1
00:00:06,950 --> 00:00:04,309
for us eva 33 both crew members will

2
00:00:08,790 --> 00:00:06,960
start out at the u.s joint airlock we

3
00:00:10,950 --> 00:00:08,800
have chell here in the suit with the red

4
00:00:12,950 --> 00:00:10,960
stripes and scott will have the suit

5
00:00:14,549 --> 00:00:12,960
with the white stripes scott will bring

6
00:00:16,230 --> 00:00:14,559
out a crew lock bag that has all the

7
00:00:18,310 --> 00:00:16,240
tools from inside the space station that

8
00:00:20,070 --> 00:00:18,320
they'll need to use on this eva

9
00:00:21,750 --> 00:00:20,080
chell will pick out a vent tool bag

10
00:00:22,630 --> 00:00:21,760
that's on the zenith portion of the crew

11
00:00:25,509 --> 00:00:22,640
lock

12
00:00:27,269 --> 00:00:25,519
and he'll take that out to the work site

13
00:00:29,269 --> 00:00:27,279

from here he'll head all the way out to

14
00:00:30,390 --> 00:00:29,279
p6 and you'll set up what we call a

15
00:00:32,069 --> 00:00:30,400
slingshot

16
00:00:34,310 --> 00:00:32,079
it's a way to get the maximum length out

17
00:00:36,229 --> 00:00:34,320
of your tether

18
00:00:37,910 --> 00:00:36,239
he'll translate out to p6 pass the

19
00:00:40,869 --> 00:00:37,920
trailing thermal control radiator the

20
00:00:44,470 --> 00:00:40,879
ticker he'll stow the vent tool bag at

21
00:00:49,110 --> 00:00:47,270
and this will be set up later in the eva

22
00:00:52,310 --> 00:00:49,120
and then he'll head over to the fluid

23
00:00:53,590 --> 00:00:52,320
quick disconnect coupler

24
00:00:55,990 --> 00:00:53,600
scott will be right behind him they'll

25
00:00:57,430 --> 00:00:56,000
work together to remove a cover here and

26
00:00:59,910 --> 00:00:57,440
then they'll drive a bolt which will

27
00:01:01,670 --> 00:00:59,920
open a valve and allow flow into the

28
00:01:06,310 --> 00:01:01,680
photovoltaic radiator that you see on

29
00:01:08,950 --> 00:01:07,750
they'll work together to get the cover

30
00:01:11,270 --> 00:01:08,960
back on

31
00:01:12,950 --> 00:01:11,280
and then scott will head over to the p3

32
00:01:15,109 --> 00:01:12,960
p4 jumper

33
00:01:17,270 --> 00:01:15,119
and then chell will stay behind at this

34
00:01:19,109 --> 00:01:17,280
work site and he'll break the connection

35
00:01:21,109 --> 00:01:19,119
close the valves that link the

36
00:01:22,710 --> 00:01:21,119
photovoltaic thermal control system and

37
00:01:24,469 --> 00:01:22,720
the early external thermal control

38
00:01:27,429 --> 00:01:24,479

system

39
00:01:31,030 --> 00:01:27,439
i'll install one of those jumpers

40
00:01:33,190 --> 00:01:31,040
to keep it protected for the future

41
00:01:35,270 --> 00:01:33,200
here we have scott at the solar alpha

42
00:01:37,030 --> 00:01:35,280
rotary joint he's going to install the

43
00:01:38,870 --> 00:01:37,040
jumper across

44
00:01:44,789 --> 00:01:38,880
across the sarge

45
00:01:48,310 --> 00:01:46,469
and meanwhile chell is going to start

46
00:01:49,910 --> 00:01:48,320
setting up the vent tool and vent tool

47
00:01:51,590 --> 00:01:49,920
extender

48
00:01:52,789 --> 00:01:51,600
now we want to have this set up we're

49
00:01:55,109 --> 00:01:52,799
going to make sure that it's in good

50
00:01:56,469 --> 00:01:55,119
working order before we begin the fill

51
00:01:58,149 --> 00:01:56,479
we're going to need to vent the fill

52
00:02:00,789 --> 00:01:58,159
line to

53
00:02:02,069 --> 00:02:00,799
prevent over pressurization

54
00:02:05,109 --> 00:02:02,079
so we don't want to lock that line up

55
00:02:08,630 --> 00:02:06,950
at this point we'll be ready to start

56
00:02:11,910 --> 00:02:08,640
the fill we have scott over at the

57
00:02:13,589 --> 00:02:11,920
ammonia tank he'll reposition a jumper

58
00:02:15,830 --> 00:02:13,599
and that will route ammonia from the

59
00:02:17,990 --> 00:02:15,840
ammonia tank into the fill line

60
00:02:19,430 --> 00:02:18,000
after a short leap check

61
00:02:20,790 --> 00:02:19,440
as long as everything is successful

62
00:02:25,350 --> 00:02:20,800
there we'll have

63
00:02:27,510 --> 00:02:25,360

a chell mate the p5 p6 jumper over to p6

64
00:02:32,949 --> 00:02:27,520
and this will start the fill of the

65
00:02:37,190 --> 00:02:34,790
from there he'll head back over to the

66
00:02:39,030 --> 00:02:37,200
early ammonia servicer jumpers he'll

67
00:02:39,830 --> 00:02:39,040
open a valve and that will initiate the

68
00:02:41,589 --> 00:02:39,840
fill

69
00:02:42,630 --> 00:02:41,599
of the photovoltaic thermal control

70
00:02:44,869 --> 00:02:42,640
system

71
00:02:46,869 --> 00:02:44,879
we expect this to take about 20 minutes

72
00:02:48,949 --> 00:02:46,879
so while that fill is going on we're

73
00:02:51,190 --> 00:02:48,959
going to have chell retract the trailing

74
00:02:53,670 --> 00:02:51,200
thermal control radiator he'll be using

75
00:02:55,830 --> 00:02:53,680
a pistol grip tool which is basically an

76
00:02:58,470 --> 00:02:55,840
eva version of a cordless drill will

77
00:03:03,589 --> 00:02:58,480
drive a bolt about 50 turns and it'll

78
00:03:08,630 --> 00:03:06,070
once this is complete we expect the

79
00:03:10,470 --> 00:03:08,640
the fill to be finished as well

80
00:03:13,509 --> 00:03:10,480
so chow will head back to the early

81
00:03:15,350 --> 00:03:13,519
ammonia servicer jumpers one last time

82
00:03:17,830 --> 00:03:15,360
he'll close that connection between the

83
00:03:19,430 --> 00:03:17,840
two systems and stow them in a safe

84
00:03:23,110 --> 00:03:19,440
configuration

85
00:03:25,350 --> 00:03:23,120
and leave those two systems isolated

86
00:03:26,869 --> 00:03:25,360
he'll then pick up the bags that scott

87
00:03:28,710 --> 00:03:26,879
left behind there he'll move him to a

88
00:03:30,550 --> 00:03:28,720

new location that's more convenient for

89
00:03:32,869 --> 00:03:30,560
this portion of the eva

90
00:03:34,869 --> 00:03:32,879
and then he'll head down to the p5 p6

91
00:03:37,110 --> 00:03:34,879
jumper he'll break that connection in

92
00:03:39,350 --> 00:03:37,120
the fill line and route that to the vent

93
00:03:47,270 --> 00:03:39,360
tool and vent tool extender and this

94
00:03:51,110 --> 00:03:49,350
so you can see here the vent tool invent

95
00:03:53,589 --> 00:03:51,120
tool extender you see a cone showing

96
00:03:55,350 --> 00:03:53,599
where we expect to vent out the ammonia

97
00:03:56,830 --> 00:03:55,360
from the system

98
00:03:59,589 --> 00:03:56,840
here you can see some footage from

99
00:04:01,670 --> 00:03:59,599
sts-134 where drew feustel did the exact

100
00:04:04,229 --> 00:04:01,680
same task they did a fill of this system

101
00:04:06,309 --> 00:04:04,239
as well you can see he just opened the

102
00:04:07,670 --> 00:04:06,319
valve to the vent tool

103
00:04:09,509 --> 00:04:07,680
and you'll see him look back over his

104
00:04:11,509 --> 00:04:09,519
shoulder and you can see the venting of

105
00:04:15,350 --> 00:04:11,519
ammonia out of the system so we expect

106
00:04:17,189 --> 00:04:15,360
to have a very similar view on us eva 33

107
00:04:19,270 --> 00:04:17,199
expect that event to take about 17

108
00:04:20,789 --> 00:04:19,280
minutes to fully get all the ammonia out

109
00:04:22,550 --> 00:04:20,799
of the line

110
00:04:24,629 --> 00:04:22,560
meanwhile we'll have scott head over to

111
00:04:26,469 --> 00:04:24,639
the starboard cetacart he'll be

112
00:04:28,790 --> 00:04:26,479
reconfiguring this cedar cart so that we

113
00:04:31,590 --> 00:04:28,800

can take the mobile transporter to work

114
00:04:33,430 --> 00:04:31,600
site one and still rotate the sarge

115
00:04:38,950 --> 00:04:33,440
so he's going to fold over two brake

116
00:04:42,230 --> 00:04:40,230
from there he'll move over to the

117
00:04:44,710 --> 00:04:42,240
coupler he'll remove that and he'll

118
00:04:46,310 --> 00:04:44,720
attach it to the swing arm

119
00:04:48,230 --> 00:04:46,320
and he'll drive four bolts to release

120
00:04:49,909 --> 00:04:48,240
the swing arm and will now have the

121
00:04:51,430 --> 00:04:49,919
cedar card in a good configuration to go

122
00:04:53,270 --> 00:04:51,440
to work site one

123
00:04:54,310 --> 00:04:53,280
he'll translate to the aft side of

124
00:04:55,830 --> 00:04:54,320
station

125
00:04:57,909 --> 00:04:55,840
near the ammonia tank where he was

126
00:05:00,070 --> 00:04:57,919
working earlier

127
00:05:01,590 --> 00:05:00,080
and he'll stow that swing arm on a tool

128
00:05:03,590 --> 00:05:01,600
we call the terra

129
00:05:05,189 --> 00:05:03,600
this is a tool we haven't really used it

130
00:05:07,110 --> 00:05:05,199
all in the past but we finally found a

131
00:05:10,469 --> 00:05:07,120
use for it a stowage location for this

132
00:05:13,590 --> 00:05:11,909
so he'll stow it there then both crew

133
00:05:16,070 --> 00:05:13,600
members will head back to the solar

134
00:05:17,830 --> 00:05:16,080
alpha rotary joint now we've seen some

135
00:05:19,430 --> 00:05:17,840
vibrations in the data that we get down

136
00:05:22,150 --> 00:05:19,440
to the ground and we think that's

137
00:05:23,590 --> 00:05:22,160
because there's a strut that's loose

138
00:05:25,270 --> 00:05:23,600

so the crew members are going to both

139
00:05:27,189 --> 00:05:25,280
work and they're going to drive a bolt

140
00:05:29,110 --> 00:05:27,199
on two different struts i think it'll

141
00:05:30,550 --> 00:05:29,120
just be a fraction of a turn but

142
00:05:33,590 --> 00:05:30,560
hopefully that'll fix the vibration

143
00:05:37,189 --> 00:05:35,990
we'll then have scott head forward

144
00:05:40,150 --> 00:05:37,199
he'll remove

145
00:05:42,150 --> 00:05:40,160
the p3 p4 jumper across the sarge once

146
00:05:43,430 --> 00:05:42,160
this is removed and stowed we'll be able

147
00:05:45,270 --> 00:05:43,440
to rotate the

148
00:05:49,670 --> 00:05:45,280
solar alpha rotary joint again at the

149
00:05:55,110 --> 00:05:51,430
and chad will begin work on cleaning up

150
00:05:56,870 --> 00:05:55,120
the vent tool and vent tool extender

151
00:05:58,790 --> 00:05:56,880
again all the ammonia has been vented

152
00:06:01,749 --> 00:05:58,800
out of these lines at this point

153
00:06:04,710 --> 00:06:01,759
so he'll demate the p5 to p6 jumper from

154
00:06:06,390 --> 00:06:04,720
the vent tool he'll stow that on a dummy

155
00:06:10,150 --> 00:06:06,400
and then he'll begin coiling up the vent

156
00:06:14,390 --> 00:06:12,629
he'll pack that all back in its bag this

157
00:06:15,909 --> 00:06:14,400
is a bag that remains outside because it

158
00:06:17,990 --> 00:06:15,919
has ammonia in it we don't want to bring

159
00:06:19,350 --> 00:06:18,000
that back inside so he'll

160
00:06:21,749 --> 00:06:19,360
move that back to the airlock at the end

161
00:06:23,990 --> 00:06:21,759
of the eva

162
00:06:25,830 --> 00:06:24,000
now both crew members will meet up

163
00:06:28,550 --> 00:06:25,840

at the ticker and they'll work together

164
00:06:30,390 --> 00:06:28,560
to install six cinches

165
00:06:32,230 --> 00:06:30,400
so these cinches will compress the

166
00:06:34,189 --> 00:06:32,240
radiator hold it into place prevent it

167
00:06:36,550 --> 00:06:34,199
from being damaged here you can see on

168
00:06:38,790 --> 00:06:36,560
uscva7 the compression the crew needs to

169
00:06:40,550 --> 00:06:38,800
do in order to get a cinch installed i

170
00:06:42,790 --> 00:06:40,560
think it's about 10 pounds of force to

171
00:06:44,710 --> 00:06:42,800
push down on that radiator the crew will

172
00:06:47,270 --> 00:06:44,720
then work together to install a thermal

173
00:06:49,830 --> 00:06:47,280
cover over the ticker this will protect

174
00:06:51,670 --> 00:06:49,840
it from extreme thermal environments

175
00:06:53,909 --> 00:06:51,680
here we see a crew member working in one

176
00:06:56,070 --> 00:06:53,919
of our nbl training sessions

177
00:06:57,990 --> 00:06:56,080
to get that thermal cover installed over

178
00:06:59,350 --> 00:06:58,000
the ticker

179
00:07:00,950 --> 00:06:59,360
definitely something that it takes two

180
00:07:03,990 --> 00:07:00,960
people to do there is another crew

181
00:07:05,990 --> 00:07:04,000
member in the the top view here so one

182
00:07:07,749 --> 00:07:06,000
guy zenith one guy nader

183
00:07:09,990 --> 00:07:07,759
both crew members will pick up their

184
00:07:12,710 --> 00:07:10,000
respective bags and head back in to the

185
00:07:14,629 --> 00:07:12,720
airlock here we see scott with the vent

186
00:07:17,189 --> 00:07:14,639
tool extender bag he'll stow that on the

187
00:07:19,029 --> 00:07:17,199
zenith portion of the airlock

188
00:07:21,110 --> 00:07:19,039

chell will then on his way back in

189
00:07:22,150 --> 00:07:21,120
reconfigure the jumper at the ammonia

190
00:07:23,990 --> 00:07:22,160
tank

191
00:07:25,430 --> 00:07:24,000
he'll move it to the vent position in

192
00:07:27,189 --> 00:07:25,440
case we ever do get an over

193
00:07:29,589 --> 00:07:27,199
pressurization in the system we have the

194
00:07:31,749 --> 00:07:29,599
ability to vent overboard if we never

195
00:07:33,589 --> 00:07:31,759
needed to do that

196
00:07:34,710 --> 00:07:33,599
chow will then translate back towards

197
00:07:36,710 --> 00:07:34,720
the airlock

198
00:07:38,790 --> 00:07:36,720
he'll pick up scott's tether at the

199
00:07:42,790 --> 00:07:38,800
slingshot location

200
00:07:47,270 --> 00:07:44,550
and he'll have the two crew lock bags

201
00:07:49,270 --> 00:07:47,280
with him that are bundled together