1
00:00:03,830 --> 00:00:01,990
um so with that we can go ahead and

2
00:00:05,829 --> 00:00:03,840
start talking about the details of the

3
00:00:07,190 --> 00:00:05,839
space walks so if we can show the first

4
00:00:08,950 --> 00:00:07,200
graphic

5
00:00:11,110 --> 00:00:08,960
so there are space walking crew members

6
00:00:13,030 --> 00:00:11,120
we have rick mastracchio he comes to us

7
00:00:15,350 --> 00:00:13,040
with six space walks under his belt so

8
00:00:17,430 --> 00:00:15,360
he's a very experienced spacewalker he

9
00:00:19,830 --> 00:00:17,440
will serve the ev1 or lead spacewalk

10
00:00:22,230 --> 00:00:19,840
officer or lead spacewalker role for

11
00:00:23,429 --> 00:00:22,240
eva's one and two

12
00:00:25,509 --> 00:00:23,439
and on the right side you see mike

13
00:00:27,349 --> 00:00:25,519

hopkins he is a rookie spacewalker but

14
00:00:29,589 --> 00:00:27,359
very excited to go out the door he will

15
00:00:32,870 --> 00:00:29,599
be the ev2 for eva's 1 and 2 and then

16
00:00:34,709 --> 00:00:32,880
he'll take the lead ev1 roll on eva 3.

17
00:00:36,950 --> 00:00:34,719
on the inside we'll have koichi wakata

18
00:00:39,590 --> 00:00:36,960
who is flying the ssr ms or the space

19
00:00:41,750 --> 00:00:39,600
station robotic arm he will be as you'll

20
00:00:43,590 --> 00:00:41,760
see in the video one of the crew members

21
00:00:45,830 --> 00:00:43,600
spends a large majority of all three of

22
00:00:47,350 --> 00:00:45,840
the evas on the arm so koichi will be

23
00:00:48,470 --> 00:00:47,360
tied into this and he'll be flying the

24
00:00:51,590 --> 00:00:48,480
arm

25
00:00:53,350 --> 00:00:51,600
so the next graphic

26
00:00:55,189 --> 00:00:53,360
shows the overviews of the three space

27
00:00:57,750 --> 00:00:55,199
walks so broad strokes what we plan on

28
00:01:00,310 --> 00:00:57,760
doing on the first the first spacewalk

29
00:01:01,910 --> 00:01:00,320
is focused on de-integrating the failed

30
00:01:04,310 --> 00:01:01,920
pump module so that that includes

31
00:01:06,149 --> 00:01:04,320
demating the fluid quick disconnects

32
00:01:08,469 --> 00:01:06,159
installing a pump module jumper box

33
00:01:10,310 --> 00:01:08,479
which allows us to have fluid flow

34
00:01:12,550 --> 00:01:10,320
between the rest of the tcs the thermal

35
00:01:13,750 --> 00:01:12,560
control system with the accumulators in

36
00:01:15,030 --> 00:01:13,760
the system

37
00:01:17,030 --> 00:01:15,040
and then demating the electrical

38
00:01:18,710 --> 00:01:17,040

connectors on that failed pump module

39
00:01:20,310 --> 00:01:18,720
and then we also spend a little bit of

40
00:01:21,990 --> 00:01:20,320
time working on the spare pump module

41
00:01:24,550 --> 00:01:22,000
which includes releasing some

42
00:01:26,230 --> 00:01:24,560
multi-layer insulation on the second eva

43
00:01:28,149 --> 00:01:26,240
we're focused on removing the failed

44
00:01:30,310 --> 00:01:28,159
pump module from the truss and then

45
00:01:32,149 --> 00:01:30,320
temporarily stowing it on the poa or the

46
00:01:34,469 --> 00:01:32,159
payload oru accommodation tempstow

47
00:01:36,710 --> 00:01:34,479
location and then we work at the end of

48
00:01:37,749 --> 00:01:36,720
the eva on releasing the spare pump

49
00:01:40,230 --> 00:01:37,759
module

50
00:01:41,590 --> 00:01:40,240
from the esp3 carrier on the outboard

51
00:01:43,429 --> 00:01:41,600
side of s3

52
00:01:45,270 --> 00:01:43,439
and then we fly that over to the s1

53
00:01:47,030 --> 00:01:45,280
location and install that into the trust

54
00:01:48,469 --> 00:01:47,040
and we plan on hooking up only the bolts

55
00:01:50,950 --> 00:01:48,479
and the electrical connectors on this

56
00:01:53,350 --> 00:01:50,960
eva and then on the third and final eva

57
00:01:55,190 --> 00:01:53,360
we will complete that spare pump module

58
00:01:58,310 --> 00:01:55,200
installation which includes mating the

59
00:02:00,069 --> 00:01:58,320
the four fluid lines and then relocating

60
00:02:03,429 --> 00:02:00,079
the failed pump module from its tempsto

61
00:02:06,069 --> 00:02:03,439
location out to the esp the esp3

62
00:02:07,749 --> 00:02:06,079
location where the failed came from

63
00:02:09,910 --> 00:02:07,759

so with that we can go ahead and get

64
00:02:12,150 --> 00:02:09,920
started with the videos and we'll talk

65
00:02:14,229 --> 00:02:12,160
through the tasks so on the first

66
00:02:16,229 --> 00:02:14,239
spacewalk the crew members egress the

67
00:02:19,589 --> 00:02:16,239
joint airlock and they make their way up

68
00:02:21,510 --> 00:02:19,599
to the center of the s1 truss

69
00:02:23,430 --> 00:02:21,520
mike hopkins mike will be the free float

70
00:02:25,990 --> 00:02:23,440
crew member rick will ingress the arm

71
00:02:27,990 --> 00:02:26,000
koichi will fly him up to the work site

72
00:02:30,550 --> 00:02:28,000
and then the two crew members will spend

73
00:02:32,550 --> 00:02:30,560
some time demating those four

74
00:02:34,470 --> 00:02:32,560
fluid quick disconnects which are

75
00:02:36,070 --> 00:02:34,480
illuminated there

76
00:02:37,830 --> 00:02:36,080
so a quick overview of the interfaces on

77
00:02:39,430 --> 00:02:37,840
the pump module you have four fluid

78
00:02:41,110 --> 00:02:39,440
quick disconnects three of them are one

79
00:02:43,670 --> 00:02:41,120
and a half inch size one is a quarter

80
00:02:45,190 --> 00:02:43,680
size you have five electrical connectors

81
00:02:47,190 --> 00:02:45,200
and then you also have four fasteners

82
00:02:49,270 --> 00:02:47,200
which are 5 8 inch fasteners which are

83
00:02:51,589 --> 00:02:49,280
what the primary fasteners that hold the

84
00:02:52,790 --> 00:02:51,599
pump module into the truss so here we

85
00:02:54,630 --> 00:02:52,800
are fortunate enough on the partial

86
00:02:56,790 --> 00:02:54,640
gravity simulator to have doug wheelock

87
00:02:58,309 --> 00:02:56,800
and tracy caldwell dyson help us create

88
00:03:00,229 --> 00:02:58,319

a training video about lessons they

89
00:03:01,589 --> 00:03:00,239
learned during the last pump module r r

90
00:03:03,110 --> 00:03:01,599
so we were able to film this training

91
00:03:04,710 --> 00:03:03,120
video just a few days ago and we got

92
00:03:06,550 --> 00:03:04,720
that uplink to the crew so they're able

93
00:03:07,910 --> 00:03:06,560
to learn of any gotchas

94
00:03:10,070 --> 00:03:07,920
once those four fluid lines are

95
00:03:11,910 --> 00:03:10,080
disconnected they'll then work to

96
00:03:13,430 --> 00:03:11,920
install the half inch and the one and a

97
00:03:15,509 --> 00:03:13,440
half inch fluid lines to this pump

98
00:03:17,830 --> 00:03:15,519
module jumper box as i mentioned this is

99
00:03:19,509 --> 00:03:17,840
what allows ammonia to flow another the

100
00:03:21,110 --> 00:03:19,519
pump module is out allows ammonia to

101
00:03:22,390 --> 00:03:21,120
have access to the

102
00:03:24,630 --> 00:03:22,400
accumulators and the nitrogen and

103
00:03:26,550 --> 00:03:24,640
ammonia tanks to prevent liquid lock

104
00:03:27,589 --> 00:03:26,560
so that's what we spend most of eva 1

105
00:03:29,830 --> 00:03:27,599
doing

106
00:03:31,270 --> 00:03:29,840
on eva 2 the focus is getting the failed

107
00:03:32,710 --> 00:03:31,280
pump module out of the trust and the new

108
00:03:34,710 --> 00:03:32,720
one in the trust so there you can see

109
00:03:36,309 --> 00:03:34,720
the loop a pump module on the s1 truss

110
00:03:37,910 --> 00:03:36,319
on the right side and as mike mentioned

111
00:03:40,869 --> 00:03:37,920
we have three spares we're shooting for

112
00:03:42,390 --> 00:03:40,879
the esp3 spare pump module to install in

113
00:03:43,990 --> 00:03:42,400

its new home

114
00:03:45,990 --> 00:03:44,000
right outside the air lock mike will

115
00:03:47,990 --> 00:03:46,000
pick up the adjustable grapple bar from

116
00:03:49,509 --> 00:03:48,000
the esp-2 carrier

117
00:03:50,949 --> 00:03:49,519
he will then translate up to the truss

118
00:03:52,630 --> 00:03:50,959
and rick will be on the arm and they'll

119
00:03:54,229 --> 00:03:52,640
work to release the four fasteners that

120
00:03:55,670 --> 00:03:54,239
are holding the pump module on the truss

121
00:03:58,070 --> 00:03:55,680
then they'll slowly slide the pump

122
00:03:59,750 --> 00:03:58,080
module out of the truss about halfway

123
00:04:01,990 --> 00:03:59,760
giving them access to the install

124
00:04:03,670 --> 00:04:02,000
location for the adjustable grapple bar

125
00:04:06,229 --> 00:04:03,680
and it's this grapple bar that allows

126
00:04:08,309 --> 00:04:06,239
the pump module to be temporarily stowed

127
00:04:10,309 --> 00:04:08,319
between evas

128
00:04:12,550 --> 00:04:10,319
so once the pump module is free of the

129
00:04:14,390 --> 00:04:12,560
trust they'll give koichi the go to

130
00:04:16,310 --> 00:04:14,400
relocate the arm

131
00:04:18,229 --> 00:04:16,320
and rick over to the poa or the

132
00:04:20,310 --> 00:04:18,239
temporary stow location

133
00:04:22,230 --> 00:04:20,320
for this pump module mike said this is

134
00:04:23,909 --> 00:04:22,240
our desire is to keep this pump module

135
00:04:25,189 --> 00:04:23,919
as a viable spare so that we can perform

136
00:04:26,790 --> 00:04:25,199
additional maintenance on it in the

137
00:04:28,790 --> 00:04:26,800
future

138
00:04:30,870 --> 00:04:28,800

so once they have the spare pump module

139
00:04:32,710 --> 00:04:30,880
stowed on the poa

140
00:04:34,710 --> 00:04:32,720
they'll then work to translate over to

141
00:04:35,749 --> 00:04:34,720
esp3 where the new pump module is

142
00:04:38,390 --> 00:04:35,759
located

143
00:04:41,189 --> 00:04:38,400
they'll release that from the carrier

144
00:04:43,350 --> 00:04:41,199
and then fly back over to the truss to

145
00:04:45,990 --> 00:04:43,360
install that new pump module in the same

146
00:04:47,189 --> 00:04:46,000
location where we removed the failed

147
00:04:48,790 --> 00:04:47,199
as you can see there's quite a bit of

148
00:04:50,550 --> 00:04:48,800
arm maneuvers throughout all of these

149
00:04:53,189 --> 00:04:50,560
evas so i'm sure koichi will be getting

150
00:04:57,030 --> 00:04:54,870
so they'll work together to slowly guide

151
00:04:58,230 --> 00:04:57,040
the pump module into the truss

152
00:04:59,990 --> 00:04:58,240
and then they'll attach the four

153
00:05:01,990 --> 00:05:00,000
fasteners that hold it in place and then

154
00:05:03,670 --> 00:05:02,000
mate the electrical connectors which

155
00:05:05,749 --> 00:05:03,680
will give us good insight into seeing if

156
00:05:11,909 --> 00:05:05,759
we have a viable spare in this pump

157
00:05:16,070 --> 00:05:14,390
so the third space walk is focused on

158
00:05:17,749 --> 00:05:16,080
getting the fluid lines hooked up to the

159
00:05:19,510 --> 00:05:17,759
pump module those four fluid lines

160
00:05:21,830 --> 00:05:19,520
hooked up to the pump module and then

161
00:05:23,590 --> 00:05:21,840
working on relocating the failed pump

162
00:05:24,550 --> 00:05:23,600
module from its temporary stowage

163
00:05:28,870 --> 00:05:24,560

location

164
00:05:30,950 --> 00:05:28,880
retrieved the spare

165
00:05:32,469 --> 00:05:30,960
on eva 3 we'll be swapping rolls so mike

166
00:05:33,909 --> 00:05:32,479
will actually be the crew member in the

167
00:05:36,150 --> 00:05:33,919
arm this time and rick will be the free

168
00:05:38,150 --> 00:05:36,160
float crew member as koichi is flying

169
00:05:40,710 --> 00:05:38,160
mike over with the failed pump module

170
00:05:43,189 --> 00:05:40,720
rick will spend some time at the s1 pump

171
00:05:44,230 --> 00:05:43,199
module install location verifying that

172
00:05:45,670 --> 00:05:44,240
he has

173
00:05:49,029 --> 00:05:45,680
everything buttoned up and that we've

174
00:05:52,070 --> 00:05:49,039
cleared the mt translation corridor

175
00:05:54,390 --> 00:05:52,080
once they're at the esp3 worksite

176
00:05:56,469 --> 00:05:54,400
mike will slowly

177
00:05:58,309 --> 00:05:56,479
give commands to koichi to bring him

178
00:05:59,670 --> 00:05:58,319
into the work site

179
00:06:01,510 --> 00:05:59,680
then they will the two crew members will

180
00:06:02,870 --> 00:06:01,520
work together to release the adjustable

181
00:06:04,550 --> 00:06:02,880
grapple bar

182
00:06:07,189 --> 00:06:04,560
and then they will work on rotating the

183
00:06:09,510 --> 00:06:07,199
pump module 180 degrees to allow them to

184
00:06:11,990 --> 00:06:09,520
install it into the rails

185
00:06:13,510 --> 00:06:12,000
on the esp3 worksite once they install

186
00:06:15,189 --> 00:06:13,520
it they'll attach the four fasteners

187
00:06:16,950 --> 00:06:15,199
that hold it in place make some

188
00:06:18,870 --> 00:06:16,960

electrical connectors to provide heater

189
00:06:20,950 --> 00:06:18,880
power to this failed unit and then

190
00:06:22,629 --> 00:06:20,960
install some multi-layer insulation over

191
00:06:24,230 --> 00:06:22,639
it to protect it

192
00:06:26,150 --> 00:06:24,240
michael then worked to retrieve the

193
00:06:28,309 --> 00:06:26,160
adjustable grapple bar from a temp stow

194
00:06:30,469 --> 00:06:28,319
location

195
00:06:33,430 --> 00:06:30,479
and koichi will then begin maneuvering

196
00:06:35,590 --> 00:06:33,440
him from the outboard location on s3 all

197
00:06:36,950 --> 00:06:35,600
the way back to the esp-2 carrier on the

198
00:06:38,469 --> 00:06:36,960
airlock

199
00:06:40,710 --> 00:06:38,479
during this time rick will be cleaning

200
00:06:42,150 --> 00:06:40,720
up the work site which includes

201
00:06:43,510 --> 00:06:42,160
packing up the tool bags that they

202
00:06:45,670 --> 00:06:43,520
brought out with them and then heading

203
00:06:47,110 --> 00:06:45,680
back towards the airlock once at the

204
00:06:48,950 --> 00:06:47,120
esp-2

205
00:06:50,710 --> 00:06:48,960
location

206
00:06:52,710 --> 00:06:50,720
mike will install the adjustable grapple

207
00:06:54,390 --> 00:06:52,720
bar onto the fhrc or the flex hose

208
00:06:56,629 --> 00:06:54,400
rotary coupler which is its temp stow

209
00:06:58,230 --> 00:06:56,639
location once complete with that he will

210
00:07:00,230 --> 00:06:58,240
work on egressing the arm and removing

211
00:07:01,670 --> 00:07:00,240
the foot restraint and then the two crew