
PAO

1
00:00:04,150 --> 00:00:02,629
so i'm joined now in mission control

2
00:00:05,829 --> 00:00:04,160
houston by somebody who's pretty

3
00:00:07,510 --> 00:00:05,839
familiar with uh what this spacewalk is

4
00:00:09,509 --> 00:00:07,520
going to entail nasa astronaut doug

5
00:00:11,990 --> 00:00:09,519
wheelock doug thanks so much for joining

6
00:00:14,470 --> 00:00:12,000
me and you've done this before you've

7
00:00:17,109 --> 00:00:14,480
done almost this exact same spacewalk uh

8
00:00:18,710 --> 00:00:17,119
back in 2010. yeah absolutely it's a

9
00:00:21,349 --> 00:00:18,720
little bit different failure that we're

10
00:00:24,150 --> 00:00:21,359
experiencing uh this time around but um

11
00:00:26,630 --> 00:00:24,160
the spacewalks to remove this old pump

12
00:00:28,230 --> 00:00:26,640
module and replace it with a new spare

13
00:00:31,750 --> 00:00:28,240

is exactly the same as what we did in

14
00:00:33,830 --> 00:00:31,760
2010 so we we had a lot of lessons

15
00:00:35,430 --> 00:00:33,840
learned back then and so we've

16
00:00:37,750 --> 00:00:35,440
implemented those changes into our

17
00:00:39,750 --> 00:00:37,760
procedures in the in the way that we

18
00:00:41,430 --> 00:00:39,760
prepare our suits and

19
00:00:43,670 --> 00:00:41,440
our tools and so we'll be ready to go on

20
00:00:45,670 --> 00:00:43,680
saturday and so

21
00:00:47,590 --> 00:00:45,680
obviously a lot of similarities it so it

22
00:00:48,950 --> 00:00:47,600
really is identical are there any

23
00:00:51,270 --> 00:00:48,960
differences

24
00:00:53,910 --> 00:00:51,280
uh well the difference is now we we

25
00:00:55,830 --> 00:00:53,920
learned it was sort of difficult to uh

26
00:00:58,069 --> 00:00:55,840
disconnect these ammonia connectors back

27
00:01:00,229 --> 00:00:58,079
in 2010 the pressure we were running

28
00:01:01,349 --> 00:01:00,239
pretty high at operational pressures 360

29
00:01:03,270 --> 00:01:01,359
psi

30
00:01:05,109 --> 00:01:03,280
and so i had a difficult time

31
00:01:08,310 --> 00:01:05,119
disconnecting these connectors and we

32
00:01:09,830 --> 00:01:08,320
learned in the latter two space walks

33
00:01:11,510 --> 00:01:09,840
during that time frame

34
00:01:13,030 --> 00:01:11,520
that if we lowered that pressure it'd

35
00:01:14,950 --> 00:01:13,040
certainly help us

36
00:01:16,950 --> 00:01:14,960
in disconnecting and reconnecting those

37
00:01:18,870 --> 00:01:16,960
ammonia lines so we learned that and

38
00:01:20,550 --> 00:01:18,880

we've we've kind of done some simulation

39
00:01:22,710 --> 00:01:20,560
and we've uh we're going to drop the

40
00:01:23,990 --> 00:01:22,720
pressure so to kind of give these guys a

41
00:01:25,830 --> 00:01:24,000
little bit of a head start when they get

42
00:01:27,030 --> 00:01:25,840
outside so so some lessons learned

43
00:01:28,870 --> 00:01:27,040
already so

44
00:01:30,390 --> 00:01:28,880
this is some this is a spacewalk that

45
00:01:31,830 --> 00:01:30,400
wasn't planned this is an unplanned

46
00:01:33,910 --> 00:01:31,840
spacewalk

47
00:01:35,990 --> 00:01:33,920
so i imagine there's got to be a lot of

48
00:01:37,830 --> 00:01:36,000
stuff to do on orbit just to get ready i

49
00:01:39,109 --> 00:01:37,840
mean what are the crews been doing over

50
00:01:40,789 --> 00:01:39,119
the last couple of days to try and

51
00:01:42,469 --> 00:01:40,799
prepare it yeah that's right it's it's

52
00:01:45,350 --> 00:01:42,479
we refer to it as a contingency

53
00:01:47,030 --> 00:01:45,360
spacewalk and so um the the skills

54
00:01:48,950 --> 00:01:47,040
really though are fundamental and we

55
00:01:50,710 --> 00:01:48,960
practice all of these skills

56
00:01:52,789 --> 00:01:50,720
uh just rehearse them over and over

57
00:01:54,469 --> 00:01:52,799
again in the pool and the crew has done

58
00:01:57,429 --> 00:01:54,479
these particular skills

59
00:02:00,149 --> 00:01:57,439
and so the the skills are the same

60
00:02:02,310 --> 00:02:00,159
but space always has surprises for us

61
00:02:04,310 --> 00:02:02,320
especially when we go outside a lot of

62
00:02:06,310 --> 00:02:04,320
this mechanical uh hardware that's

63
00:02:08,309 --> 00:02:06,320

operating outside

64
00:02:10,309 --> 00:02:08,319
is bombarded with all kinds of little

65
00:02:12,949 --> 00:02:10,319
micro meteor uh

66
00:02:14,710 --> 00:02:12,959
uh little tiny flecks and also um the

67
00:02:16,869 --> 00:02:14,720
radiation outside and the temperature

68
00:02:20,309 --> 00:02:16,879
swings that we have in day and night

69
00:02:22,550 --> 00:02:20,319
passes uh this these mechanical devices

70
00:02:25,430 --> 00:02:22,560
don't operate like they do here on earth

71
00:02:28,229 --> 00:02:25,440
or underwater in the pool and so we try

72
00:02:30,150 --> 00:02:28,239
to simulate those malfunctions and

73
00:02:32,229 --> 00:02:30,160
prepare the crew

74
00:02:33,670 --> 00:02:32,239
to face those should they occur when

75
00:02:35,509 --> 00:02:33,680
they get outside

76
00:02:37,350 --> 00:02:35,519
and we actually have some video from

77
00:02:38,790 --> 00:02:37,360
your last spacewalk maybe you can walk

78
00:02:40,070 --> 00:02:38,800
us through a couple of the other

79
00:02:41,270 --> 00:02:40,080
procedures

80
00:02:43,030 --> 00:02:41,280
sure i'm pretty sure there's a good

81
00:02:45,589 --> 00:02:43,040
example yeah you see here into something

82
00:02:47,670 --> 00:02:45,599
you don't expect well the robotic arm is

83
00:02:49,110 --> 00:02:47,680
moving into place and you can see you'll

84
00:02:51,509 --> 00:02:49,120
probably see some what looks like

85
00:02:53,430 --> 00:02:51,519
snowflakes and some of these views and

86
00:02:55,350 --> 00:02:53,440
that's ammonia that's kind of leaking

87
00:02:57,509 --> 00:02:55,360
out of this system and you'll see that

88
00:02:58,790 --> 00:02:57,519

there are three large connectors in one

89
00:03:00,869 --> 00:02:58,800
small connector that they're going to

90
00:03:03,270 --> 00:03:00,879
have to disconnect and then reconnect to

91
00:03:06,149 --> 00:03:03,280
the new pump module and here i had a

92
00:03:09,190 --> 00:03:06,159
kind of do i have a makeshift hammer to

93
00:03:11,910 --> 00:03:09,200
try to break the ice off of this uh

94
00:03:13,190 --> 00:03:11,920
connector the ammonia formed ice inside

95
00:03:15,589 --> 00:03:13,200
that cavity there you can see a little

96
00:03:17,430 --> 00:03:15,599
bit of snow flurries there and there you

97
00:03:19,589 --> 00:03:17,440
can see the ammonia leaking out of the

98
00:03:21,990 --> 00:03:19,599
connector as well

99
00:03:24,149 --> 00:03:22,000
we think that we've got a good solution

100
00:03:26,869 --> 00:03:24,159
to this now where we can

101
00:03:29,589 --> 00:03:26,879
lower that pressure and give us a little

102
00:03:31,190 --> 00:03:29,599
bit of a better chance of success on the

103
00:03:33,110 --> 00:03:31,200
first run

104
00:03:35,509 --> 00:03:33,120
disconnecting these connectors this pump

105
00:03:36,630 --> 00:03:35,519
module is really a big piece of hardware

106
00:03:40,550 --> 00:03:36,640
it's uh

107
00:03:41,670 --> 00:03:40,560
it weighs about 800 pounds and

108
00:03:43,589 --> 00:03:41,680
and

109
00:03:46,710 --> 00:03:43,599
although things everything is weightless

110
00:03:48,070 --> 00:03:46,720
in space it still has mass and f still

111
00:03:50,229 --> 00:03:48,080
equals m a

112
00:03:52,550 --> 00:03:50,239
in space and so so when you're moving

113
00:03:54,630 --> 00:03:52,560

this big kind of double door

114
00:03:57,910 --> 00:03:54,640
refrigerator size piece of hardware

115
00:04:00,710 --> 00:03:57,920
around it and it's the mass distribution

116
00:04:02,630 --> 00:04:00,720
and the thing is not symmetric and so

117
00:04:04,550 --> 00:04:02,640
so it's got some interesting handling

118
00:04:06,869 --> 00:04:04,560
qualities that we also simulate in our

119
00:04:09,429 --> 00:04:06,879
virtual reality lab here in houston you

120
00:04:10,789 --> 00:04:09,439
can see me on the arm there hoisting

121
00:04:13,270 --> 00:04:10,799
that big um

122
00:04:15,990 --> 00:04:13,280
uh pump module out of the uh out of its

123
00:04:18,629 --> 00:04:16,000
uh place there on the truss and then

124
00:04:20,789 --> 00:04:18,639
tracy and i went out to uh

125
00:04:22,790 --> 00:04:20,799
to get the new pump module and we have

126
00:04:24,950 --> 00:04:22,800
three spares on board currently so we're

127
00:04:26,790 --> 00:04:24,960
going to use one of those uh with these

128
00:04:29,590 --> 00:04:26,800
coming up ebas that'll leave us with two

129
00:04:30,950 --> 00:04:29,600
spares but the crew will will also go

130
00:04:33,189 --> 00:04:30,960
and get a spare

131
00:04:34,950 --> 00:04:33,199
off of one of the outside it's kind of

132
00:04:36,950 --> 00:04:34,960
like a porch area where we keep a lot of

133
00:04:38,870 --> 00:04:36,960
these spare parts and they'll return

134
00:04:39,670 --> 00:04:38,880
that pump module here's a good view of

135
00:04:42,070 --> 00:04:39,680
us

136
00:04:43,830 --> 00:04:42,080
inserting the new pump module back in

137
00:04:45,909 --> 00:04:43,840
2010

138
00:04:47,670 --> 00:04:45,919

into its slot and then you bolt it down

139
00:04:49,909 --> 00:04:47,680
it's got four bolts that hold it in

140
00:04:53,909 --> 00:04:49,919
place and it's also got these four

141
00:04:55,510 --> 00:04:53,919
ammonia connectors and also six five

142
00:04:58,150 --> 00:04:55,520
electrical power

143
00:05:01,830 --> 00:04:58,160
cables that connect to it to run it from

144
00:05:03,270 --> 00:05:01,840
inside and then um it as you saw that we

145
00:05:05,590 --> 00:05:03,280
were coming that last scene we were

146
00:05:07,189 --> 00:05:05,600
coming back into the airlock and and

147
00:05:10,230 --> 00:05:07,199
part of what we have to do we have to be

148
00:05:12,310 --> 00:05:10,240
ready for is to um if we get ammonia on

149
00:05:15,029 --> 00:05:12,320
these suits we really need we do what we

150
00:05:17,990 --> 00:05:15,039
call is as a bake out and so we we try

151
00:05:20,550 --> 00:05:18,000
to stay into the sun for for a period of

152
00:05:22,390 --> 00:05:20,560
time and we have smart people on the

153
00:05:24,150 --> 00:05:22,400
ground to kind of calculate

154
00:05:26,629 --> 00:05:24,160
how much ammonia came out how much could

155
00:05:29,430 --> 00:05:26,639
have contacted the suits and how long we

156
00:05:31,670 --> 00:05:29,440
should stay in sunlight to uh to let

157
00:05:33,909 --> 00:05:31,680
that sublimate to space so we don't

158
00:05:35,189 --> 00:05:33,919
bring drops of that ammonia inside of

159
00:05:36,629 --> 00:05:35,199
the space station yeah it probably

160
00:05:38,550 --> 00:05:36,639
wouldn't make for a good atmosphere

161
00:05:39,990 --> 00:05:38,560
bunch of ammonia floating around yeah it

162
00:05:41,909 --> 00:05:40,000
would not be a good day if we brought

163
00:05:44,230 --> 00:05:41,919

ammonia inside so we but we do have

164
00:05:46,469 --> 00:05:44,240
precautions for that and um and the crew

165
00:05:48,629 --> 00:05:46,479
inside is going to be working very hard

166
00:05:50,550 --> 00:05:48,639
as well to get these guys back inside

167
00:05:52,950 --> 00:05:50,560
when they're done with their spacewalks

168
00:05:55,909 --> 00:05:52,960
and they are integral part of

169
00:05:57,909 --> 00:05:55,919
of the cleanup and also the bake out and

170
00:06:00,550 --> 00:05:57,919
um and preparation of the station for

171
00:06:02,790 --> 00:06:00,560
when these suits come back inside uh so

172
00:06:04,230 --> 00:06:02,800
we're ready for any contingency and so

173
00:06:06,469 --> 00:06:04,240
you're kind of one of the resident

174
00:06:07,670 --> 00:06:06,479
experts on this having done it before so

175
00:06:09,110 --> 00:06:07,680
what and you're going to be pretty

176
00:06:10,390 --> 00:06:09,120
closely involved in these upcoming

177
00:06:12,309 --> 00:06:10,400
spacewalks as well what's your role

178
00:06:14,550 --> 00:06:12,319
going to be here in michigan we've had

179
00:06:16,550 --> 00:06:14,560
just teams of people working here at

180
00:06:18,309 --> 00:06:16,560
johnson space center to get the crew

181
00:06:20,790 --> 00:06:18,319
ready and get the vehicle ready and and

182
00:06:22,550 --> 00:06:20,800
the suits ready as well and so uh for

183
00:06:24,629 --> 00:06:22,560
all three of these spacewalks on the

184
00:06:26,870 --> 00:06:24,639
capcom console which is the capsule

185
00:06:28,710 --> 00:06:26,880
communicator uh console here in mission

186
00:06:31,029 --> 00:06:28,720
control just sits just to the right of

187
00:06:33,590 --> 00:06:31,039
the flight director who is in charge of

188
00:06:35,830 --> 00:06:33,600

the uh of the control room at the time

189
00:06:37,350 --> 00:06:35,840
so i'll be sitting on um i'll be sitting

190
00:06:39,029 --> 00:06:37,360
a right seat

191
00:06:41,270 --> 00:06:39,039
at the capcom console which we call

192
00:06:42,710 --> 00:06:41,280
ground iv so i'll be

193
00:06:45,430 --> 00:06:42,720
talking to the crew while they're

194
00:06:47,110 --> 00:06:45,440
outside so kind of walking through their

195
00:06:49,670 --> 00:06:47,120
timeline i'll have their timeline in

196
00:06:51,589 --> 00:06:49,680
front of me they don't they probably

197
00:06:54,150 --> 00:06:51,599
will have parts of it memorized

198
00:06:55,990 --> 00:06:54,160
and lots of it practiced inside with

199
00:06:58,150 --> 00:06:56,000
body control and stuff inside of the

200
00:06:58,950 --> 00:06:58,160
station before they go out and we also

201
00:07:01,189 --> 00:06:58,960
have

202
00:07:03,270 --> 00:07:01,199
mock-ups of the fluid connectors inside

203
00:07:05,510 --> 00:07:03,280
the space station so they can practice

204
00:07:08,150 --> 00:07:05,520
moving these bales and operating these

205
00:07:10,950 --> 00:07:08,160
connectors so i'll be sitting

206
00:07:12,870 --> 00:07:10,960
and talking to the crew and hopefully uh

207
00:07:14,629 --> 00:07:12,880
we'll have a smooth day on saturday as

208
00:07:15,510 --> 00:07:14,639
we disconnect these lines from the old

209
00:07:17,110 --> 00:07:15,520
pump

210
00:07:18,790 --> 00:07:17,120
and uh we'll we'll walk them through

211
00:07:20,870 --> 00:07:18,800
their timeline did you get a chance to

212
00:07:23,029 --> 00:07:20,880
teach them that hammer technique at all

213
00:07:24,469 --> 00:07:23,039

yeah we uh we've had a couple of video

214
00:07:26,390 --> 00:07:24,479
conferences well several video

215
00:07:27,430 --> 00:07:26,400
conferences with the crew and so

216
00:07:28,870 --> 00:07:27,440
um i

217
00:07:31,749 --> 00:07:28,880
kind of gave them some tips on how to

218
00:07:34,309 --> 00:07:31,759
position their body part part of um

219
00:07:36,629 --> 00:07:34,319
probably the the greatest nuance when

220
00:07:37,589 --> 00:07:36,639
you're outside working especially

221
00:07:40,309 --> 00:07:37,599
is to

222
00:07:42,309 --> 00:07:40,319
get things in a comfortable work area

223
00:07:44,710 --> 00:07:42,319
because the suit is kind of bulky and

224
00:07:46,710 --> 00:07:44,720
it's pressurized and so it uh it it

225
00:07:48,150 --> 00:07:46,720
it'll work against you and when you get

226
00:07:50,309 --> 00:07:48,160
in a wrestling match with your suit the

227
00:07:52,469 --> 00:07:50,319
suit's going to win so so during our

228
00:07:54,390 --> 00:07:52,479
training we we learn to work with the

229
00:07:56,869 --> 00:07:54,400
suit and have the suit work for us and

230
00:07:59,430 --> 00:07:56,879
so we we try to get the crews to get

231
00:08:00,469 --> 00:07:59,440
their work site in a good working work

232
00:08:03,430 --> 00:08:00,479
envelope

233
00:08:05,589 --> 00:08:03,440
and then also to position themselves to

234
00:08:07,670 --> 00:08:05,599
counteract uh forces and torque and

235
00:08:09,270 --> 00:08:07,680
things like that okay well again nasa

236
00:08:10,869 --> 00:08:09,280
astronaut doug wheelock he's done this

237
00:08:13,749 --> 00:08:10,879
spacewalk before and he'll be helping

238
00:08:15,270 --> 00:08:13,759

them out as they kick it off on saturday

239
00:08:17,270 --> 00:08:15,280
doug thanks so much for joining me