1
00:00:06,470 --> 00:00:03,990
scott will come out first at the airlock

2
00:00:07,990 --> 00:00:06,480
we'll hand out the bags uh once scott's

3
00:00:09,910 --> 00:00:08,000
out jail we'll start handing out all the

4
00:00:12,310 --> 00:00:09,920
bags this is to keep us from going back

5
00:00:13,350 --> 00:00:12,320
in to the airlock uh midway through the

6
00:00:15,509 --> 00:00:13,360
eva

7
00:00:17,510 --> 00:00:15,519
so we'll head out uh chow will come out

8
00:00:20,870 --> 00:00:17,520
shortly

9
00:00:23,109 --> 00:00:20,880
scott's going to carry the mli bag that

10
00:00:24,550 --> 00:00:23,119
we're going to put the mbsu mli on and

11
00:00:25,589 --> 00:00:24,560
chell is going to take care of the lee

12
00:00:27,349 --> 00:00:25,599
lube

13
00:00:30,230 --> 00:00:27,359

equipment that's going to go stage at

14
00:00:33,190 --> 00:00:30,240
the lee lube area so cho will grab the

15
00:00:36,310 --> 00:00:33,200
blt or ball screw lubricating tool

16
00:00:37,990 --> 00:00:36,320
uh from scott and move it over to esp2

17
00:00:40,310 --> 00:00:38,000
where

18
00:00:41,910 --> 00:00:40,320
he's going to pick up an apo far

19
00:00:44,790 --> 00:00:41,920
so scott's going to head out we're both

20
00:00:46,869 --> 00:00:44,800
heading to the starboard truss

21
00:00:48,310 --> 00:00:46,879
on the forward side out to almost the

22
00:00:49,270 --> 00:00:48,320
start so we're going to go up to see the

23
00:00:51,670 --> 00:00:49,280
spur

24
00:00:54,389 --> 00:00:51,680
with scott he's going to translate out

25
00:00:55,670 --> 00:00:54,399
all the way to the end to sarge area

26
00:00:58,869 --> 00:00:55,680
where he's going to go up on the sarge

27
00:01:03,029 --> 00:00:58,879
handrail to the logistics carrier module

28
00:01:07,270 --> 00:01:05,429
as we get there

29
00:01:08,710 --> 00:01:07,280
he's going to take the mli bag that he

30
00:01:10,630 --> 00:01:08,720
has

31
00:01:11,990 --> 00:01:10,640
and stow it on the bag

32
00:01:14,550 --> 00:01:12,000
while he's doing that joe it's going to

33
00:01:16,630 --> 00:01:14,560
be working to get an apfr off the esp2

34
00:01:17,910 --> 00:01:16,640
and drop off the

35
00:01:22,230 --> 00:01:17,920
lee lube

36
00:01:23,990 --> 00:01:22,240
tools and bring the apfr out to ams

37
00:01:25,510 --> 00:01:24,000
when scott's got that bag deployed he's

38
00:01:27,590 --> 00:01:25,520

going to start removing the

39
00:01:29,990 --> 00:01:27,600
mli or

40
00:01:32,069 --> 00:01:30,000
off the mbsu he's going to start tying

41
00:01:35,270 --> 00:01:32,079
down what we call the skirt which is a

42
00:01:36,789 --> 00:01:35,280
lower portion of the mli it has eight

43
00:01:38,950 --> 00:01:36,799
tabs on the front we're going to tie

44
00:01:40,870 --> 00:01:38,960
four down to one handrail four down to

45
00:01:42,870 --> 00:01:40,880
the other and during the near the

46
00:01:45,510 --> 00:01:42,880
electric connections we're going to tie

47
00:01:46,950 --> 00:01:45,520
that side of the mli skirt down after we

48
00:01:48,950 --> 00:01:46,960
get it tied down we're going to move to

49
00:01:50,149 --> 00:01:48,960
the aft side where there are two bolts

50
00:01:53,270 --> 00:01:50,159
that remove

51
00:01:54,789 --> 00:01:53,280
the mbsu mli after we've got it there

52
00:01:57,190 --> 00:01:54,799
scott's going to stuff it back in the

53
00:01:59,030 --> 00:01:57,200
bag and allow chill to bring it back

54
00:02:01,910 --> 00:01:59,040
inside

55
00:02:03,510 --> 00:02:01,920
here's cho going to the apfr area

56
00:02:06,389 --> 00:02:03,520
where he's going to drop off the lead

57
00:02:08,790 --> 00:02:06,399
lube tools and grab the apfr from that

58
00:02:10,630 --> 00:02:08,800
area and take it out to ams he's pretty

59
00:02:12,949 --> 00:02:10,640
much going to go the same route he's

60
00:02:16,390 --> 00:02:12,959
going to go up to the forward truss and

61
00:02:19,510 --> 00:02:16,400
out to the cedar cart area up the ams

62
00:02:21,190 --> 00:02:19,520
and then deploy the apfr because the

63
00:02:23,350 --> 00:02:21,200

translation holds on the

64
00:02:27,350 --> 00:02:23,360
on the ams

65
00:02:29,350 --> 00:02:27,360
we're taking the apfr out there for a gr

66
00:02:31,509 --> 00:02:29,360
additional handholds

67
00:02:32,710 --> 00:02:31,519
and translation ports

68
00:02:35,110 --> 00:02:32,720
once it gets there we'll take some

69
00:02:36,869 --> 00:02:35,120
pictures and install a small wedge

70
00:02:39,110 --> 00:02:36,879
over one of the radiators it's going to

71
00:02:41,190 --> 00:02:39,120
slide into an area

72
00:02:43,270 --> 00:02:41,200
and i have a video shortly slide into

73
00:02:44,949 --> 00:02:43,280
the area between the two radiators and

74
00:02:46,550 --> 00:02:44,959
secure there

75
00:02:47,750 --> 00:02:46,560
and here is how we're sliding it over

76
00:02:50,470 --> 00:02:47,760
the main radiator and then we're

77
00:02:54,390 --> 00:02:50,480
grappling with a wire tie to tie it down

78
00:02:56,229 --> 00:02:54,400
once we get it secured then the mli will

79
00:02:58,630 --> 00:02:56,239
pop out like a small tint filling the

80
00:03:00,550 --> 00:02:58,640
wedge in between the two radiators to

81
00:03:02,790 --> 00:03:00,560
protect the radiators

82
00:03:04,949 --> 00:03:02,800
once we're there scott's

83
00:03:06,550 --> 00:03:04,959
shell is going to work back to

84
00:03:07,350 --> 00:03:06,560
put on the big blanket you'll see it

85
00:03:09,430 --> 00:03:07,360
here

86
00:03:11,509 --> 00:03:09,440
this is point a the first tie down he

87
00:03:13,030 --> 00:03:11,519
does and you saw the blanket kind of pop

88
00:03:14,630 --> 00:03:13,040

in it's not going to happen that quick

89
00:03:17,110 --> 00:03:14,640
on orbit we're going to have to go down

90
00:03:19,110 --> 00:03:17,120
to a second strap put that strap around

91
00:03:21,190 --> 00:03:19,120
ams and then work to a third and a

92
00:03:22,790 --> 00:03:21,200
fourth strap

93
00:03:25,509 --> 00:03:22,800
so this is our third strap it's very

94
00:03:27,430 --> 00:03:25,519
possible to get into the apfr

95
00:03:29,270 --> 00:03:27,440
and tie that strap around the strut

96
00:03:30,470 --> 00:03:29,280
right there by the wedge and then he'll

97
00:03:32,550 --> 00:03:30,480
move

98
00:03:34,149 --> 00:03:32,560
aft and zenith

99
00:03:36,869 --> 00:03:34,159
to protect

100
00:03:38,309 --> 00:03:36,879
the final area of

101
00:03:40,070 --> 00:03:38,319
of staging there

102
00:03:42,070 --> 00:03:40,080
once we do that it does have a grounding

103
00:03:43,270 --> 00:03:42,080
pin on it that we'll apply and once the

104
00:03:45,750 --> 00:03:43,280
grounding pin is installed we're

105
00:03:47,750 --> 00:03:45,760
complete with both ams small blanket and

106
00:03:49,509 --> 00:03:47,760
large blanket to protect their pumps and

107
00:03:51,430 --> 00:03:49,519
here's an mbl video just showing the

108
00:03:53,990 --> 00:03:51,440
actual size of the blanket as it's

109
00:03:56,309 --> 00:03:54,000
deployed he's working down what would

110
00:04:01,350 --> 00:03:56,319
have been the nader part of the previous

111
00:04:06,070 --> 00:04:03,030
so after we get the two blankets

112
00:04:08,630 --> 00:04:06,080
installed and the am mbsu

113
00:04:10,149 --> 00:04:08,640

mli removed

114
00:04:13,670 --> 00:04:10,159
chell and scott will work together to

115
00:04:14,949 --> 00:04:13,680
bring both the apfr and the mbsu mli

116
00:04:23,270 --> 00:04:14,959
back

117
00:04:26,950 --> 00:04:23,280
he came to the airlock where he'll stow

118
00:04:29,350 --> 00:04:26,960
that bag outside the airlock

119
00:04:31,990 --> 00:04:29,360
and grab a cable bag the cable bag is

120
00:04:38,550 --> 00:04:32,000
the one mike spoke of with the pma ida

121
00:04:41,350 --> 00:04:39,990
again stowing most of the bags on the

122
00:04:42,550 --> 00:04:41,360
outside of the airlock so we don't have

123
00:04:44,629 --> 00:04:42,560
to ingress

124
00:04:47,030 --> 00:04:44,639
scott will come back with the apfr that

125
00:04:49,270 --> 00:04:47,040
we grab from the ams area and install it

126
00:04:52,390 --> 00:04:49,280
at esp2

127
00:04:54,710 --> 00:04:52,400
to perform the lead lubing the arm will

128
00:04:56,629 --> 00:04:54,720
be presented there and move in close to

129
00:04:58,469 --> 00:04:56,639
scott we have some photos of that a

130
00:05:01,510 --> 00:04:58,479
little bit later

131
00:05:03,830 --> 00:05:01,520
chell will grab that cable bag and go

132
00:05:05,990 --> 00:05:03,840
nader underneath the lab up to the porch

133
00:05:07,430 --> 00:05:06,000
side where we'll deploy the bag while

134
00:05:09,830 --> 00:05:07,440
he's doing that we're giving him kind of

135
00:05:11,830 --> 00:05:09,840
good reference hand roll holds of where

136
00:05:13,350 --> 00:05:11,840
the cable is going to be tied to or

137
00:05:15,830 --> 00:05:13,360
deployed to

138
00:05:17,590 --> 00:05:15,840

after he installs the

139
00:05:20,150 --> 00:05:17,600
the cable bag he's going to pull out the

140
00:05:22,230 --> 00:05:20,160
forward portion of the cable

141
00:05:23,510 --> 00:05:22,240
and temporarily stow it on a handrail

142
00:05:25,110 --> 00:05:23,520
that's going to give us a good point

143
00:05:27,990 --> 00:05:25,120
where the center

144
00:05:29,909 --> 00:05:28,000
line of the cable is will secure it at

145
00:05:32,390 --> 00:05:29,919
the center point and then grab the aft

146
00:05:34,390 --> 00:05:32,400
portion of the cable out of the bag and

147
00:05:35,909 --> 00:05:34,400
route it

148
00:05:38,710 --> 00:05:35,919
zenith

149
00:05:40,870 --> 00:05:38,720
on the lab over to the node where we'll

150
00:05:42,870 --> 00:05:40,880
connect the power cables up so the

151
00:05:46,230 --> 00:05:42,880
orange cable is the first one we'll do

152
00:05:47,990 --> 00:05:46,240
it is data for both ida and pma3 so

153
00:05:52,310 --> 00:05:48,000
we'll route it connect it to the data

154
00:05:53,990 --> 00:05:52,320
port and as we move back forward

155
00:05:55,830 --> 00:05:54,000
as we move back forward we'll push all

156
00:06:01,270 --> 00:05:55,840
the cable slack forward make sure we

157
00:06:04,830 --> 00:06:02,790
once he's back at the center point he's

158
00:06:06,469 --> 00:06:04,840
going to move that directly forward on

159
00:06:09,110 --> 00:06:06,479
station

160
00:06:11,510 --> 00:06:09,120
over to node 2

161
00:06:13,189 --> 00:06:11,520
and then up to the cbm

162
00:06:14,550 --> 00:06:13,199
area where we're going to deploy those

163
00:06:16,150 --> 00:06:14,560

two cables

164
00:06:17,830 --> 00:06:16,160
tucking it out of the way of any pedal

165
00:06:18,870 --> 00:06:17,840
deployments on the

166
00:06:20,469 --> 00:06:18,880
cbm

167
00:06:21,990 --> 00:06:20,479
once he's complete with the orange cable

168
00:06:23,830 --> 00:06:22,000
or the data cable we're going to go back

169
00:06:25,670 --> 00:06:23,840
and get the power cable which we call

170
00:06:27,270 --> 00:06:25,680
the purple white cable he'll do the

171
00:06:29,189 --> 00:06:27,280
exact same thing where he stows the

172
00:06:31,029 --> 00:06:29,199
forward half of the cable out

173
00:06:31,909 --> 00:06:31,039
and then routes the aft portion of the

174
00:06:33,670 --> 00:06:31,919
cable

175
00:06:35,830 --> 00:06:33,680
back towards

176
00:06:36,870 --> 00:06:35,840
node 1 where we're going to plug it in

177
00:06:39,189 --> 00:06:36,880
again

178
00:06:41,029 --> 00:06:39,199
nader of node 1.

179
00:06:42,710 --> 00:06:41,039
as he's done with that he'll move back

180
00:06:44,710 --> 00:06:42,720
forward pushing the cable forward

181
00:06:45,990 --> 00:06:44,720
getting all the slack out and back to

182
00:06:47,430 --> 00:06:46,000
the center point

183
00:06:49,350 --> 00:06:47,440
at this point joe is going to break out

184
00:06:51,589 --> 00:06:49,360
of the cables and go

185
00:06:52,390 --> 00:06:51,599
work on the mpv and while we're doing

186
00:06:54,870 --> 00:06:52,400
that

187
00:06:56,070 --> 00:06:54,880
scott's already back at the lee working

188
00:06:58,790 --> 00:06:56,080

on the

189
00:07:01,029 --> 00:06:58,800
lubricating lee b

190
00:07:02,870 --> 00:07:01,039
here's a good shot of lee a that was

191
00:07:04,150 --> 00:07:02,880
previously lubricated

192
00:07:05,830 --> 00:07:04,160
as we bring it in you can see the

193
00:07:07,830 --> 00:07:05,840
centralizing ball screw right in the

194
00:07:10,150 --> 00:07:07,840
middle and the four latches we're going

195
00:07:12,230 --> 00:07:10,160
to label those latches around clockwise

196
00:07:14,070 --> 00:07:12,240
just so we have a reference point

197
00:07:16,550 --> 00:07:14,080
one two three and four and each side has

198
00:07:18,469 --> 00:07:16,560
an a and a b side just so we can talk to

199
00:07:20,870 --> 00:07:18,479
scott while we're greasing up the

200
00:07:22,469 --> 00:07:20,880
equalization brackets and the rollers

201
00:07:24,230 --> 00:07:22,479
there's two equalization brackets and

202
00:07:26,309 --> 00:07:24,240
four rollers on each latch you can see

203
00:07:27,589 --> 00:07:26,319
them when they're extended so that's

204
00:07:30,469 --> 00:07:27,599
what we're going to grease when it's

205
00:07:35,189 --> 00:07:30,479
retracted we'll also grease the linear

206
00:07:38,550 --> 00:07:36,629
here you can see a demonstration of the

207
00:07:40,629 --> 00:07:38,560
centralizing ball screw using the ball

208
00:07:41,670 --> 00:07:40,639
screw lubricating tool or the blt as we

209
00:07:44,150 --> 00:07:41,680
call it

210
00:07:46,629 --> 00:07:44,160
he's got grease on it address it to the

211
00:07:50,390 --> 00:07:48,950
and push it forward

212
00:07:52,070 --> 00:07:50,400
and let's make sure that we have the

213
00:07:54,309 --> 00:07:52,080

grease in the grooves that we're looking

214
00:07:55,670 --> 00:07:54,319
at now this one's the easy ball screw so

215
00:07:57,270 --> 00:07:55,680
we're going to attack it first because

216
00:07:58,629 --> 00:07:57,280
it's very visible the other ones are

217
00:08:00,550 --> 00:07:58,639
blind mate

218
00:08:02,150 --> 00:08:00,560
you can look here and see just an

219
00:08:03,189 --> 00:08:02,160
indication that there is grease that's

220
00:08:05,670 --> 00:08:03,199
moved

221
00:08:07,430 --> 00:08:05,680
by seeing the ridges in the grease

222
00:08:08,710 --> 00:08:07,440
here's the blind made connector on any

223
00:08:10,710 --> 00:08:08,720
one of the latches they're all pretty

224
00:08:12,230 --> 00:08:10,720
much the same we're going to go in

225
00:08:14,710 --> 00:08:12,240
through a small cutout near the

226
00:08:20,710 --> 00:08:14,720
electrical connections go back about 12

227
00:08:24,950 --> 00:08:22,550
as he inserts it he's trying to miss any

228
00:08:27,189 --> 00:08:24,960
electronics or bolts that are in there

229
00:08:29,990 --> 00:08:27,199
once we get it into the depth which is

230
00:08:32,149 --> 00:08:30,000
the tape that's on the plt we're going

231
00:08:34,630 --> 00:08:32,159
to rotate the cradle in towards the ball

232
00:08:36,469 --> 00:08:34,640
screw once it's there then we'll apply

233
00:08:45,990 --> 00:08:36,479
grease to the ball screw that's in the

234
00:08:49,030 --> 00:08:47,430
and of course this is very easy to see

235
00:08:50,550 --> 00:08:49,040
on our trainer but really hard to see in

236
00:08:52,710 --> 00:08:50,560
space so after that we're going to go

237
00:08:56,150 --> 00:08:52,720
after those linear bearing tracks grease

238
00:08:58,790 --> 00:08:56,160

both sides of each linear bearing track

239
00:09:00,150 --> 00:08:58,800
to get grease and as the latch moves

240
00:09:03,430 --> 00:09:00,160
forward it'll pull the grease back

241
00:09:04,790 --> 00:09:03,440
through the whole linear bearing track

242
00:09:08,070 --> 00:09:04,800
after that we're going to go to the

243
00:09:10,070 --> 00:09:08,080
equalization brackets

244
00:09:11,990 --> 00:09:10,080
both inboard and outboard there are four

245
00:09:14,710 --> 00:09:12,000
points for the equalization brackets and

246
00:09:16,710 --> 00:09:14,720
four rollers on each side a side and b

247
00:09:19,030 --> 00:09:16,720
side there's two each so we'll attack

248
00:09:20,790 --> 00:09:19,040
those equalization brackets and rollers

249
00:09:22,630 --> 00:09:20,800
and after that we're complete taking

250
00:09:24,470 --> 00:09:22,640
photos and getting out of here and i

251
00:09:25,829 --> 00:09:24,480
think the next video you'll see

252
00:09:27,829 --> 00:09:25,839
is the

253
00:09:30,150 --> 00:09:27,839
arm moving in and if you look closely on

254
00:09:34,710 --> 00:09:30,160
that you can see the dots of grease that

255
00:09:38,389 --> 00:09:36,630
so on each latch you can see grease

256
00:09:40,550 --> 00:09:38,399
dropped on each roller on the

257
00:09:42,150 --> 00:09:40,560
equalization bracket

258
00:09:48,550 --> 00:09:42,160
the only thing you can see here is a

259
00:09:51,269 --> 00:09:49,750
all right when scott's done with that

260
00:09:52,630 --> 00:09:51,279
we'll clean up the workstation he's

261
00:09:53,750 --> 00:09:52,640
going to go

262
00:09:56,470 --> 00:09:53,760
uh

263
00:09:58,150 --> 00:09:56,480

nader over the lab to pick up on cables

264
00:09:59,910 --> 00:09:58,160
chell is going to pick up the mpv or

265
00:10:00,870 --> 00:09:59,920
non-propulsive vent

266
00:10:04,470 --> 00:10:00,880
go

267
00:10:06,870 --> 00:10:04,480
zenith on node 3 to the port side incone

268
00:10:08,150 --> 00:10:06,880
where we're going to install the mpv

269
00:10:10,870 --> 00:10:08,160
you'll see it here it's a really tight

270
00:10:13,269 --> 00:10:10,880
area we have the pmm that was relocated

271
00:10:14,949 --> 00:10:13,279
removed and there's a plate on it

272
00:10:16,630 --> 00:10:14,959
as removed for this video i'll show you

273
00:10:17,750 --> 00:10:16,640
just a second how tight the tolerances

274
00:10:19,590 --> 00:10:17,760
is but we're going to move that first

275
00:10:22,470 --> 00:10:19,600
plate and then put the non-propulsive

276
00:10:24,550 --> 00:10:22,480
vent back on again this is a very tight

277
00:10:26,790 --> 00:10:24,560
workspace you can see here in the mbl

278
00:10:28,389 --> 00:10:26,800
video of how tight those two modules are

279
00:10:30,069 --> 00:10:28,399
actually going to be together

280
00:10:31,430 --> 00:10:30,079
so we're using a lot of special tools to

281
00:10:33,030 --> 00:10:31,440
get that

282
00:10:34,710 --> 00:10:33,040
tied down when we get it in and

283
00:10:36,310 --> 00:10:34,720
installed

284
00:10:38,870 --> 00:10:36,320
and chell's got the longest arm so

285
00:10:40,710 --> 00:10:38,880
that's why we're sending them to the mpv

286
00:10:42,550 --> 00:10:40,720
moving scott over

287
00:10:47,269 --> 00:10:42,560
the zenith of the lab over to the port

288
00:10:51,750 --> 00:10:49,190

that shell had temporarily stowed run it

289
00:10:54,230 --> 00:10:51,760
the exact same way over the orange cable

290
00:10:55,190 --> 00:10:54,240
and that's our power cable deployed back

291
00:10:57,670 --> 00:10:55,200
on

292
00:11:00,470 --> 00:10:57,680
the handrails getting ready for cbm pma

293
00:11:01,990 --> 00:11:00,480
move and ida install once we're done

294
00:11:03,590 --> 00:11:02,000
with that we'll clean up the work sites

295
00:11:06,150 --> 00:11:03,600
and head back to the airlock that's

296
00:11:06,870 --> 00:11:06,160
about a six and a half hour eva