



1
00:00:04,150 --> 00:00:01,910
good afternoon welcome back to mission

2
00:00:05,990 --> 00:00:04,160
control here in houston uh joining me is

3
00:00:09,190 --> 00:00:06,000
our lead uh spacewalk flight director

4
00:00:10,790 --> 00:00:09,200
for today royce renfrew rice uh

5
00:00:12,789 --> 00:00:10,800
if you could uh take a moment to

6
00:00:15,270 --> 00:00:12,799
summarize uh today's spacewalk

7
00:00:17,750 --> 00:00:15,280
activities uh and the events that led up

8
00:00:20,230 --> 00:00:17,760
to and uh required an early termination

9
00:00:23,189 --> 00:00:20,240
to the spacewalk sure so

10
00:00:26,230 --> 00:00:24,790
what i said to the team before we went

11
00:00:28,150 --> 00:00:26,240
out the hatch

12
00:00:30,070 --> 00:00:28,160
and i said this in the

13
00:00:32,150 --> 00:00:30,080

every eba i've done the one in december

14

00:00:34,310 --> 00:00:32,160

it was the same speech was that

15

00:00:36,150 --> 00:00:34,320

the objective that we have today is to

16

00:00:37,670 --> 00:00:36,160

take the crew outside the hatch and

17

00:00:40,229 --> 00:00:37,680

bring them back in

18

00:00:41,590 --> 00:00:40,239

and somewhere in between the depress and

19

00:00:43,910 --> 00:00:41,600

the repress we're going to do some other

20

00:00:46,869 --> 00:00:43,920

things but the primary objective is to

21

00:00:49,029 --> 00:00:46,879

get the crew back inside the hatch safe

22

00:00:51,430 --> 00:00:49,039

and that's what we're all focused on

23

00:00:53,750 --> 00:00:51,440

and that's exactly what we did today we

24

00:00:57,110 --> 00:00:53,760

we went outside we did a couple of tasks

25

00:00:59,670 --> 00:00:57,120

there the suit started talking to us

26
00:01:02,229 --> 00:00:59,680
we had a co2 sensor that went fritzzy on

27
00:01:03,270 --> 00:01:02,239
us and then a little bit later in the

28
00:01:04,950 --> 00:01:03,280
eva

29
00:01:06,870 --> 00:01:04,960
tim copper started seeing some water on

30
00:01:08,870 --> 00:01:06,880
his visor those are all indications that

31
00:01:10,870 --> 00:01:08,880
we have some water carry over in that

32
00:01:12,870 --> 00:01:10,880
emu i'm not going to try to diagnose the

33
00:01:15,030 --> 00:01:12,880
problem that i had with the emu today

34
00:01:16,550 --> 00:01:15,040
was very similar to the one that we that

35
00:01:18,710 --> 00:01:16,560
we've had before where we had water

36
00:01:20,070 --> 00:01:18,720
carry over into the helmet

37
00:01:21,990 --> 00:01:20,080
i made the call

38
00:01:24,390 --> 00:01:22,000

after we started getting some water on

39

00:01:27,670 --> 00:01:24,400

the visor to terminate the eva

40

00:01:30,149 --> 00:01:27,680

we bought uh both crew back inside uh uh

41

00:01:32,390 --> 00:01:30,159

ran the expedited suit off for uh tim

42

00:01:34,390 --> 00:01:32,400

copra to get him out of his helmet

43

00:01:35,670 --> 00:01:34,400

anyway and then uh

44

00:01:38,149 --> 00:01:35,680

then we

45

00:01:41,749 --> 00:01:38,159

strolled back to our normal

46

00:01:43,429 --> 00:01:41,759

egress and post eva procedures for tim

47

00:01:45,190 --> 00:01:43,439

peake and tim copper after that after we

48

00:01:47,109 --> 00:01:45,200

got his helmet off we did do some

49

00:01:48,950 --> 00:01:47,119

collections some sample collection we we

50

00:01:51,910 --> 00:01:48,960

got some of the water out of the helmet

51
00:01:54,310 --> 00:01:51,920
the the helmet a high absorbent pad

52
00:01:56,550 --> 00:01:54,320
that's inside the helmet now we

53
00:01:57,830 --> 00:01:56,560
collected that we used a syringe to pick

54
00:01:59,350 --> 00:01:57,840
up some water that was in there took a

55
00:02:01,910 --> 00:01:59,360
bunch of pictures

56
00:02:03,350 --> 00:02:01,920
looked at the the lcvg that tim was

57
00:02:04,789 --> 00:02:03,360
wearing after he came out looked at his

58
00:02:06,550 --> 00:02:04,799
drink bag looked at a bunch of different

59
00:02:07,990 --> 00:02:06,560
stuff so we

60
00:02:09,749 --> 00:02:08,000
coordinating with our friends down in

61
00:02:11,750 --> 00:02:09,759
the mur our engineering counterparts uh

62
00:02:14,630 --> 00:02:11,760
try to get as much data gathering off of

63
00:02:16,070 --> 00:02:14,640

uh this emu as we could so that going

64

00:02:17,670 --> 00:02:16,080

forward we can go figure out what

65

00:02:19,910 --> 00:02:17,680

happened to this uh

66

00:02:22,710 --> 00:02:19,920

what happened on this eva to this emu so

67

00:02:24,390 --> 00:02:22,720

we can prevent that in the future rice a

68

00:02:26,229 --> 00:02:24,400

great deal of work since the chris

69

00:02:28,470 --> 00:02:26,239

cassidy look apartment tonno spacewalk

70

00:02:30,949 --> 00:02:28,480

in july of 2013 a lot of work has been

71

00:02:33,670 --> 00:02:30,959

done to refine

72

00:02:35,910 --> 00:02:33,680

the flight rules regarding situations

73

00:02:38,710 --> 00:02:35,920

such as we saw today can you talk a

74

00:02:41,270 --> 00:02:38,720

little bit about the approach now versus

75

00:02:43,110 --> 00:02:41,280

july of 2013 and how you as a flight

76

00:02:44,630 --> 00:02:43,120

director uh interpret the flight rules

77

00:02:47,750 --> 00:02:44,640

and then make the final call that you

78

00:02:49,589 --> 00:02:47,760

did today sure and and so so everybody's

79

00:02:52,390 --> 00:02:49,599

completely cognizant of that

80

00:02:54,869 --> 00:02:52,400

of that case where luca wound up with a

81

00:02:56,869 --> 00:02:54,879

bunch of waters helmet with mr cassidy

82

00:02:58,390 --> 00:02:56,879

out there we brought them back inside we

83

00:02:59,750 --> 00:02:58,400

and we've spent a great deal of time the

84

00:03:01,750 --> 00:02:59,760

last couple years

85

00:03:03,990 --> 00:03:01,760

looking at that case in particular

86

00:03:05,910 --> 00:03:04,000

trying to understand the the what

87

00:03:08,390 --> 00:03:05,920

happened in the emu to allow that water

88

00:03:12,229 --> 00:03:08,400

carryover to occur and to posture

89

00:03:14,630 --> 00:03:12,239

ourselves so that we are in a config

90

00:03:16,309 --> 00:03:14,640

that if we got into the case again which

91

00:03:18,149 --> 00:03:16,319

is conceivably i'm not going to try to

92

00:03:20,070 --> 00:03:18,159

call it today but again it's conceivably

93

00:03:21,509 --> 00:03:20,080

what we got into today

94

00:03:23,190 --> 00:03:21,519

i think that demonstrates that the

95

00:03:24,550 --> 00:03:23,200

training that we've uh that we've gone

96

00:03:25,830 --> 00:03:24,560

through in the last couple years you're

97

00:03:26,949 --> 00:03:25,840

talking about the flight rules we're

98

00:03:29,589 --> 00:03:26,959

talking about

99

00:03:32,229 --> 00:03:29,599

uh understanding what it means when that

100

00:03:33,750 --> 00:03:32,239

co2 sensor goes bad that could be water

101
00:03:35,430 --> 00:03:33,760
carry over into the suit we didn't

102
00:03:37,750 --> 00:03:35,440
terminate the eva at that time because

103
00:03:40,550 --> 00:03:37,760
we've seen that in the past but we did

104
00:03:42,550 --> 00:03:40,560
if you remember as we were going forward

105
00:03:44,710 --> 00:03:42,560
from that point we did ask

106
00:03:47,990 --> 00:03:44,720
tim koper to give us hap checks more

107
00:03:49,509 --> 00:03:48,000
often than we had normally would have uh

108
00:03:51,030 --> 00:03:49,519
and that's part of the training part of

109
00:03:53,910 --> 00:03:51,040
the follow-on from what we did there you

110
00:03:55,589 --> 00:03:53,920
see that co2 sensor go by go bad one of

111
00:03:57,110 --> 00:03:55,599
the legs of that fault tree says you're

112
00:03:59,589 --> 00:03:57,120
going to get water in the helmet so you

113
00:04:00,550 --> 00:03:59,599

start asking the crew

114

00:04:01,990 --> 00:04:00,560

not only

115

00:04:03,509 --> 00:04:02,000

are you starting to have any co2

116

00:04:05,910 --> 00:04:03,519

symptoms because i don't have a sensor

117

00:04:07,270 --> 00:04:05,920

there but are you starting to feel any

118

00:04:08,550 --> 00:04:07,280

if you move your head around inside the

119

00:04:10,309 --> 00:04:08,560

helmet are you starting to feel any

120

00:04:12,390 --> 00:04:10,319

water in the half and then when we got

121

00:04:13,750 --> 00:04:12,400

the water on the visor that was that was

122

00:04:16,949 --> 00:04:13,760

the trigger where i pulled the trigger

123

00:04:18,469 --> 00:04:16,959

and we terminated the eva

124

00:04:30,710 --> 00:04:18,479

the

125

00:04:33,350 --> 00:04:30,720

objectives have been completed of course

126

00:04:35,430 --> 00:04:33,360

what uh obviously the crew is never in

127

00:04:37,830 --> 00:04:35,440

any danger right crew is not in any

128

00:04:39,909 --> 00:04:37,840

danger today uh

129

00:04:41,430 --> 00:04:39,919

again based on what the lessons learned

130

00:04:44,150 --> 00:04:41,440

that we had

131

00:04:46,150 --> 00:04:44,160

we executed per our normal procedures

132

00:04:48,070 --> 00:04:46,160

for this failure case

133

00:04:50,310 --> 00:04:48,080

there are multiple feather cases on the

134

00:04:51,909 --> 00:04:50,320

emu and we spend a great deal of time

135

00:04:53,430 --> 00:04:51,919

looking at each of those individual

136

00:04:54,550 --> 00:04:53,440

federal cases what would you do in this

137

00:04:56,390 --> 00:04:54,560

case

138

00:04:59,030 --> 00:04:56,400

this thing called a cuff checklist

139

00:05:00,230 --> 00:04:59,040

uh you'll see the eevee crew members

140

00:05:03,350 --> 00:05:00,240

thumbing through it occasionally i have

141

00:05:05,029 --> 00:05:03,360

one on my console there are 30 40 pages

142

00:05:07,189 --> 00:05:05,039

in there of things that could go wrong

143

00:05:09,029 --> 00:05:07,199

with the suit one of them in there says

144

00:05:11,510 --> 00:05:09,039

we have water and helmet

145

00:05:13,909 --> 00:05:11,520

so we executed per our nominal timeline

146

00:05:15,990 --> 00:05:13,919

and again the crew was not in any danger

147

00:05:18,950 --> 00:05:16,000

which is why we were in a terminate case

148

00:05:21,590 --> 00:05:18,960

instead of an abort case and we did not

149

00:05:23,270 --> 00:05:21,600

do the expedited repress we did the

150

00:05:25,590 --> 00:05:23,280

normal repress because following the

151

00:05:27,270 --> 00:05:25,600

signature as it was going

152

00:05:29,350 --> 00:05:27,280

we made the decision that we did not

153

00:05:31,510 --> 00:05:29,360

need to go down a path to do an

154

00:05:34,230 --> 00:05:31,520

emergency repress the airlock or call an

155

00:05:36,390 --> 00:05:34,240

abort for the case there's a subtle

156

00:05:38,629 --> 00:05:36,400

difference in eva terminology between a

157

00:05:39,990 --> 00:05:38,639

terminate and an abort terminate you can

158

00:05:41,029 --> 00:05:40,000

take a little bit of time clean up the

159

00:05:42,629 --> 00:05:41,039

work site

160

00:05:44,629 --> 00:05:42,639

and in abort case you drop everything

161

00:05:46,629 --> 00:05:44,639

come back inside i called it terminate

162

00:05:49,909 --> 00:05:46,639

today we did not do the emergency

163

00:05:52,070 --> 00:05:49,919

repress we did the normal repress so

164

00:05:53,110 --> 00:05:52,080

we were we were in control of the case

165

00:05:54,950 --> 00:05:53,120

but the

166

00:05:55,830 --> 00:05:54,960

we could not ignore the case as we went

167

00:05:57,670 --> 00:05:55,840

forward

168

00:05:59,189 --> 00:05:57,680

and in fact the crew took time out to

169

00:06:01,909 --> 00:05:59,199

thank the team down here before the

170

00:06:04,230 --> 00:06:01,919

repress even began another indication uh

171

00:06:06,629 --> 00:06:04,240

that uh there was time to do this in an

172

00:06:07,350 --> 00:06:06,639

orderly fashion yeah i thought that was

173

00:06:09,590 --> 00:06:07,360

good

174

00:06:11,270 --> 00:06:09,600

uh tim copeland so again the objective

175

00:06:13,670 --> 00:06:11,280

for today's eva was to go out and

176

00:06:15,189 --> 00:06:13,680

replace the sequential shunt unit on on

177

00:06:17,350 --> 00:06:15,199

channel one bravo

178

00:06:19,590 --> 00:06:17,360

uh and we did and it works just fine and

179

00:06:21,909 --> 00:06:19,600

that's awesome so we managed to get our

180

00:06:23,430 --> 00:06:21,919

primary objective done and while tim was

181

00:06:25,909 --> 00:06:23,440

in the airlock while we were doing that

182

00:06:27,590 --> 00:06:25,919

nominal repress he took a few minutes to

183

00:06:29,270 --> 00:06:27,600

thank the teams for all the work that

184

00:06:31,749 --> 00:06:29,280

had gone into getting him out and

185

00:06:33,029 --> 00:06:31,759

getting to co do that ssu r r so good

186

00:06:35,270 --> 00:06:33,039

indication that

187

00:06:37,830 --> 00:06:35,280

that the crew was not in imminent danger

188

00:06:39,749 --> 00:06:37,840

if he's giving uh thank you thank you

189

00:06:41,590 --> 00:06:39,759

speeches at the oscars here

190

00:06:43,510 --> 00:06:41,600

and the bottom line is uh the engineers

191

00:06:44,950 --> 00:06:43,520

now go off in a csi mode and do

192

00:06:46,150 --> 00:06:44,960

detective work

193

00:06:48,070 --> 00:06:46,160

that's correct and that's why it's

194

00:06:49,189 --> 00:06:48,080

important uh

195

00:06:52,070 --> 00:06:49,199

you probably heard some of the calls

196

00:06:54,230 --> 00:06:52,080

going up between jessica and reid there

197

00:06:55,430 --> 00:06:54,240

to go get a syringe and and collect the

198

00:06:58,070 --> 00:06:55,440

water that was in the helmet we

199

00:07:00,390 --> 00:06:58,080

collected the the pa the hap out of the

200

00:07:01,909 --> 00:07:00,400

helmet we collected a bunch of pictures

201
00:07:03,430 --> 00:07:01,919
and then we'll turn all that over the

202
00:07:05,510 --> 00:07:03,440
engineering community along with the ops

203
00:07:07,270 --> 00:07:05,520
guys and i'll sit around see if we can

204
00:07:09,029 --> 00:07:07,280
figure out what happened here again to

205
00:07:11,589 --> 00:07:09,039
to try to prevent this from happening

206
00:07:14,309 --> 00:07:11,599
again but i but i do want to emphasize

207
00:07:16,309 --> 00:07:14,319
that you know that our the plans that we

208
00:07:18,230 --> 00:07:16,319
had the procedures that we had the the

209
00:07:19,990 --> 00:07:18,240
products that we have on console was the

210
00:07:23,270 --> 00:07:20,000
training that we've gone through in the

211
00:07:25,270 --> 00:07:23,280
last couple of years was exactly on

212
00:07:26,950 --> 00:07:25,280
on par with what we executed today so i

213
00:07:29,350 --> 00:07:26,960

was very happy about that team did a

214

00:07:31,029 --> 00:07:29,360

great job great thanks very much royce

215

00:07:32,550 --> 00:07:31,039

renfrew lead flight director for today's

216

00:07:35,189 --> 00:07:32,560

spacewalk appreciate it and

217

00:07:36,790 --> 00:07:35,199

congratulations on accomplishing uh the