1
00:00:07,340 --> 00:00:05,179
so on USEPA 30 with butch wilmore being

2
00:00:09,770 --> 00:00:07,350
eb1 he is gonna be wearing the red

3
00:00:13,250 --> 00:00:09,780
stripes on the spacesuit and terry virts

4
00:00:14,930 --> 00:00:13,260
being eb-2 he is going to be wearing the

5
00:00:16,700 --> 00:00:14,940
white stripes on his suit

6
00:00:19,010 --> 00:00:16,710
so both crew members are going to

7
00:00:21,650 --> 00:00:19,020
ingress the airlock which is gonna meet

8
00:00:23,960 --> 00:00:21,660
you crossing first and you see Jerry

9
00:00:25,880 --> 00:00:23,970
who's going to be translating to the lab

10
00:00:27,620 --> 00:00:25,890
forward end cone very similar

11
00:00:30,050 --> 00:00:27,630
translation path to the first DDA and

12
00:00:33,079 --> 00:00:30,060
he's at that end cone he's going to be

13
00:00:35,149 --> 00:00:33,089

putting some inhibits in place that is

14
00:00:37,790 --> 00:00:35,159
required for mating and debating some

15
00:00:39,290 --> 00:00:37,800
cables that's for the Ida task so he

16
00:00:42,950 --> 00:00:39,300
does some on the starboard side and then

17
00:00:46,040 --> 00:00:42,960
he goes to the nadir side to essentially

18
00:00:47,509 --> 00:00:46,050
unplug this visiting vehicle power so

19
00:00:52,430 --> 00:00:47,519
that during the EBA we are not making

20
00:00:54,349 --> 00:00:52,440
any hot mates or D mates meanwhile which

21
00:00:56,629 --> 00:00:54,359
is going to be translating to node2

22
00:00:58,789 --> 00:00:56,639
zenith forward end cone again a very

23
00:01:01,699 --> 00:00:58,799
similar translation path that he had for

24
00:01:03,999 --> 00:01:01,709
EBA one and he's going to be going to

25
00:01:07,249 --> 00:01:04,009
PMA to the pressurized mating adapter

26
00:01:09,020 --> 00:01:07,259
same same work site location is EBA one

27
00:01:13,340 --> 00:01:09,030
he's going to be setting up that area

28
00:01:16,969 --> 00:01:13,350
setting down a bag in which they are

29
00:01:18,800 --> 00:01:16,979
going to be removing the PMA to cover so

30
00:01:21,139 --> 00:01:18,810
this cover acts as a thermal and

31
00:01:22,670 --> 00:01:21,149
micrometeorite protection and we need to

32
00:01:24,679 --> 00:01:22,680
remove it because it's this is where

33
00:01:26,929 --> 00:01:24,689
item one is going to be installed so

34
00:01:29,450 --> 00:01:26,939
both crew members help in that removal

35
00:01:33,080 --> 00:01:29,460
and they pack up that cover and put it

36
00:01:36,380 --> 00:01:33,090
into the bag once that's complete the

37
00:01:37,940 --> 00:01:36,390
crew is going to finish up the cable

38
00:01:40,249 --> 00:01:37,950

routing that was not completed on the

39
00:01:41,690 --> 00:01:40,259
the first TVA so Terry's gonna be

40
00:01:44,719 --> 00:01:41,700
working on the starboard side you see

41
00:01:47,419 --> 00:01:44,729
him right here he is mating and debating

42
00:01:49,880 --> 00:01:47,429
some connectors this is what those

43
00:01:51,919 --> 00:01:49,890
inhibits were needed so that none of

44
00:01:55,429 --> 00:01:51,929
these connections that he has or will be

45
00:01:58,520 --> 00:01:55,439
will be hot mates or ordi mates so butch

46
00:01:59,719 --> 00:01:58,530
is going to be on the port side and he's

47
00:02:03,080 --> 00:01:59,729
essentially going to be doing the same

48
00:02:05,179 --> 00:02:03,090
thing you'll be seeing him mating and D

49
00:02:09,530 --> 00:02:05,189
mating some of those connectors here and

50
00:02:11,900 --> 00:02:09,540
once the connectors have been connected

51
00:02:14,080 --> 00:02:11,910
up they are going to continue the cable

52
00:02:16,990 --> 00:02:14,090
routing of the

53
00:02:18,819 --> 00:02:17,000
as Karina mentioned some of these are

54
00:02:23,289 --> 00:02:18,829
for Ida one and some of these are for

55
00:02:25,630 --> 00:02:23,299
Ida two moving over to back over to

56
00:02:27,699 --> 00:02:25,640
Terry with this orange cable you'll see

57
00:02:29,259 --> 00:02:27,709
this orange cable going up to the node

58
00:02:32,199 --> 00:02:29,269
two forward end cone and that will be

59
00:02:34,960 --> 00:02:32,209
needed for Ida two connections moving

60
00:02:37,780 --> 00:02:34,970
back over to Terry the cables that are

61
00:02:40,630 --> 00:02:37,790
going to be at the PMA 2 nadir location

62
00:02:42,729 --> 00:02:40,640
that's for item 1 and then you can see

63
00:02:44,979 --> 00:02:42,739

him routing the ones that are going to

64
00:02:47,800 --> 00:02:44,989
be needed for Ida 2 again on that node 2

65
00:02:49,839 --> 00:02:47,810
forward and cone and that should

66
00:02:51,640 --> 00:02:49,849
complete all of the theater cable

67
00:02:54,339 --> 00:02:51,650
routing that's required for these EBA s

68
00:02:56,740 --> 00:02:54,349
once that's done Terry's going to head

69
00:02:59,619 --> 00:02:56,750
back to the lab forward end cone and

70
00:03:01,390 --> 00:02:59,629
basically plug back in that vias

71
00:03:02,589 --> 00:03:01,400
visiting vehicle power so those inhibits

72
00:03:07,390 --> 00:03:02,599
he put in place he's going to go ahead

73
00:03:10,390 --> 00:03:07,400
and make those back again and both crew

74
00:03:14,920 --> 00:03:10,400
members are going to help with the that

75
00:03:16,720 --> 00:03:14,930
cleanup at the work site of PMA - Terry

76
00:03:19,119 --> 00:03:16,730
is going to go ahead and pick up that

77
00:03:20,619 --> 00:03:19,129
bag that was left out on EBA 1 and bring

78
00:03:23,020 --> 00:03:20,629
that back inside in the airlock and

79
00:03:25,210 --> 00:03:23,030
is going to grab the bag that has

80
00:03:27,550 --> 00:03:25,220
the PMA to cover in it and bring that

81
00:03:30,099 --> 00:03:27,560
back to the airlock and so they stole

82
00:03:32,050 --> 00:03:30,109
both of those bags inside the airlock

83
00:03:34,750 --> 00:03:32,060
and then they grab the bags that they

84
00:03:38,409 --> 00:03:34,760
will need for the rest of the tasks for

85
00:03:40,629 --> 00:03:38,419
the EBA so Terry's task is going to be

86
00:03:44,140 --> 00:03:40,639
on ESP 2 which is the external stowage

87
00:03:47,170 --> 00:03:44,150
platform he is going to be reconfiguring

88
00:03:48,550 --> 00:03:47,180

a foot restraint and he will then go

89
00:03:51,240 --> 00:03:48,560
ahead and ingress into that foot

90
00:03:53,140 --> 00:03:51,250
restraint so he can complete the

91
00:03:55,059 --> 00:03:53,150
lubrication of the space station and

92
00:03:58,119 --> 00:03:55,069
remote manipulator system the SSRMS

93
00:03:59,559 --> 00:03:58,129
latching end effector the lee and so

94
00:04:01,420 --> 00:03:59,569
Samantha Christopher ready she's going

95
00:04:03,189 --> 00:04:01,430
to be the robotics operator for the EBA

96
00:04:04,659 --> 00:04:03,199
so butch and Samantha are going to be

97
00:04:07,300 --> 00:04:04,669
I'm sorry Terry and Samantha are going

98
00:04:10,360 --> 00:04:07,310
to be talking throughout the EBA making

99
00:04:12,909 --> 00:04:10,370
sure that the arm is in a location where

100
00:04:15,909 --> 00:04:12,919
Terry can get to the lubrication that's

101
00:04:18,099 --> 00:04:15,919
required and so we are going to be

102
00:04:20,890 --> 00:04:18,109
essentially lubricating five different

103
00:04:23,409 --> 00:04:20,900
portions of the Lea the latching end

104
00:04:25,180 --> 00:04:23,419
effector this picture shows that the

105
00:04:26,850 --> 00:04:25,190
face of the Lea and you can see that

106
00:04:29,279 --> 00:04:26,860
there are four latches on it

107
00:04:32,969 --> 00:04:29,289
labeled that's one two three and four

108
00:04:35,129 --> 00:04:32,979
and the next picture shows these latches

109
00:04:37,589 --> 00:04:35,139
in the extended position so while the

110
00:04:39,559 --> 00:04:37,599
latches are they extended we will be

111
00:04:41,760 --> 00:04:39,569
able to lubricate the latch ball screws

112
00:04:44,279 --> 00:04:41,770
equalization brackets and latch

113
00:04:45,809 --> 00:04:44,289

deployment rollers this next picture

114
00:04:47,999 --> 00:04:45,819
shows the latches in the retracted

115
00:04:51,270 --> 00:04:48,009
position where we can lubricate the

116
00:04:52,740 --> 00:04:51,280
linear track bearings another thing that

117
00:04:54,839 --> 00:04:52,750
we're going to be lubricating is the

118
00:04:56,909 --> 00:04:54,849
rigid eyes central ball screw so in this

119
00:04:58,589 --> 00:04:56,919
video you can see that this ball screw

120
00:05:01,350 --> 00:04:58,599
is right in the middle of the Li and

121
00:05:05,339 --> 00:05:01,360
they are going to be putting grease on a

122
00:05:07,740 --> 00:05:05,349
tool and getting the feel for what that

123
00:05:10,559 --> 00:05:07,750
ball screw feels like through the gloved

124
00:05:12,450 --> 00:05:10,569
hand and using this tool and so it's

125
00:05:14,399 --> 00:05:12,460
it's a you can see it and the reason

126
00:05:16,080 --> 00:05:14,409
we're doing that first is because we

127
00:05:19,679 --> 00:05:16,090
really want to get Terry to have that

128
00:05:22,140 --> 00:05:19,689
feel of how it feels to lubricate

129
00:05:24,990 --> 00:05:22,150
because the next task is going to be

130
00:05:27,179 --> 00:05:25,000
lubricating a similar ball screw for the

131
00:05:29,040 --> 00:05:27,189
latches and so in this video you can see

132
00:05:33,719 --> 00:05:29,050
they're going to insert this tool into

133
00:05:35,939 --> 00:05:33,729
the cavity of the latch and it is all

134
00:05:38,670 --> 00:05:35,949
going to be a blind operation he's not

135
00:05:40,140 --> 00:05:38,680
going to actually physically see the the

136
00:05:41,790 --> 00:05:40,150
ball screw that he is lubricating and

137
00:05:43,730 --> 00:05:41,800
that's why we want him to make sure he

138
00:05:45,719 --> 00:05:43,740

is comfortable so that he knows he is

139
00:05:50,249 --> 00:05:45,729
lubricating the the portion that we

140
00:05:52,200 --> 00:05:50,259
would like so this is showing what it

141
00:05:55,230 --> 00:05:52,210
will look like on the inside of that

142
00:05:57,629 --> 00:05:55,240
latch and spreading grease all along

143
00:05:59,010 --> 00:05:57,639
that ball screw again Terry's not going

144
00:06:04,610 --> 00:05:59,020
to be able to see that but this is what

145
00:06:08,600 --> 00:06:07,400
once that lubrication is complete we're

146
00:06:10,400 --> 00:06:08,610
going to go ahead and retract the

147
00:06:14,060 --> 00:06:10,410
latches so we can lubricate the linear

148
00:06:15,560 --> 00:06:14,070
track bearings so each latch has these

149
00:06:19,430 --> 00:06:15,570
two track bearings and we're going to

150
00:06:24,350 --> 00:06:19,440
lubricate both sides of those tracks on

151
00:06:26,090 --> 00:06:24,360
each of the four latches if there's

152
00:06:28,160 --> 00:06:26,100
enough time in the EBA we're going to go

153
00:06:30,980 --> 00:06:28,170
ahead and continue lubrication we're

154
00:06:32,900 --> 00:06:30,990
going to extend the latches again to

155
00:06:35,690 --> 00:06:32,910
lubricate the equalization brackets as

156
00:06:37,960 --> 00:06:35,700
well as the deployment rollers so in

157
00:06:40,490 --> 00:06:37,970
this picture again of the extended latch

158
00:06:43,370 --> 00:06:40,500
you can see the equalization bracket so

159
00:06:46,040 --> 00:06:43,380
each latch has one equalization bracket

160
00:06:49,730 --> 00:06:46,050
and then there are four latch deployment

161
00:06:51,050 --> 00:06:49,740
rollers per latch so for the last

162
00:06:53,660 --> 00:06:51,060
deployment rollers we're just basically

163
00:06:55,400 --> 00:06:53,670

putting a little dab of grease onto the

164
00:06:56,840 --> 00:06:55,410
rollers and the equalization bracket we

165
00:06:58,970 --> 00:06:56,850
put a little grease along the the

166
00:07:02,870 --> 00:06:58,980
inboard and the outboard sides of that

167
00:07:05,600 --> 00:07:02,880
bracket meanwhile but just going to be

168
00:07:07,610 --> 00:07:05,610
doing the the PMM prep portion of the

169
00:07:10,730 --> 00:07:07,620
EBA so the permanent multi-purpose

170
00:07:13,850 --> 00:07:10,740
module on his way to the worksite he's

171
00:07:15,860 --> 00:07:13,860
going to go up to the z1 port toolbox

172
00:07:20,110 --> 00:07:15,870
where he's going to get a socket that's

173
00:07:23,270 --> 00:07:20,120
required for the worksite out at node 3

174
00:07:25,580 --> 00:07:23,280
so you can see his translation path how

175
00:07:27,950 --> 00:07:25,590
to node3 first he's going to go to the

176
00:07:30,590 --> 00:07:27,960
forward side of node 3 and he's going to

177
00:07:35,420 --> 00:07:30,600
be removing a non propulsive valve and

178
00:07:39,110 --> 00:07:35,430
npv that when we are relocating the PMM

179
00:07:41,780 --> 00:07:39,120
it's a very tight clearance of that

180
00:07:45,710 --> 00:07:41,790
relocation so we'd like to remove this

181
00:07:48,560 --> 00:07:45,720
valve during this EBA and then in its

182
00:07:50,360 --> 00:07:48,570
place install a vent cover plate so that

183
00:07:52,310 --> 00:07:50,370
is the valve that we're going to remove

184
00:07:53,990 --> 00:07:52,320
and that vent cover plate is installed

185
00:07:55,790 --> 00:07:54,000
we install that cover plate to protect

186
00:07:58,460 --> 00:07:55,800
the sealing surfaces of that valve

187
00:08:01,600 --> 00:07:58,470
because once the PMM is relocated here

188
00:08:03,980 --> 00:08:01,610

we do have plans to reinstall that valve

189
00:08:05,600 --> 00:08:03,990
once that's complete he moves to the

190
00:08:07,790 --> 00:08:05,610
starboard side and is going to be

191
00:08:10,070 --> 00:08:07,800
removing a handrail that has actual

192
00:08:13,040 --> 00:08:10,080
physical interference when the PMM is

193
00:08:16,470 --> 00:08:13,050
relocated here so we will not be

194
00:08:18,260 --> 00:08:16,480
reinstalling it next in view is the

195
00:08:22,290 --> 00:08:18,270
the CBM the common birthing mechanism

196
00:08:25,230 --> 00:08:22,300
and this is actually where the the PMM

197
00:08:27,570 --> 00:08:25,240
is going to be relocated and so there

198
00:08:30,030 --> 00:08:27,580
are some launch locks that need to be

199
00:08:32,310 --> 00:08:30,040
released as well as a flap that needs to

200
00:08:35,580 --> 00:08:32,320
be open for some camera views so on the

201
00:08:38,490 --> 00:08:35,590
CBMs there are four petals each that has

202
00:08:39,900 --> 00:08:38,500
two launch locks and so which is going

203
00:08:44,640 --> 00:08:39,910
to be releasing all eight of those

204
00:08:46,800 --> 00:08:44,650
launch locks on this CBM when he is

205
00:08:49,590 --> 00:08:46,810
complete with the forward side of node

206
00:08:51,150 --> 00:08:49,600
three he's going to translate over to

207
00:08:53,570 --> 00:08:51,160
the outside you could see his

208
00:08:57,540 --> 00:08:53,580
translation path here so the app side

209
00:09:01,410 --> 00:08:57,550
going to that CBM and essentially doing

210
00:09:03,300 --> 00:09:01,420
the same thing in this location is where

211
00:09:05,610 --> 00:09:03,310
the beam experiment the Bigelow

212
00:09:09,840 --> 00:09:05,620
expandable Activity module is going to

213
00:09:13,290 --> 00:09:09,850

be birth to and so again he needs to

214
00:09:15,570 --> 00:09:13,300
release the launch locks of all four

215
00:09:19,080 --> 00:09:15,580
petals and then open up the flap that's

216
00:09:21,660 --> 00:09:19,090
needed for the camera views so once all

217
00:09:23,670 --> 00:09:21,670
of the launch locks are released and

218
00:09:25,800 --> 00:09:23,680
this is for both the forward and the aft

219
00:09:27,480 --> 00:09:25,810
CBM their ground is going to command

220
00:09:29,850 --> 00:09:27,490
these petals open to a 45-degree

221
00:09:32,550 --> 00:09:29,860
position and which is going to verify

222
00:09:34,200 --> 00:09:32,560
that they did deploy in that position

223
00:09:35,790 --> 00:09:34,210
and then the ground is going to go ahead

224
00:09:38,370 --> 00:09:35,800
and close them in which is going to

225
00:09:40,140 --> 00:09:38,380
verify that they are closed once that's

226
00:09:44,280 --> 00:09:40,150
complete he's going to head back to that

227
00:09:48,720 --> 00:09:44,290
tool box put his sock it away and head

228
00:09:50,250 --> 00:09:48,730
on back to the airlock and so butch and

229
00:09:53,070 --> 00:09:50,260
Terry would be back at the airlock and

230
00:09:55,260 --> 00:09:53,080
that's the the planned tasks for the CVA

231
00:09:57,450 --> 00:09:55,270
we do anticipate we'll have some time

232
00:09:59,820 --> 00:09:57,460
for the get a heads the first get ahead

233
00:10:01,860 --> 00:09:59,830
we would be putting wire ties on the s0

234
00:10:07,140 --> 00:10:01,870
trust and this is getting a head start

235
00:10:09,960 --> 00:10:07,150
for the third EBA another task we can do

236
00:10:12,600 --> 00:10:09,970
is to be removing a light that's on a

237
00:10:14,430 --> 00:10:12,610
camera port that's a p1 lower outboard

238
00:10:15,720 --> 00:10:14,440

work site so there the light is dim

239
00:10:18,680 --> 00:10:15,730
there so we'll bring the light inside

240
00:10:21,330 --> 00:10:18,690
and get that fixed another task would be

241
00:10:23,010 --> 00:10:21,340
reconfiguring the seated cart the CT

242
00:10:24,990 --> 00:10:23,020
carts the crew and equipment translation

243
00:10:27,720 --> 00:10:25,000
need so we basically want to put these

244
00:10:30,120 --> 00:10:27,730
in a lower profile for the MT the mobile

245
00:10:32,250 --> 00:10:30,130
transporter so it won't have any clear

246
00:10:36,570 --> 00:10:32,260
issues with it so we tie some brake

247
00:10:38,270 --> 00:10:36,580
handles back we go ahead and we remove a

248
00:10:44,910 --> 00:10:38,280
coupler

249
00:10:48,330 --> 00:10:44,920
the swing arm and we pull those off and

250
00:10:51,660 --> 00:10:48,340
translate over to along the along the

251
00:10:53,640 --> 00:10:51,670
truss to a zero where we're going to go

252
00:10:57,030 --> 00:10:53,650
ahead and stow that out of the way on

253
00:10:59,400 --> 00:10:57,040
the wedge face there this is showing the

254
00:11:02,250 --> 00:10:59,410
port seated cart where at this location

255
00:11:05,220 --> 00:11:02,260
all we need to do is take a tether to

256
00:11:06,840 --> 00:11:05,230
tie down these brake handles another

257
00:11:09,960 --> 00:11:06,850
task we can do is back at the airlock

258
00:11:13,050 --> 00:11:09,970
there is a known sharp edge along the

259
00:11:15,150 --> 00:11:13,060
handrail of the airlock and so we have a

260
00:11:17,190 --> 00:11:15,160
handrail clamp that can go over that

261
00:11:19,590 --> 00:11:17,200
sharp edge you can see it here in the

262
00:11:21,780 --> 00:11:19,600
picture so we install that and so since

263
00:11:23,100 --> 00:11:21,790

this is such a highly traveled area we

264
00:11:25,770 --> 00:11:23,110
install that clamp and then the crew

265
00:11:27,420 --> 00:11:25,780
doesn't need to worry about cutting

266
00:11:29,130 --> 00:11:27,430
their glove or anything else on their

267
00:11:32,160 --> 00:11:29,140
spacesuit and going over that handrail

268
00:11:34,440 --> 00:11:32,170
and so that is the get a heads that we