



1  
00:00:06,590 --> 00:00:04,880  
so starting out for us EBA 31 Terry will

2  
00:00:09,470 --> 00:00:06,600  
come out first he'll be the lead

3  
00:00:12,200 --> 00:00:09,480  
spacewalker wearing the suit with the

4  
00:00:14,509 --> 00:00:12,210  
red stripes butch will pass out the

5  
00:00:15,049 --> 00:00:14,519  
large oru bag with the four cable reels

6  
00:00:17,990 --> 00:00:15,059  
in it

7  
00:00:20,810 --> 00:00:18,000  
he'll also pass out the larger of the

8  
00:00:22,250 --> 00:00:20,820  
two booms the p3 boom and butch will

9  
00:00:23,689 --> 00:00:22,260  
come out with the shorter of the two

10  
00:00:26,300 --> 00:00:23,699  
booms that will be going on the

11  
00:00:28,370 --> 00:00:26,310  
starboard side here you see both booms

12  
00:00:30,200 --> 00:00:28,380  
the boom on the bottom is the port boom

13  
00:00:32,060 --> 00:00:30,210

that Terry will bring out it has a

14

00:00:34,580 --> 00:00:32,070

reflector bag and an antenna bag

15

00:00:36,260 --> 00:00:34,590

attached to it the boom at the top of

16

00:00:37,729 --> 00:00:36,270

the page is the starboard boom that

17

00:00:40,160 --> 00:00:37,739

butch will bring out and it has an

18

00:00:43,069 --> 00:00:40,170

antenna bag on it here you see the

19

00:00:44,720 --> 00:00:43,079

antenna bag the hi-fi hardware we

20

00:00:46,910 --> 00:00:44,730

configure the antennas in this way to

21

00:00:49,310 --> 00:00:46,920

protect the delicate surface on the end

22

00:00:51,319 --> 00:00:49,320

of the antennas here you see an antenna

23

00:00:52,850 --> 00:00:51,329

in the upper right hand corner that

24

00:00:54,799 --> 00:00:52,860

white surface is the area that we're

25

00:00:56,510 --> 00:00:54,809

trying to protect we also have a

26

00:00:58,430 --> 00:00:56,520

protective cover that will be installed

27

00:01:02,000 --> 00:00:58,440

on it now you see that cover at the top

28

00:01:03,410 --> 00:01:02,010

of the screen here at this point both

29

00:01:05,990 --> 00:01:03,420

crew members will head to their

30

00:01:08,179 --> 00:01:06,000

respective work sites butch will head

31

00:01:11,030 --> 00:01:08,189

Harb will head starboard and here you

32

00:01:14,060 --> 00:01:11,040

see Terry headed port Kerry will

33

00:01:15,590 --> 00:01:14,070

translate over the rat's nest we call it

34

00:01:19,880 --> 00:01:15,600

that because of all the cabling in the

35

00:01:23,840 --> 00:01:19,890

area so he'll continue out to the p3 or

36

00:01:26,330 --> 00:01:23,850

port 3 truss there he'll install his

37

00:01:29,149 --> 00:01:26,340

boom into a worksite interface or width

38

00:01:30,969 --> 00:01:29,159

this width is typically used for foot

39

00:01:33,289 --> 00:01:30,979

restraints for crew members but this

40

00:01:37,219 --> 00:01:33,299

Hardware has been adapted to install

41

00:01:38,929 --> 00:01:37,229

into this mechanism once he gets the

42

00:01:42,710 --> 00:01:38,939

boom installed Terry will remove both

43

00:01:48,560 --> 00:01:42,720

bags and stow those on structure he'll

44

00:01:50,690 --> 00:01:48,570

then open up the antenna bag you see

45

00:01:52,880 --> 00:01:50,700

that opening up here flashing he'll

46

00:01:55,340 --> 00:01:52,890

remove both antennas and install them on

47

00:01:57,380 --> 00:01:55,350

the boom from there he'll remove the

48

00:01:59,780 --> 00:01:57,390

protective cover from the antennas and

49

00:02:01,459 --> 00:01:59,790

stow those in the crew lock bag here you

50

00:02:03,289 --> 00:02:01,469

see the antennas and their final

51  
00:02:05,270 --> 00:02:03,299  
configuration we have both antennas

52  
00:02:07,130 --> 00:02:05,280  
installed now we also have

53  
00:02:08,930 --> 00:02:07,140  
retroreflectors installed we're going to

54  
00:02:11,119 --> 00:02:08,940  
wait till the end of the EBA to get

55  
00:02:13,580 --> 00:02:11,129  
these installed because they're delicate

56  
00:02:13,940 --> 00:02:13,590  
and we want to protect the glass on

57  
00:02:17,690 --> 00:02:13,950  
those

58  
00:02:19,339 --> 00:02:17,700  
reflectors so meanwhile while Terry is

59  
00:02:21,949 --> 00:02:19,349  
working on the portside butch will head

60  
00:02:25,009 --> 00:02:21,959  
out to the starboard side he'll head out

61  
00:02:26,869 --> 00:02:25,019  
to s3 or the starboard 3 truss he'll

62  
00:02:31,520 --> 00:02:26,879  
install the shorter of the two booms and

63  
00:02:34,009 --> 00:02:31,530

s3 with 13 once he gets that installed

64

00:02:36,080 --> 00:02:34,019

he'll move his crew lock bag with

65

00:02:38,780 --> 00:02:36,090

antennas in it off to a handrail and

66

00:02:41,600 --> 00:02:38,790

then he'll open up that bag and install

67

00:02:43,880 --> 00:02:41,610

both antennas into the boom he'll use a

68

00:02:47,509 --> 00:02:43,890

pip pin or pull and pull out pin to

69

00:02:48,920 --> 00:02:47,519

secure these to the boom once both are

70

00:02:52,520 --> 00:02:48,930

installed he'll remove the protective

71

00:02:54,289 --> 00:02:52,530

covering from the antennas this point

72

00:02:55,789 --> 00:02:54,299

he'll close up the bag and leave it at

73

00:02:57,910 --> 00:02:55,799

the worksite because we'll use it to

74

00:03:00,170 --> 00:02:57,920

bring back in caps later in the evie a

75

00:03:04,600 --> 00:03:00,180

so at this point both crew members will

76  
00:03:09,110 --> 00:03:07,100  
here you see butch headed back to the

77  
00:03:11,600 --> 00:03:09,120  
large or you bag this contains the four

78  
00:03:13,940 --> 00:03:11,610  
cable reels that will be deployed during

79  
00:03:16,460 --> 00:03:13,950  
the e VA he's going to move this bag to

80  
00:03:19,490 --> 00:03:16,470  
the u.s. laboratory to get it in close

81  
00:03:22,960 --> 00:03:19,500  
proximity to the debris shield that the

82  
00:03:25,340 --> 00:03:22,970  
C too busy to be - system connects under

83  
00:03:27,490 --> 00:03:25,350  
so here you see Butch and Terry working

84  
00:03:29,930 --> 00:03:27,500  
together to remove the debris shield

85  
00:03:32,809 --> 00:03:29,940  
they'll demate a connector under that

86  
00:03:36,080 --> 00:03:32,819  
shield and make the c2v2 connector and

87  
00:03:38,840 --> 00:03:36,090  
then reintegrate as a j.7 connector that

88  
00:03:40,610 --> 00:03:38,850

they D made it into the ctv - cable here

89

00:03:43,670 --> 00:03:40,620

you see the j7 connector that the crew

90

00:03:48,349 --> 00:03:43,680

will demate this actually runs to GPS

91

00:03:50,420 --> 00:03:48,359

and kayuu band antennas here you see the

92

00:03:52,009 --> 00:03:50,430

ctv - connector the connector on the

93

00:03:53,870 --> 00:03:52,019

left is the one that will attach

94

00:03:57,229 --> 00:03:53,880

underneath the shield the one on the

95

00:04:01,069 --> 00:03:57,239

right will reintegrate the GPS and kayuu

96

00:04:05,870 --> 00:04:01,079

band system the crew will then work

97

00:04:07,879 --> 00:04:05,880

together to reinstall the shield at this

98

00:04:09,949 --> 00:04:07,889

point butch will head over to the larger

99

00:04:13,129 --> 00:04:09,959

or you bag and he'll retrieve two cable

100

00:04:17,779 --> 00:04:13,139

reels he'll hand one to Terry and he'll

101  
00:04:20,659 --> 00:04:17,789  
keep one for himself and they'll get

102  
00:04:22,880 --> 00:04:20,669  
ready to route the port legs here you

103  
00:04:24,800 --> 00:04:22,890  
see four of the cable bags these bags

104  
00:04:26,420 --> 00:04:24,810  
are all tied together by one connector

105  
00:04:28,010 --> 00:04:26,430  
that you see at the bottom of the

106  
00:04:30,379 --> 00:04:28,020  
a cheer that connects underneath the

107  
00:04:32,870 --> 00:04:30,389  
shield here you see the 100 feet of

108  
00:04:35,510 --> 00:04:32,880  
cable coiled up inside of one of the

109  
00:04:37,700 --> 00:04:35,520  
bags as I mentioned both crew members

110  
00:04:40,460 --> 00:04:37,710  
will be getting set to head out port for

111  
00:04:42,110 --> 00:04:40,470  
their routing this graphic shows the two

112  
00:04:44,330 --> 00:04:42,120  
legs at route port which they'll take

113  
00:04:46,580 --> 00:04:44,340

care of first now once that's complete

114

00:04:49,999 --> 00:04:46,590

they'll route the to starboard legs that

115

00:04:50,659 --> 00:04:50,009

head out to s3 so Terry will head out

116

00:04:53,379 --> 00:04:50,669

first

117

00:04:56,689 --> 00:04:53,389

he'll translate over the rat's nest

118

00:05:04,040 --> 00:04:56,699

he'll be taking the aft translation path

119

00:05:05,810 --> 00:05:04,050

on the port side of the truss and along

120

00:05:09,050 --> 00:05:05,820

the way he'll be securing this cable

121

00:05:11,270 --> 00:05:09,060

with copper wire ties and that will

122

00:05:12,950 --> 00:05:11,280

secure the cable to handrails to make

123

00:05:16,339 --> 00:05:12,960

sure that it doesn't move and cause any

124

00:05:19,400 --> 00:05:16,349

issues once he arrives at the boom he'll

125

00:05:20,629 --> 00:05:19,410

remove two caps from the antennas these

126

00:05:22,610 --> 00:05:20,639

are to protect the electrical

127

00:05:25,210 --> 00:05:22,620

connections he'll then remove the

128

00:05:27,860 --> 00:05:25,220

remaining slack out of his cable bag and

129

00:05:32,149 --> 00:05:27,870

then he will mate that cable to the

130

00:05:35,420 --> 00:05:32,159

inboard antenna meanwhile butch will be

131

00:05:37,790 --> 00:05:35,430

following Terry about 20 feet behind you

132

00:05:39,980 --> 00:05:37,800

can see his cable routing path here as

133

00:05:41,990 --> 00:05:39,990

he translated out translates along the

134

00:05:45,439 --> 00:05:42,000

rat's nest he'll be actually putting

135

00:05:48,110 --> 00:05:45,449

both sets of cables into one set of wire

136

00:05:50,060 --> 00:05:48,120

ties until he gets to the point that you

137

00:05:52,939 --> 00:05:50,070

see here at this point butch will break

138

00:05:56,510 --> 00:05:52,949

off and start routing his cable on the

139

00:05:59,029 --> 00:05:56,520

forward path along the nadir side of the

140

00:06:01,399 --> 00:05:59,039

port truss this will separate both

141

00:06:03,860 --> 00:06:01,409

cables by about 18 inches and it'll

142

00:06:05,620 --> 00:06:03,870

protect the system from being taken out

143

00:06:08,450 --> 00:06:05,630

by a single debris strike

144

00:06:10,219 --> 00:06:08,460

so once butch arrives he'll hand his

145

00:06:12,589 --> 00:06:10,229

cable off to Terry he'll make that to

146

00:06:15,950 --> 00:06:12,599

the outboard antenna completing the

147

00:06:17,450 --> 00:06:15,960

connections on the port side so the last

148

00:06:20,659 --> 00:06:17,460

thing to do with this worksite will be

149

00:06:24,140 --> 00:06:20,669

to install two retroreflectors onto the

150

00:06:26,029 --> 00:06:24,150

boom Terry will take care of that here

151  
00:06:28,159 --> 00:06:26,039  
you see the reflectors that will be used

152  
00:06:30,620 --> 00:06:28,169  
during this EBA it's used for visiting

153  
00:06:32,120 --> 00:06:30,630  
vehicle range-finding you also see the

154  
00:06:33,649 --> 00:06:32,130  
delicate glass surfaces that we're

155  
00:06:35,450 --> 00:06:33,659  
trying to protect and that's why we want

156  
00:06:38,489 --> 00:06:35,460  
to install these last thing before we

157  
00:06:42,579 --> 00:06:40,689  
at this point they'll start cleaning up

158  
00:06:45,070 --> 00:06:42,589  
this worksite Terry will take the

159  
00:06:49,059 --> 00:06:45,080  
reflector bag and bundle that to his

160  
00:06:50,799 --> 00:06:49,069  
empty cable reel bag butch will take the

161  
00:06:52,959 --> 00:06:50,809  
antenna bag and he'll bundle that with

162  
00:06:55,269 --> 00:06:52,969  
his empty cable reel bag both crew

163  
00:06:56,199 --> 00:06:55,279

members will head back to the u.s.

164

00:06:58,329 --> 00:06:56,209

laboratory

165

00:07:00,850 --> 00:06:58,339

they'll stow their empty reel bags and

166

00:07:03,540 --> 00:07:00,860

the empty crew lock bag and the large

167

00:07:06,879 --> 00:07:03,550

hour.you bag and they'll both pick up a

168

00:07:10,899 --> 00:07:06,889

cable reel and this time they'll head

169

00:07:13,149 --> 00:07:10,909

out starboard butch will leave this time

170

00:07:16,899 --> 00:07:13,159

and here we see Butch's translation path

171

00:07:20,399 --> 00:07:16,909

he'll take the aft path out to s3 and

172

00:07:23,889 --> 00:07:20,409

Terry will be taking the forward path

173

00:07:26,309 --> 00:07:23,899

once a butch arrives at s3 he'll get

174

00:07:30,129 --> 00:07:26,319

ready to remove the two protective caps

175

00:07:34,809 --> 00:07:30,139

from the antenna he'll stow those in the

176

00:07:37,829 --> 00:07:34,819

crew lock bag then he'll remove their

177

00:07:41,049 --> 00:07:37,839

remaining slack out of his bag and

178

00:07:42,730 --> 00:07:41,059

attach that to the inboard antenna at

179

00:07:45,189 --> 00:07:42,740

this time Terry should be arriving at

180

00:07:47,889 --> 00:07:45,199

the work site he'll drop off the

181

00:07:49,929 --> 00:07:47,899

reflector bag and leave that for butch

182

00:07:52,689 --> 00:07:49,939

he'll then pick up the crew lock bag

183

00:07:54,969 --> 00:07:52,699

that now has caps and protective covers

184

00:07:57,549 --> 00:07:54,979

in it and he'll bundle that with his

185

00:07:59,109 --> 00:07:57,559

empty cable reel bag Terry will then

186

00:08:01,809 --> 00:07:59,119

pull out the remaining slack of his

187

00:08:04,209 --> 00:08:01,819

cable hand that off to Butch and butch

188

00:08:07,299 --> 00:08:04,219

will mate the final connection to the

189

00:08:12,549 --> 00:08:07,309

CTV 2 system the outboard connector on

190

00:08:14,649 --> 00:08:12,559

the starboard boom at this point Terry

191

00:08:16,600 --> 00:08:14,659

will head back towards the airlock he'll

192

00:08:17,169 --> 00:08:16,610

take his empty reel bag and crew lock

193

00:08:19,089 --> 00:08:17,179

bag

194

00:08:21,339 --> 00:08:19,099

he'll stow those into the large overyou

195

00:08:25,659 --> 00:08:21,349

bag and get this ready to bring back

196

00:08:28,179 --> 00:08:25,669

inside meanwhile butch will finish up

197

00:08:30,519 --> 00:08:28,189

out on the starboard truss he'll install

198

00:08:33,730 --> 00:08:30,529

the final retroreflector onto the

199

00:08:36,759 --> 00:08:33,740

starboard boom once this is complete

200

00:08:39,429 --> 00:08:36,769

he'll take the empty reflector bag and

201

00:08:41,379 --> 00:08:39,439

he'll stow that on his cable reel bag

202

00:08:43,300 --> 00:08:41,389

and head back to the airlock

203

00:08:46,120 --> 00:08:43,310

butch will ingress first with those two

204

00:08:49,740 --> 00:08:46,130

bags then Terry will pass in his large

205

00:08:51,070 --> 00:08:49,750

oru bag and then Terry will ingress and