:36:40,230 --> 00:36:37,680
team members

936
00:36:41,990 --> 00:36:40,240
at the conclusion of this mission first

937
00:36:43,589 --> 00:36:42,000
of all we already missed the ones that

938
00:36:45,990 --> 00:36:43,599

have left they're all very highly

939
00:36:47,829 --> 00:36:46,000
qualified individuals excellent people

940
00:36:49,829 --> 00:36:47,839
to work with and we'll miss the ones

941
00:36:51,829 --> 00:36:49,839
that are moving on after the mission as

942
00:36:53,349 --> 00:36:51,839
well

943
00:36:55,670 --> 00:36:53,359
after that we'll have standard

944
00:36:57,190 --> 00:36:55,680
maintenance operations that will go in

945
00:36:59,990 --> 00:36:57,200
to the mission control center and

946
00:37:01,589 --> 00:37:00,000
support to maintain the suit

947
00:37:03,829 --> 00:37:01,599
to make sure that we're ready to support

948
00:37:06,150 --> 00:37:03,839
any contingency operations

949
00:37:08,950 --> 00:37:06,160
we'll also continue to work on all of

950
00:37:11,430 --> 00:37:08,960
the planning for

951
00:37:13,030 --> 00:37:11,440
the major elements that can fail on the

952
00:37:14,790 --> 00:37:13,040
international space station that could

953
00:37:16,950 --> 00:37:14,800
put us into a zero fault tolerant

954
00:37:19,670 --> 00:37:16,960
situation we'll continue to work on

955
00:37:21,430 --> 00:37:19,680
those procedures back in the office

956
00:37:23,510 --> 00:37:21,440
and to prepare for those times such that

957
00:37:25,270 --> 00:37:23,520
we could be called in and very short

958
00:37:27,670 --> 00:37:25,280
order to perform

959
00:37:30,390 --> 00:37:27,680
maintenance evas on the space station

960
00:37:33,349 --> 00:37:30,400
what that means is we need to have a

961
00:37:34,950 --> 00:37:33,359
fairly high level of preparedness across

962
00:37:36,630 --> 00:37:34,960
the board so we'll need to be doing

963
00:37:38,550 --> 00:37:36,640

simulations

964
00:37:40,630 --> 00:37:38,560
in preparation for those

965
00:37:43,030 --> 00:37:40,640
uh highly intense work periods when

966
00:37:44,870 --> 00:37:43,040
you'd have a contingency eva that would

967
00:37:46,950 --> 00:37:44,880
be required within the matter of a few

968
00:37:48,710 --> 00:37:46,960
days or weeks

969
00:37:50,870 --> 00:37:48,720
so it'll be a sort of a

970
00:37:52,630 --> 00:37:50,880
steady state of work of maintaining

971
00:37:55,750 --> 00:37:52,640
preparedness maintaining our training

972
00:37:57,430 --> 00:37:55,760
levels and proficiency levels

973
00:37:59,030 --> 00:37:57,440
and then intersperse with some peak

974
00:38:01,349 --> 00:37:59,040
levels of activity that will be very

975
00:38:02,950 --> 00:38:01,359
intense for quite some time so that will

976
00:38:04,790 --> 00:38:02,960
be a challenge for us to maintain that

977
00:38:06,870 --> 00:38:04,800
proficiency

978
00:38:09,109 --> 00:38:06,880
in order to help out with that the space

979
00:38:11,670 --> 00:38:09,119
station program will be

980
00:38:13,750 --> 00:38:11,680
interspersing some planned spacewalks

981
00:38:19,910 --> 00:38:13,760
for

982
00:38:21,750 --> 00:38:19,920
installing equipment that

983
00:38:23,990 --> 00:38:21,760
that can be changed out

984
00:38:25,589 --> 00:38:24,000
and then we can there are some lower

985
00:38:28,150 --> 00:38:25,599
priority maintenance objectives that we

986
00:38:29,990 --> 00:38:28,160
can take care of during those periodic

987
00:38:32,550 --> 00:38:30,000
spacewalks as well

988
00:38:35,589 --> 00:38:32,560

we hope to get at least one of those per

989
00:38:38,069 --> 00:38:35,599
year and maybe two until the uh the new

990
00:38:40,150 --> 00:38:38,079
oxygen supply system comes up once that

991
00:38:42,630 --> 00:38:40,160
new oxygen supply system is up then we

992
00:38:45,270 --> 00:38:42,640
can start falling back into a pattern of

993
00:38:46,790 --> 00:38:45,280
more regular ebas and start knocking out

994
00:38:48,950 --> 00:38:46,800
some of the maintenance activities that

995
00:38:50,230 --> 00:38:48,960
will sure to be building up before we

996
00:38:53,349 --> 00:38:50,240
have a chance to

997
00:38:55,030 --> 00:38:53,359
uh do more space walks

998
00:38:57,270 --> 00:38:55,040
okay

999
00:38:59,910 --> 00:38:57,280
marisha done associated press does

1000
00:39:03,030 --> 00:38:59,920
dexter keep hold of the robotic

1001
00:39:05,430 --> 00:39:03,040
refueling experiment indefinitely um

1002
00:39:08,470 --> 00:39:05,440
does he put it down and when will that

1003
00:39:10,950 --> 00:39:08,480
actually be tested out if you know

1004
00:39:13,589 --> 00:39:10,960
okay i am not um

1005
00:39:15,270 --> 00:39:13,599
i'm not the expert on on all of that but

1006
00:39:18,950 --> 00:39:15,280
this is what i do know

1007
00:39:21,910 --> 00:39:18,960
during the stage after uh uls7 departs

1008
00:39:23,670 --> 00:39:21,920
the robotics operators

1009
00:39:25,910 --> 00:39:23,680
working with goddard space flight center

1010
00:39:28,790 --> 00:39:25,920
they have a control center there those

1011
00:39:31,510 --> 00:39:28,800
two groups working together will move

1012
00:39:33,430 --> 00:39:31,520
the rrm from where it is on the lab out

1013
00:39:36,550 --> 00:39:33,440

to its final location on one of the

1014
00:39:38,310 --> 00:39:36,560
external logistics carriers

1015
00:39:40,630 --> 00:39:38,320
somewhat like where the where you saw

1016
00:39:42,710 --> 00:39:40,640
the oremate position so a very similar

1017
00:39:47,430 --> 00:39:42,720
pallet area to that

1018
00:39:51,030 --> 00:39:47,440
at that location the dexter arm will

1019
00:39:51,990 --> 00:39:51,040
grasp some of the robotic tools that are

1020
00:39:53,430 --> 00:39:52,000
on

1021
00:39:59,030 --> 00:39:53,440
the

1022
00:40:00,310 --> 00:39:59,040
perform all kinds of of satellite type

1023
00:40:02,630 --> 00:40:00,320
of maintenance

1024
00:40:05,349 --> 00:40:02,640
there's some multi-layer insulation that

1025
00:40:08,069 --> 00:40:05,359
they can cut they have a cutting tool

1026
00:40:11,430 --> 00:40:08,079
there are different kinds of electrical

1027
00:40:16,630 --> 00:40:14,309
as well as the refueling caps each one

1028
00:40:18,790 --> 00:40:16,640
of those has a little safety wire that's

1029
00:40:21,349 --> 00:40:18,800
very common on many of the satellites

1030
00:40:25,829 --> 00:40:21,359
that are already operating in space so

1031
00:40:27,270 --> 00:40:25,839
they'll practice cutting that wire

1032
00:40:29,270 --> 00:40:27,280
so those are some of the types of

1033
00:40:32,150 --> 00:40:29,280
experiments that they'll be doing and

1034
00:40:38,069 --> 00:40:32,160
then in addition to the refueling the

1035
00:40:41,670 --> 00:40:40,950
i do not remember the the uh the liquid

1036
00:40:46,390 --> 00:40:41,680
that

1037
00:40:47,829 --> 00:40:46,400
using as their um

1038
00:40:50,470 --> 00:40:47,839

their fuel

1039
00:40:52,470 --> 00:40:50,480
simulator but they can pump it from one

1040
00:40:54,230 --> 00:40:52,480
tank to another so they can hook up a

1041
00:40:56,230 --> 00:40:54,240
little connector

1042
00:40:58,309 --> 00:40:56,240
coupler and then pump the fuel through

1043
00:40:59,430 --> 00:40:58,319
their tool back into

1044
00:41:00,870 --> 00:40:59,440
the

1045
00:41:03,990 --> 00:41:00,880
experiment

1046
00:41:06,550 --> 00:41:04,000
the all of the data for that comes down

1047
00:41:10,150 --> 00:41:06,560
remotely and

1048
00:41:12,470 --> 00:41:10,160
the operation of how all of that works

1049
00:41:14,550 --> 00:41:12,480
will be communicated between the goddard

1050
00:41:17,030 --> 00:41:14,560
space flight center marshall space

1051
00:41:20,309 --> 00:41:17,040
flight center and then the controllers

1052
00:41:22,550 --> 00:41:20,319
of the robotic arm and the dexter hand

1053
00:41:25,190 --> 00:41:22,560
here at johnson space center

1054
00:41:27,750 --> 00:41:25,200
so the technique and the expertise of

1055
00:41:29,829 --> 00:41:27,760
all of those robotics operators working

1056
00:41:32,069 --> 00:41:29,839
together is also a key

1057
00:41:33,270 --> 00:41:32,079
technology development that they want to

1058
00:41:35,430 --> 00:41:33,280
work on

1059
00:41:37,829 --> 00:41:35,440
the operations team for the robotics is

1060
00:41:39,510 --> 00:41:37,839
just as important as the actual hardware

1061
00:41:42,470 --> 00:41:39,520
so they'll be checking out not just how

1062
00:41:44,150 --> 00:41:42,480
the hardware works uh but also how their

1063
00:41:46,230 --> 00:41:44,160

team works and how operations need to

1064
00:41:47,910 --> 00:41:46,240
work you could see how that could be

1065
00:41:50,150 --> 00:41:47,920
important if we're

1066
00:41:52,309 --> 00:41:50,160
doing exploration a lot of that work

1067
00:41:53,990 --> 00:41:52,319
will be done uh robotically and we may

1068
00:41:56,309 --> 00:41:54,000
need to take some of these same

1069
00:41:58,630 --> 00:41:56,319
techniques from the operations teams as

1070
00:42:00,950 --> 00:41:58,640
well as the same tools and we'll also

1071
00:42:03,030 --> 00:42:00,960
learn a lot about how those couplers and

1072
00:42:04,710 --> 00:42:03,040
the connectors work to see if there's

1073
00:42:06,309 --> 00:42:04,720
maybe better ways that we can design

1074
00:42:10,309 --> 00:42:06,319
those in the future to be more

1075
00:42:10,319 --> 00:42:13,910
down here marcia

1076
00:42:18,390 --> 00:42:15,670
let's see i think all together with its

1077
00:42:20,069 --> 00:42:18,400
carrier it is about 800 pounds just a

1078
00:42:22,270 --> 00:42:20,079
second i have that information right

1079
00:42:25,349 --> 00:42:22,280
here

1080
00:42:26,630 --> 00:42:25,359
820 pounds including the platform that

1081
00:42:28,550 --> 00:42:26,640
it's on

1082
00:42:31,270 --> 00:42:28,560
i thought greg was going to give him

1083
00:42:35,190 --> 00:42:31,280
over here

1084
00:42:39,349 --> 00:42:35,200
hang on we're going to go here to the

1085
00:42:42,790 --> 00:42:41,270
educate with architecturalism you

1086
00:42:45,750 --> 00:42:42,800
mentioned that you'll be using the light

1087
00:42:47,430 --> 00:42:45,760
procedure again for pre eva prep i

1088
00:42:49,190 --> 00:42:47,440

wondered if that proved so successful

1089
00:42:51,030 --> 00:42:49,200
with the last mission that they met me

1090
00:42:51,990 --> 00:42:51,040
that may be the approach used from now

1091
00:42:53,510 --> 00:42:52,000
on

1092
00:42:54,630 --> 00:42:53,520
that's what we're hoping

1093
00:42:56,790 --> 00:42:54,640
it does

1094
00:42:58,630 --> 00:42:56,800
allow the crew members to

1095
00:43:00,309 --> 00:42:58,640
move about freely the night before as

1096
00:43:02,630 --> 00:43:00,319
you know we use have been using the

1097
00:43:04,309 --> 00:43:02,640
campout protocol in which we

1098
00:43:07,030 --> 00:43:04,319
put them into the quest airlock the

1099
00:43:08,390 --> 00:43:07,040
night before their eva and bring down

1100
00:43:10,710 --> 00:43:08,400
the

1101
00:43:12,870 --> 00:43:10,720
pressure in that

1102
00:43:16,230 --> 00:43:12,880
in that section where they're where they

1103
00:43:18,390 --> 00:43:16,240
are to about 10.2 psi of pressure

1104
00:43:20,150 --> 00:43:18,400
and at that lower pressure that and then

1105
00:43:22,150 --> 00:43:20,160
breathing the pure oxygen when they're

1106
00:43:25,190 --> 00:43:22,160
on the mask helps them to purge the

1107
00:43:28,390 --> 00:43:25,200
nitrogen this other technique allows

1108
00:43:30,470 --> 00:43:28,400
them to just go to bed in their own bed

1109
00:43:32,309 --> 00:43:30,480
at night and then get up in the morning

1110
00:43:33,349 --> 00:43:32,319
get into their spacesuits

1111
00:43:35,750 --> 00:43:33,359
and then

1112
00:43:38,390 --> 00:43:35,760
really the only difference is that they

1113
00:43:40,710 --> 00:43:38,400

have to begin these light exercises

1114
00:43:42,870 --> 00:43:40,720
basically just to keep your heart

1115
00:43:44,309 --> 00:43:42,880
pumping and your respiration levels up

1116
00:43:46,550 --> 00:43:44,319
enough that it'll help purge the

1117
00:43:48,309 --> 00:43:46,560
nitrogen from your tissues

1118
00:43:50,710 --> 00:43:48,319
and yeah that'll be great we can save a

1119
00:43:54,069 --> 00:43:50,720
lot of oxygen that way too not having to

1120
00:43:55,430 --> 00:43:54,079
pump down the uh the vehicle as well

1121
00:43:57,510 --> 00:43:55,440
bill yeah bill harvard again just a

1122
00:43:59,109 --> 00:43:57,520
quick follow-up uh do you do you have a

1123
00:44:01,430 --> 00:43:59,119
ballpark number for how many people are

1124
00:44:03,510 --> 00:44:01,440
in the spacewalk office at the heyday of

1125
00:44:05,430 --> 00:44:03,520
construction or any time you want versus

1126
00:44:06,390 --> 00:44:05,440
what it's going to be after shuttle

1127
00:44:08,390 --> 00:44:06,400
retire

1128
00:44:10,230 --> 00:44:08,400
no but we can probably get those numbers

1129
00:44:12,230 --> 00:44:10,240
from the astronaut office for you as a

1130
00:44:14,710 --> 00:44:12,240
follow-up

1131
00:44:16,790 --> 00:44:14,720
okay phillip

1132
00:44:19,109 --> 00:44:16,800
phillips with nasa spaceflight.com uh

1133
00:44:20,390 --> 00:44:19,119
just a couple the first one is do you

1134
00:44:21,670 --> 00:44:20,400
have any uh

1135
00:44:23,750 --> 00:44:21,680
how much flexibility do you have in

1136
00:44:25,430 --> 00:44:23,760
terms of how long you can go on the cva

1137
00:44:27,190 --> 00:44:25,440
i mean i know that there's a you have a

1138
00:44:28,550 --> 00:44:27,200

very tight timeline just in general for

1139
00:44:31,190 --> 00:44:28,560
this flight so

1140
00:44:33,990 --> 00:44:31,200
can can you go along on this eva if you

1141
00:44:36,069 --> 00:44:34,000
need to in preparation for every eva we

1142
00:44:38,550 --> 00:44:36,079
make those decisions and rules ahead of

1143
00:44:40,710 --> 00:44:38,560
time and per our rules we can go to the

1144
00:44:43,589 --> 00:44:40,720
full extent of the consumables available

1145
00:44:45,829 --> 00:44:43,599
to us to transfer the pump module and

1146
00:44:48,630 --> 00:44:45,839
the robotics refueling mission

1147
00:44:50,710 --> 00:44:48,640
those are hot very high priority items

1148
00:44:53,510 --> 00:44:50,720
also the ormate experiment is also very

1149
00:44:55,510 --> 00:44:53,520
high priority the users of the data from

1150
00:44:56,870 --> 00:44:55,520
that experiment really need to have that

1151
00:44:58,309 --> 00:44:56,880
data back

1152
00:45:00,230 --> 00:44:58,319
sometime

1153
00:45:01,430 --> 00:45:00,240
late next year or the following year so

1154
00:45:03,190 --> 00:45:01,440
they need to make sure that they get

1155
00:45:04,950 --> 00:45:03,200
that deployed

1156
00:45:06,950 --> 00:45:04,960
in time so that they can get the data

1157
00:45:08,710 --> 00:45:06,960
back and then make their final materials

1158
00:45:11,349 --> 00:45:08,720
choices for the vehicles that are going

1159
00:45:13,109 --> 00:45:11,359
to be using that data so that also has a

1160
00:45:15,109 --> 00:45:13,119
high priority and so we've decided we

1161
00:45:18,069 --> 00:45:15,119
would be able to extend up to seven

1162
00:45:20,390 --> 00:45:18,079
hours of eba time to accomplish that

1163
00:45:22,630 --> 00:45:20,400

item if we were running ahead and we got

1164
00:45:24,950 --> 00:45:22,640
everything done we will not extend to

1165
00:45:26,710 --> 00:45:24,960
get extra get ahead items done

1166
00:45:28,790 --> 00:45:26,720
unless we have already committed

1167
00:45:30,390 --> 00:45:28,800
ourselves to an item and then

1168
00:45:32,790 --> 00:45:30,400
something's not going as well as we had

1169
00:45:34,390 --> 00:45:32,800
expected we'll anticipate coming in very

1170
00:45:36,230 --> 00:45:34,400
close to six and a half hours we're

1171
00:45:38,390 --> 00:45:36,240
going to try very hard to stick to that

1172
00:45:40,470 --> 00:45:38,400
our highest priority items on this

1173
00:45:43,030 --> 00:45:40,480
mission as quasi men mentioned to you

1174
00:45:45,190 --> 00:45:43,040
earlier today are transfer of all of

1175
00:45:47,030 --> 00:45:45,200
that hardware out of the mplm so we

1176
00:45:48,150 --> 00:45:47,040
don't want to take a long time with our

1177
00:45:49,750 --> 00:45:48,160
eva

1178
00:45:51,270 --> 00:45:49,760
we need to be able to get back inside

1179
00:45:53,349 --> 00:45:51,280
and start helping out with all of that

1180
00:45:55,349 --> 00:45:53,359
transfer

1181
00:45:56,710 --> 00:45:55,359
okay one more follow-up

1182
00:45:57,910 --> 00:45:56,720
yeah just

1183
00:46:00,790 --> 00:45:57,920
asking about

1184
00:46:03,109 --> 00:46:00,800
planning for this eva since you have the

1185
00:46:04,150 --> 00:46:03,119
two ev crew are actually on orbit right

1186
00:46:06,230 --> 00:46:04,160
now

1187
00:46:08,950 --> 00:46:06,240
this seems at least from the outside

1188
00:46:11,109 --> 00:46:08,960

very similar to the the three

1189
00:46:12,870 --> 00:46:11,119
the big 14 stage evas that you did last

1190
00:46:14,790 --> 00:46:12,880
year where you have a lot of development

1191
00:46:16,470 --> 00:46:14,800
work going uh

1192
00:46:18,309 --> 00:46:16,480
going on the ground here

1193
00:46:20,230 --> 00:46:18,319
uh how are you

1194
00:46:22,870 --> 00:46:20,240
how are you conferencing with the crew

1195
00:46:25,030 --> 00:46:22,880
on orbit um with the crew on the ground

1196
00:46:27,349 --> 00:46:25,040
before they leave in terms of

1197
00:46:30,309 --> 00:46:27,359
conveying some of the lessons learned

1198
00:46:31,910 --> 00:46:30,319
in the nbl runs with the crew on orbit

1199
00:46:32,950 --> 00:46:31,920
okay well that's an excellent question

1200
00:46:34,790 --> 00:46:32,960
and we knew that that would be a

1201
00:46:36,309 --> 00:46:34,800
challenge right from the very beginning

1202
00:46:37,670 --> 00:46:36,319
when we were making those selections as

1203
00:46:41,190 --> 00:46:37,680
to which astronauts would be doing the

1204
00:46:42,790 --> 00:46:41,200
spacewalks you're right in that

1205
00:46:44,390 --> 00:46:42,800
they had to do all of their training

1206
00:46:48,390 --> 00:46:44,400
quite a long time before they're

1207
00:46:50,630 --> 00:46:48,400
actually doing their spacewalk for the

1208
00:46:52,390 --> 00:46:50,640
big 14 tasks that you mentioned before

1209
00:46:54,309 --> 00:46:52,400
like the pump module

1210
00:46:56,390 --> 00:46:54,319
all of those very critical maintenance

1211
00:46:59,109 --> 00:46:56,400
tasks on the international space station

1212
00:47:01,510 --> 00:46:59,119
we assemble a list of

1213
00:47:03,750 --> 00:47:01,520

generic skills that they need to have to

1214
00:47:06,150 --> 00:47:03,760
be able to accomplish any one of those

1215
00:47:08,470 --> 00:47:06,160
and then we show them the work sites

1216
00:47:10,470 --> 00:47:08,480
that are particular to those items and

1217
00:47:12,150 --> 00:47:10,480
that is in their generic flow

1218
00:47:14,390 --> 00:47:12,160
um trading flow

1219
00:47:17,270 --> 00:47:14,400
both ron and mike got all of that

1220
00:47:18,950 --> 00:47:17,280
training uh and so they had a good skill

1221
00:47:20,790 --> 00:47:18,960
set to start with

1222
00:47:22,390 --> 00:47:20,800
then we added this

1223
00:47:25,109 --> 00:47:22,400
these uh

1224
00:47:27,670 --> 00:47:25,119
the spacewalk and the primary objectives

1225
00:47:29,270 --> 00:47:27,680
of transferring the pump module and the

1226
00:47:32,230 --> 00:47:29,280
robotics refueling mission those

1227
00:47:33,109 --> 00:47:32,240
objectives were added fairly early last

1228
00:47:35,670 --> 00:47:33,119
fall

1229
00:47:38,950 --> 00:47:35,680
and that allowed them to each conduct

1230
00:47:40,390 --> 00:47:38,960
two full runs together and one

1231
00:47:43,750 --> 00:47:40,400
separately

1232
00:47:45,510 --> 00:47:43,760
so ron and mike have each had

1233
00:47:48,309 --> 00:47:45,520
a training session where they started

1234
00:47:49,910 --> 00:47:48,319
their eva and went end to end at least

1235
00:47:51,670 --> 00:47:49,920
through the part

1236
00:47:54,470 --> 00:47:51,680
where they transferred the robotics

1237
00:47:56,150 --> 00:47:54,480
refueling mission the ormate payload was

1238
00:47:57,589 --> 00:47:56,160

added after

1239
00:47:59,030 --> 00:47:57,599
ron left

1240
00:48:00,790 --> 00:47:59,040
but mike got to help out with

1241
00:48:02,309 --> 00:48:00,800
development on it on his final run that

1242
00:48:05,109 --> 00:48:02,319
was in march

1243
00:48:07,510 --> 00:48:05,119
after that as i mentioned we used sandy

1244
00:48:10,710 --> 00:48:07,520
and rex to help out with development we

1245
00:48:12,549 --> 00:48:10,720
also use several other astronauts in the

1246
00:48:14,790 --> 00:48:12,559
astronaut corps that were already

1247
00:48:16,549 --> 00:48:14,800
scheduled to do nbl training

1248
00:48:19,829 --> 00:48:16,559
for other tasks

1249
00:48:21,589 --> 00:48:19,839
either planning for for tasks downstream

1250
00:48:24,309 --> 00:48:21,599
or just getting generic training in

1251
00:48:26,549 --> 00:48:24,319
preparation for their own selections to

1252
00:48:28,630 --> 00:48:26,559
space flight later we were able to

1253
00:48:31,670 --> 00:48:28,640
utilize them to help out with certain

1254
00:48:35,030 --> 00:48:31,680
portions of the development like the

1255
00:48:36,069 --> 00:48:35,040
the pma 3 cover for example we had a set

1256
00:48:42,630 --> 00:48:36,079
of

1257
00:48:44,950 --> 00:48:42,640
at that in the nbl and provide a good

1258
00:48:48,549 --> 00:48:44,960
idea of how it could be done

1259
00:48:52,150 --> 00:48:48,559
then in terms of training um

1260
00:48:54,870 --> 00:48:52,160
mike and ron on orbit

1261
00:48:56,069 --> 00:48:54,880
we assembled a video much like what you

1262
00:48:58,150 --> 00:48:56,079
saw today

1263
00:49:01,430 --> 00:48:58,160

but in a little bit more detail

1264
00:49:05,109 --> 00:49:01,440
they also should have the actual

1265
00:49:06,790 --> 00:49:05,119
vr lab program it's called doug and they

1266
00:49:09,829 --> 00:49:06,800
should have that available to them next

1267
00:49:13,030 --> 00:49:09,839
week to do some final checks on their

1268
00:49:15,270 --> 00:49:13,040
translation paths uh the intricacies of

1269
00:49:17,190 --> 00:49:15,280
how they move about on the space station

1270
00:49:18,950 --> 00:49:17,200
where it's tight what handrails to use

1271
00:49:21,109 --> 00:49:18,960
etc

1272
00:49:23,030 --> 00:49:21,119
we've also been doing

1273
00:49:24,790 --> 00:49:23,040
training sessions with them we have

1274
00:49:26,630 --> 00:49:24,800
already completed four of those training

1275
00:49:28,390 --> 00:49:26,640
sessions including two hours of

1276
00:49:30,630 --> 00:49:28,400
procedure review each

1277
00:49:33,270 --> 00:49:30,640
followed by approximately a half an hour

1278
00:49:34,870 --> 00:49:33,280
of space to ground tag up time with our

1279
00:49:37,829 --> 00:49:34,880
training team here

1280
00:49:40,069 --> 00:49:37,839
so think of that as

1281
00:49:42,069 --> 00:49:40,079
a video conference between space and the

1282
00:49:45,349 --> 00:49:42,079
ground and it allows us to do that

1283
00:49:47,270 --> 00:49:45,359
training answer questions provide

1284
00:49:48,950 --> 00:49:47,280
demonstrations of the hardware we can

1285
00:49:50,950 --> 00:49:48,960
bring that with us and show them those

1286
00:49:54,230 --> 00:49:50,960
items on on television they'll have

1287
00:49:57,270 --> 00:49:54,240
their final training session on july 6th

1288
00:49:58,710 --> 00:49:57,280

that'll be two hours of training of

1289
00:50:00,630 --> 00:49:58,720
material review

1290
00:50:02,470 --> 00:50:00,640
followed by

1291
00:50:04,470 --> 00:50:02,480
i think we're hoping for nearly 45

1292
00:50:06,230 --> 00:50:04,480
minutes of space to ground tag up time

1293
00:50:08,710 --> 00:50:06,240
we are still working to try to get rex

1294
00:50:10,630 --> 00:50:08,720
tied in for that so he can participate

1295
00:50:14,069 --> 00:50:10,640
as well he'll be in quarantine at the

1296
00:50:18,790 --> 00:50:16,470
let's see i think that probably answers

1297
00:50:20,870 --> 00:50:18,800
most of your questions oh we did do a

1298
00:50:24,309 --> 00:50:20,880
dry run of the

1299
00:50:25,829 --> 00:50:24,319
suit up operations and tested the aisle

1300
00:50:27,270 --> 00:50:25,839
protocol just looking through the

1301
00:50:28,630 --> 00:50:27,280
procedures we didn't go all the way

1302
00:50:31,589 --> 00:50:28,640
through the protocol but they got into

1303
00:50:33,510 --> 00:50:31,599
their spacesuits and checked the fit

1304
00:50:36,470 --> 00:50:33,520
and we did have to make some adjustments

1305
00:50:37,990 --> 00:50:36,480
on ron's suit fit but he's dialed in now

1306
00:50:40,150 --> 00:50:38,000
and he'll be very comfortable for the

1307
00:50:41,349 --> 00:50:40,160
eva

1308
00:50:42,630 --> 00:50:41,359
okay we're going to wrap it up from here

1309
00:50:44,790 --> 00:50:42,640
at the johnson space center coming up

1310
00:50:47,270 --> 00:50:44,800
next on nasa television at 1 pm central

1311
00:50:48,390 --> 00:50:47,280
time 2 pm eastern time will be the crew

1312
00:50:51,750 --> 00:50:48,400
news conference with all of the

1313
00:50:53,190 --> 00:50:51,760

astronauts for sts-135 so stick around

1314
00:50:54,790 --> 00:50:53,200
for that and of course for always the

1315
00:50:57,990 --> 00:50:54,800
latest on the mission you can log on to

1316
00:50:59,589 --> 00:50:58,000
our nasa website at nasa.gov where you

1317
00:51:01,030 --> 00:50:59,599
can also learn about these uh the

1318
00:51:02,230 --> 00:51:01,040
spacewalk activity that glenda's been

1319
00:51:03,589 --> 00:51:02,240
talking about so we thank you for