
Space Cen
enter

1
00:00:06,800 --> 00:00:02,840
good afternoon and welcome today's

2
00:00:08,660 --> 00:00:06,810
expedition 32 post spacewalk briefing

3
00:00:10,790 --> 00:00:08,670
today we have with us International

4
00:00:13,759 --> 00:00:10,800
Space Station program manager Mike SEF

5
00:00:15,589 --> 00:00:13,769
rodini advanced ice the flight director

6
00:00:18,109 --> 00:00:15,599
in charge of the spacewalk today and

7
00:00:19,970 --> 00:00:18,119
Keith Johnson a lead spacewalk officer

8
00:00:21,349 --> 00:00:19,980
for today's activities we'll start off

9
00:00:24,200 --> 00:00:21,359
with some opening statements and they'll

10
00:00:26,210 --> 00:00:24,210
move on to your questions well good

11
00:00:28,189 --> 00:00:26,220
afternoon I never thought I'd be saying

12
00:00:29,990 --> 00:00:28,199
this but I've never been so happy to

13
00:00:33,620 --> 00:00:30,000

have seven of eight power channels

14
00:00:35,389 --> 00:00:33,630
onboard ISS as I am today and I won't go

15
00:00:37,040 --> 00:00:35,399
through all the details of the EBA I'll

16
00:00:40,430 --> 00:00:37,050
leave that to Eddie and Keith since they

17
00:00:42,709 --> 00:00:40,440
they live through it but we do have as

18
00:00:46,069 --> 00:00:42,719
everyone knows we've got the NBS you one

19
00:00:49,040 --> 00:00:46,079
installed and activated its it's acting

20
00:00:51,830 --> 00:00:49,050
very well and over the next couple of

21
00:00:54,979 --> 00:00:51,840
days we'll integrate all of the

22
00:00:57,529 --> 00:00:54,989
components back in that that mvsu feeds

23
00:01:00,349 --> 00:00:57,539
so we get more closer to a nominal

24
00:01:02,060 --> 00:01:00,359
config in addition that the team was

25
00:01:04,700 --> 00:01:02,070
able to take the time to change out the

26
00:01:07,190 --> 00:01:04,710
SSR ms boom camera which put us in a

27
00:01:10,190 --> 00:01:07,200
really good configuration for all the

28
00:01:12,310 --> 00:01:10,200
operations we do utilizing the arm while

29
00:01:16,550 --> 00:01:12,320
it was difficult to live without the

30
00:01:19,190 --> 00:01:16,560
this boom camera we can and and we're

31
00:01:22,219 --> 00:01:19,200
prepared to do that if we had to but

32
00:01:24,580 --> 00:01:22,229
today's EBA went as good as you could

33
00:01:27,080 --> 00:01:24,590
hope for and once we have to be MBS you

34
00:01:29,899 --> 00:01:27,090
installed the crew and the ground team

35
00:01:32,179 --> 00:01:29,909
decided they they have the time to go

36
00:01:33,920 --> 00:01:32,189
ahead and get the boom camper replace so

37
00:01:36,679 --> 00:01:33,930
we're in good shape the EBA went very

38
00:01:38,270 --> 00:01:36,689

well I'll talk a little bit about the

39
00:01:41,719 --> 00:01:38,280
future and then hand it to these guys to

40
00:01:43,850 --> 00:01:41,729
tell you more of the details so with the

41
00:01:45,679 --> 00:01:43,860
EBA that we had to do today we really

42
00:01:48,170 --> 00:01:45,689
couldn't squeeze in the HTV departure

43
00:01:51,889 --> 00:01:48,180
which was originally planned for for

44
00:01:54,620 --> 00:01:51,899
tomorrow in there in between the HTTP

45
00:01:59,060 --> 00:01:54,630
departure and the Soyuz departure we had

46
00:02:01,429 --> 00:01:59,070
a reboost planned to really it's for

47
00:02:03,440 --> 00:02:01,439
phasing for future vehicles it would

48
00:02:05,870 --> 00:02:03,450
tweak the landing a little bit but that

49
00:02:09,169 --> 00:02:05,880
wasn't mandatory but in working with the

50
00:02:12,559 --> 00:02:09,179
rest of the partners we've decided that

51
00:02:13,730 --> 00:02:12,569
the plan is as follows we will we will

52
00:02:17,900 --> 00:02:13,740
plan to have h

53
00:02:20,330 --> 00:02:17,910
depart on the 12th will do a reboost to

54
00:02:22,760 --> 00:02:20,340
tweak the phasing of the orbit on the

55
00:02:25,040 --> 00:02:22,770
fourteenth and then the soy of 30 so

56
00:02:27,650 --> 00:02:25,050
users will depart on time on the

57
00:02:30,140 --> 00:02:27,660
sixteenth and and that then puts

58
00:02:32,270 --> 00:02:30,150
everything in play to go ahead and have

59
00:02:34,270 --> 00:02:32,280
the ATV depart on time which i think is

60
00:02:36,800 --> 00:02:34,280
currently the twenty-fifth of September

61
00:02:40,210 --> 00:02:36,810
so hats off to the team they did a

62
00:02:43,940 --> 00:02:40,220
fantastic job this is a very challenging

63
00:02:45,920 --> 00:02:43,950

issue that took a lot of a lot of

64
00:02:47,960 --> 00:02:45,930
thinking about what do you have in your

65
00:02:51,080 --> 00:02:47,970
your list of tools and not necessarily

66
00:02:53,150 --> 00:02:51,090
tools on orbit that you can use to get

67
00:02:56,600 --> 00:02:53,160
yourself in a good posture to install

68
00:02:59,240 --> 00:02:56,610
this bolt as it turned out the bolt post

69
00:03:03,190 --> 00:02:59,250
did had some some rough threads in it

70
00:03:05,900 --> 00:03:03,200
and since we don't have on orbit a

71
00:03:07,430 --> 00:03:05,910
tapping device per se we had to come up

72
00:03:08,930 --> 00:03:07,440
with tools kind of cleaning out as best

73
00:03:11,390 --> 00:03:08,940
we could and then and then run this

74
00:03:13,850 --> 00:03:11,400
other bolt in but the team did a really

75
00:03:16,700 --> 00:03:13,860
great job the crew did a fantastic job

76
00:03:18,410 --> 00:03:16,710
outside today and and as a result of

77
00:03:20,450 --> 00:03:18,420
that we're back in in really good shape

78
00:03:24,860 --> 00:03:20,460
on orbit and so with that I'll hand it

79
00:03:26,600 --> 00:03:24,870
over to add thank you sir i'll start

80
00:03:28,580 --> 00:03:26,610
with the the end of today obviously i

81
00:03:32,890 --> 00:03:28,590
getting MBS you one installed and

82
00:03:36,680 --> 00:03:32,900
activated doing that successfully is a

83
00:03:37,970 --> 00:03:36,690
broad team across several organizations

84
00:03:40,220 --> 00:03:37,980
throughout the program and across the

85
00:03:42,680 --> 00:03:40,230
partnership to to make that all happen

86
00:03:44,480 --> 00:03:42,690
and i'm extremely proud and impressed

87
00:03:46,760 --> 00:03:44,490
with all the work of all the people that

88
00:03:50,000 --> 00:03:46,770

were involved in putting this together

89
00:03:51,710 --> 00:03:50,010
not only the EV a team but as they're

90
00:03:53,720 --> 00:03:51,720
the ones that are out in front pulling

91
00:03:55,910 --> 00:03:53,730
this together for the crew but all of

92
00:03:57,580 --> 00:03:55,920
the different flight control disciplines

93
00:04:00,530 --> 00:03:57,590
that are involved all the engineers

94
00:04:02,750 --> 00:04:00,540
analysts the folks at Kennedy Space

95
00:04:05,390 --> 00:04:02,760
Center that actually installed the MBS

96
00:04:06,800 --> 00:04:05,400
you into s0 before it launched at the

97
00:04:08,480 --> 00:04:06,810
press conference we had last week mr.

98
00:04:10,280 --> 00:04:08,490
Sabatini talked about going back and

99
00:04:12,740 --> 00:04:10,290
pulling paper on the actual initial

100
00:04:14,510 --> 00:04:12,750
installations we did that we talked to

101
00:04:16,039 --> 00:04:14,520
everybody we possibly could to

102
00:04:18,410 --> 00:04:16,049
understand what was going on and that

103
00:04:19,970 --> 00:04:18,420
paid off here today in the end I'll talk

104
00:04:22,010 --> 00:04:19,980
briefly about what's happened over the

105
00:04:23,900 --> 00:04:22,020
last six days if you can believe it it's

106
00:04:24,620 --> 00:04:23,910
today's only the sixth day after the end

107
00:04:28,490 --> 00:04:24,630
of the

108
00:04:32,210 --> 00:04:28,500
third-longest a VA in US history last

109
00:04:34,700 --> 00:04:32,220
Thursday since that time even friday

110
00:04:37,670 --> 00:04:34,710
morning we had a skeleton plan of what

111
00:04:40,190 --> 00:04:37,680
we would do on a EV a that turned out to

112
00:04:42,110 --> 00:04:40,200
be today we came with a bunch of

113
00:04:43,370 --> 00:04:42,120

questions first obviously what happened

114
00:04:45,980 --> 00:04:43,380
and wanted to understand as best we

115
00:04:47,750 --> 00:04:45,990
could what happened last Thursday and

116
00:04:50,570 --> 00:04:47,760
then we went from those questions to try

117
00:04:52,670 --> 00:04:50,580
to in broad terms say what needs to be

118
00:04:55,370 --> 00:04:52,680
done to make us most successful on doing

119
00:04:58,160 --> 00:04:55,380
it again so of course that meant go take

120
00:04:59,390 --> 00:04:58,170
a look at the failed MBS you the the MBS

121
00:05:00,830 --> 00:04:59,400
you we have been trying to install and

122
00:05:03,230 --> 00:05:00,840
see if it had been damaged if there is

123
00:05:05,360 --> 00:05:03,240
anything on that MBS you that might tell

124
00:05:06,980 --> 00:05:05,370
us some clues about what had happened we

125
00:05:09,290 --> 00:05:06,990
also needed to clean that up and get it

126
00:05:11,780 --> 00:05:09,300
ready for installation go inspect the

127
00:05:14,480 --> 00:05:11,790
cold plate on the s0 work site where the

128
00:05:16,970 --> 00:05:14,490
NBS you gets installed make sure see if

129
00:05:18,290 --> 00:05:16,980
there are any smoking guns out there to

130
00:05:20,060 --> 00:05:18,300
show us what had happened but then also

131
00:05:22,340 --> 00:05:20,070
get that all cleaned up and ready for an

132
00:05:24,410 --> 00:05:22,350
installation task from that point the

133
00:05:27,620 --> 00:05:24,420
engineers and all the various flight

134
00:05:29,150 --> 00:05:27,630
controllers went from those questions to

135
00:05:30,530 --> 00:05:29,160
finding ways to get answers to those

136
00:05:32,330 --> 00:05:30,540
questions so of course we looked at

137
00:05:35,390 --> 00:05:32,340
paperwork we looked at previous tasks

138
00:05:38,180 --> 00:05:35,400

that had similar types of installations

139
00:05:40,550 --> 00:05:38,190
for example the battery charge discharge

140
00:05:42,200 --> 00:05:40,560
units the BC to use we've installed some

141
00:05:44,480 --> 00:05:42,210
of those in our past and they have a

142
00:05:46,220 --> 00:05:44,490
similar configuration we went talked to

143
00:05:49,070 --> 00:05:46,230
all the people involved with those

144
00:05:50,840 --> 00:05:49,080
activities to learn what we could we

145
00:05:52,700 --> 00:05:50,850
also like mr. suffered any mentioned we

146
00:05:54,500 --> 00:05:52,710
went and invented new tools that we

147
00:05:57,260 --> 00:05:54,510
could take outside to help us clean and

148
00:06:01,250 --> 00:05:57,270
chase the threads in the posts of the

149
00:06:03,770 --> 00:06:01,260
SEO cold plate to blow out any debris to

150
00:06:05,990 --> 00:06:03,780
look for damage and to make sure that we

151
00:06:08,600 --> 00:06:06,000
fully understood and could correct the

152
00:06:10,790 --> 00:06:08,610
best we could the situation there at s0

153
00:06:12,410 --> 00:06:10,800
we also had several very long

154
00:06:14,780 --> 00:06:12,420
discussions with all of our engineering

155
00:06:16,880 --> 00:06:14,790
counterparts to take the questions as

156
00:06:18,740 --> 00:06:16,890
far deep as we possibly could what if we

157
00:06:20,840 --> 00:06:18,750
find such and such out at the work site

158
00:06:22,880 --> 00:06:20,850
what are we going to do if this method

159
00:06:24,680 --> 00:06:22,890
doesn't work what's the next step so

160
00:06:26,270 --> 00:06:24,690
we've really completely developed as

161
00:06:29,120 --> 00:06:26,280
much we could as we could what we call

162
00:06:32,120 --> 00:06:29,130
the crib sheet or the what do you do if

163
00:06:35,360 --> 00:06:32,130

this happens paperwork and that went

164
00:06:37,820 --> 00:06:35,370
very smoothly developing that was a long

165
00:06:38,159 --> 00:06:37,830
process several meetings went into that

166
00:06:41,580 --> 00:06:38,169
but

167
00:06:43,110 --> 00:06:41,590
today's success shows the the results of

168
00:06:44,399 --> 00:06:43,120
all those all those meetings and how

169
00:06:46,200 --> 00:06:44,409
fruitful they were we had a great

170
00:06:47,969 --> 00:06:46,210
documentation we didn't have to stray

171
00:06:50,519 --> 00:06:47,979
from it and it enabled us to be

172
00:06:52,890 --> 00:06:50,529
successful today so the we call it a

173
00:06:55,649 --> 00:06:52,900
team for effort and it's because we were

174
00:06:59,070 --> 00:06:55,659
pulling out a separate team to go focus

175
00:07:00,959 --> 00:06:59,080
on all these it really was a amazing

176
00:07:02,879 --> 00:07:00,969
experience to be a part of and to watch

177
00:07:05,249 --> 00:07:02,889
as this entire team came together with

178
00:07:07,469 --> 00:07:05,259
its resolve to fix the singular issue

179
00:07:08,969 --> 00:07:07,479
and then we did so with enough time left

180
00:07:11,399 --> 00:07:08,979
that we could go pick up one remaining

181
00:07:12,929 --> 00:07:11,409
scheduled test from last week CBA and

182
00:07:14,279 --> 00:07:12,939
that was replacing the boom camera so

183
00:07:16,649 --> 00:07:14,289
I'm glad we could get that done as well

184
00:07:18,360 --> 00:07:16,659
and over the course of these two epa's

185
00:07:21,300 --> 00:07:18,370
we were able to get all of our primary

186
00:07:23,670 --> 00:07:21,310
objectives for the EBA 18 accomplished

187
00:07:26,459 --> 00:07:23,680
so I'm very very happy with the success

188
00:07:31,140 --> 00:07:26,469

the EBA and I like Keitha go into any

189
00:07:33,899 --> 00:07:31,150
more details he wants to thanks it let's

190
00:07:37,679 --> 00:07:33,909
see so today zva was six hours and 28

191
00:07:41,369 --> 00:07:37,689
minutes which puts sunny at 44 hours and

192
00:07:44,639 --> 00:07:41,379
two minutes of total EV a duration puts

193
00:07:46,829 --> 00:07:44,649
her 11th in the u.s. standings and and

194
00:07:50,969 --> 00:07:46,839
she is of course the the number one

195
00:07:52,260 --> 00:07:50,979
female duration for four evaa so that's

196
00:07:55,649 --> 00:07:52,270
kind of cool and we let her know that

197
00:07:57,629 --> 00:07:55,659
during the VA she slept it off as and

198
00:07:58,769 --> 00:07:57,639
said I'm just out here doing a job and

199
00:08:01,230 --> 00:07:58,779
I'm in the right place at the right time

200
00:08:03,600 --> 00:08:01,240
so that's a as a wonderful attitude to

201
00:08:06,659 --> 00:08:03,610
have to know that she's out there to do

202
00:08:09,469 --> 00:08:06,669
her job aki that was his second dva

203
00:08:12,719 --> 00:08:09,479
makes his total 14 hours and 45 minutes

204
00:08:16,019 --> 00:08:12,729
he is the leading japanese astronaut he

205
00:08:19,350 --> 00:08:16,029
surpassed to cowboy who had 12 hours and

206
00:08:22,200 --> 00:08:19,360
43 minutes we went out the door with an

207
00:08:25,290 --> 00:08:22,210
off nominal suit configuration from the

208
00:08:28,800 --> 00:08:25,300
VA last week we had a problem with the

209
00:08:32,550 --> 00:08:28,810
cooling on aki suit and because of that

210
00:08:35,279 --> 00:08:32,560
both crew members had to shift suits aki

211
00:08:39,449 --> 00:08:35,289
went out in sunny suits which was

212
00:08:42,329 --> 00:08:39,459
resized for him and sunny went out in a

213
00:08:44,670 --> 00:08:42,339

large heart upper torso which is an off

214
00:08:46,680 --> 00:08:44,680
nominal size but she had practiced in it

215
00:08:49,780 --> 00:08:46,690
before and she didn't have any

216
00:08:53,620 --> 00:08:49,790
complaints and and stuck a head

217
00:08:56,020 --> 00:08:53,630
with the plan so I'd mentioned a lot of

218
00:08:58,960 --> 00:08:56,030
the the work that went into getting

219
00:09:00,640 --> 00:08:58,970
ready for this e VA and I have to say I

220
00:09:02,980 --> 00:09:00,650
had many people come up to me and asked

221
00:09:05,980 --> 00:09:02,990
me what I what I thought the odds were

222
00:09:08,590 --> 00:09:05,990
of installing the MBS you under these

223
00:09:10,960 --> 00:09:08,600
conditions and and really the best that

224
00:09:13,440 --> 00:09:10,970
you could do is is plan for getting the

225
00:09:15,370 --> 00:09:13,450
Box in but then also plan for all of the

226
00:09:17,250 --> 00:09:15,380
multiple things that you would have to

227
00:09:19,750 --> 00:09:17,260
do if we had to bring that box inside

228
00:09:23,080 --> 00:09:19,760
mr. suffered any asked us to look at

229
00:09:24,940 --> 00:09:23,090
that several months ago with the the

230
00:09:28,270 --> 00:09:24,950
failed box that we took out because

231
00:09:30,990 --> 00:09:28,280
their plans to potentially change out

232
00:09:34,330 --> 00:09:31,000
one of the the plates inside of that the

233
00:09:36,460 --> 00:09:34,340
cards and so we did have a chance to

234
00:09:40,180 --> 00:09:36,470
look at how well that n BSU fits inside

235
00:09:42,160 --> 00:09:40,190
of the airlock along with other bags and

236
00:09:45,000 --> 00:09:42,170
because of that we came up with a

237
00:09:48,010 --> 00:09:45,010
configuration that if we needed to bring

238
00:09:50,230 --> 00:09:48,020

everything back inside with us along

239
00:09:52,740 --> 00:09:50,240
with both crew members we we had a safe

240
00:09:56,140 --> 00:09:52,750
configuration so we had to plan for that

241
00:09:59,500 --> 00:09:56,150
and during the the week between the

242
00:10:01,450 --> 00:09:59,510
failure and the CVA today as ed

243
00:10:05,740 --> 00:10:01,460
mentioned we had teams going off

244
00:10:10,480 --> 00:10:05,750
developing many many tools to make our

245
00:10:13,570 --> 00:10:10,490
jobs more highly successful one of the

246
00:10:16,020 --> 00:10:13,580
the tools that we developed we pulled

247
00:10:21,760 --> 00:10:16,030
out we have spare boxes that are inside

248
00:10:27,310 --> 00:10:21,770
Space Station that are the same bolting

249
00:10:29,650 --> 00:10:27,320
configuration as as the MBS you so in

250
00:10:34,120 --> 00:10:29,660
order to understand what could have been

251
00:10:36,220 --> 00:10:34,130
wrong with the bolt we scavenged the the

252
00:10:40,000 --> 00:10:36,230
bolting mechanism out of one of the

253
00:10:43,000 --> 00:10:40,010
boxes that was inside and developed what

254
00:10:45,220 --> 00:10:43,010
we used as a tapping tool that mr.

255
00:10:48,460 --> 00:10:45,230
suffered any mentioned this is a

256
00:10:52,390 --> 00:10:48,470
t-handle tool that the crew members use

257
00:10:55,360 --> 00:10:52,400
to restrain some of the the outer

258
00:10:59,260 --> 00:10:55,370
coating on space station it's a handling

259
00:11:02,200 --> 00:10:59,270
aid it's got a pin on one end and it fit

260
00:11:03,220 --> 00:11:02,210
nicely into just fortunately fit nicely

261
00:11:06,970 --> 00:11:03,230
into the

262
00:11:09,040 --> 00:11:06,980
mechanism and so we could develop a tool

263
00:11:11,260 --> 00:11:09,050

that allowed us to drive the bolt

264
00:11:13,870 --> 00:11:11,270
without the box around it so we could

265
00:11:16,960 --> 00:11:13,880
see just what it took to get a bolt

266
00:11:20,080 --> 00:11:16,970
installed we also had to put tether

267
00:11:22,420 --> 00:11:20,090
features on it and that allowed us to

268
00:11:25,810 --> 00:11:22,430
keep it safely secured during the

269
00:11:27,880 --> 00:11:25,820
operation well we knew that the torque

270
00:11:29,350 --> 00:11:27,890
was going to be a high running torque or

271
00:11:32,680 --> 00:11:29,360
we suspected that it was going to be

272
00:11:35,520 --> 00:11:32,690
fairly high this is about what a gloved

273
00:11:38,560 --> 00:11:35,530
hand could could do to turn this bolt

274
00:11:41,470 --> 00:11:38,570
and because the torque could go up from

275
00:11:44,680 --> 00:11:41,480
there we had to find a way to allow us

276
00:11:49,900 --> 00:11:44,690
to take this t-handle tool off and put

277
00:11:51,910 --> 00:11:49,910
another socket in place so the the guys

278
00:11:54,130 --> 00:11:51,920
on the ground came up with a really

279
00:11:58,570 --> 00:11:54,140
nifty method to cut this particular tool

280
00:12:02,290 --> 00:11:58,580
loose and then install a much larger

281
00:12:04,000 --> 00:12:02,300
handle that would then allow them to put

282
00:12:07,270 --> 00:12:04,010
quite a bit more torque into the bolt

283
00:12:09,940 --> 00:12:07,280
and this was a really good design and

284
00:12:11,320 --> 00:12:09,950
this worked out really well because the

285
00:12:13,270 --> 00:12:11,330
torque got to the point where neither

286
00:12:16,390 --> 00:12:13,280
sunny nor aki was able to do it with

287
00:12:18,580 --> 00:12:16,400
with the t-handle tool and it also

288
00:12:21,490 --> 00:12:18,590

allowed them to drive it both forward

289
00:12:24,760 --> 00:12:21,500
and backward when installing the bolt

290
00:12:27,430 --> 00:12:24,770
and that way they overcame the rough

291
00:12:30,630 --> 00:12:27,440
spots that mr. suffer dini mentioned by

292
00:12:33,730 --> 00:12:30,640
driving it through those those spots so

293
00:12:39,100 --> 00:12:33,740
we in the process lubricated the bolt

294
00:12:42,820 --> 00:12:39,110
with lubricant that we've used on orbit

295
00:12:47,200 --> 00:12:42,830
before this is the what we call the lube

296
00:12:52,950 --> 00:12:47,210
gun and it has breakout in it which is

297
00:12:56,530 --> 00:12:52,960
kind of a vacuum stabilized grease with

298
00:12:59,950 --> 00:12:56,540
some some particles in it that allow it

299
00:13:02,860 --> 00:12:59,960
to some graphite particles that at eight

300
00:13:04,450 --> 00:13:02,870
and lubrication we brought this gun out

301
00:13:09,430 --> 00:13:04,460
with us and fortunately we didn't have

302
00:13:11,710 --> 00:13:09,440
to use it the this in previous ivas

303
00:13:15,340 --> 00:13:11,720
we've used this gun to lubricate the

304
00:13:17,310 --> 00:13:15,350
solar alpha rotary joint and also the

305
00:13:19,890 --> 00:13:17,320
the end effector on the

306
00:13:23,490 --> 00:13:19,900
and other points were grapple fixtures

307
00:13:27,630 --> 00:13:23,500
on board space station so we had this on

308
00:13:30,030 --> 00:13:27,640
board we used it to squirt into midst

309
00:13:34,320 --> 00:13:30,040
that the crew members have for applying

310
00:13:36,540 --> 00:13:34,330
this this lubricant and with that they

311
00:13:39,480 --> 00:13:36,550
put some of their other tools that we we

312
00:13:43,530 --> 00:13:39,490
applied the lubricant to such as the

313
00:13:46,560 --> 00:13:43,540

bolt that I mentioned before and also an

314
00:13:51,000 --> 00:13:46,570
application tool that may seem familiar

315
00:13:53,310 --> 00:13:51,010
to people which is a toothbrush so while

316
00:13:55,110 --> 00:13:53,320
we were I VA the crew took this

317
00:13:57,870 --> 00:13:55,120
toothbrush attached it to another

318
00:14:02,340 --> 00:13:57,880
t-handle and then put it in the grease

319
00:14:05,070 --> 00:14:02,350
and prepared it to go EV a so the

320
00:14:07,590 --> 00:14:05,080
process the crew used once they got the

321
00:14:09,540 --> 00:14:07,600
the MBS you out and away from the

322
00:14:13,830 --> 00:14:09,550
stanchion and we knew that we had

323
00:14:18,000 --> 00:14:13,840
particles down inside the socket so they

324
00:14:19,740 --> 00:14:18,010
came outside with yet another tool that

325
00:14:23,310 --> 00:14:19,750
was developed by the ground team and

326
00:14:30,360 --> 00:14:23,320
this is a very interesting tool this is

327
00:14:34,700 --> 00:14:30,370
a piece of cable that has the end wires

328
00:14:37,680 --> 00:14:34,710
bent back to make a bit of a brush and

329
00:14:40,950 --> 00:14:37,690
they took this tool out with them to the

330
00:14:42,840 --> 00:14:40,960
work site it has on the end of it what

331
00:14:45,120 --> 00:14:42,850
we can attach the the pistol grip tool

332
00:14:49,580 --> 00:14:45,130
so they put the pistol grip tool on it

333
00:14:52,950 --> 00:14:49,590
and then drove it down into the socket

334
00:14:54,990 --> 00:14:52,960
and then back out again and in the

335
00:14:57,540 --> 00:14:55,000
process of doing that they liberated a

336
00:15:00,060 --> 00:14:57,550
lot of the extra material that that we

337
00:15:01,740 --> 00:15:00,070
suspect was binding the bolt and they

338
00:15:03,570 --> 00:15:01,750

also had a chance to kind of feel how

339
00:15:05,190 --> 00:15:03,580
stiff it was driving it in and then

340
00:15:07,590 --> 00:15:05,200
driving back out again so it gave him

341
00:15:08,790 --> 00:15:07,600
some appreciation for what they had in

342
00:15:11,760 --> 00:15:08,800
store for them when they were going to

343
00:15:13,770 --> 00:15:11,770
drive the bolt after that we took the

344
00:15:16,470 --> 00:15:13,780
gas the tool that you saw in the

345
00:15:18,540 --> 00:15:16,480
previous e VA which is a nitrogen

346
00:15:20,910 --> 00:15:18,550
canister attached to a little nozzle and

347
00:15:23,400 --> 00:15:20,920
they put it down in and they they

348
00:15:25,680 --> 00:15:23,410
bursted the nitrogen gas down in to get

349
00:15:29,730 --> 00:15:25,690
blow out the particulate that was down

350
00:15:30,660 --> 00:15:29,740
inside and then after that was done we

351
00:15:33,330 --> 00:15:30,670
took the

352
00:15:37,290 --> 00:15:33,340
brush that I mentioned and my little bag

353
00:15:41,130 --> 00:15:37,300
of tricks here and we used this covered

354
00:15:45,600 --> 00:15:41,140
with lubricant and drove it down in and

355
00:15:47,940 --> 00:15:45,610
then back out again and lubricated again

356
00:15:50,310 --> 00:15:47,950
the socket drove the bolt down in with

357
00:15:52,860 --> 00:15:50,320
the tools that I mentioned and after

358
00:15:55,170 --> 00:15:52,870
doing that back and forth several times

359
00:15:57,690 --> 00:15:55,180
to get past those points the crew

360
00:16:00,300 --> 00:15:57,700
members felt that it was time to install

361
00:16:03,210 --> 00:16:00,310
the box as we did on the ground and we

362
00:16:05,850 --> 00:16:03,220
put the MBS you in place and in this

363
00:16:08,310 --> 00:16:05,860

particular case you saw before we were

364
00:16:10,920 --> 00:16:08,320
using a torque multiplier and a PG t we

365
00:16:12,780 --> 00:16:10,930
decided that probably the best method

366
00:16:15,060 --> 00:16:12,790
for driving this bolt where you'd get

367
00:16:18,240 --> 00:16:15,070
the most feedback and you also have a

368
00:16:20,760 --> 00:16:18,250
good lever arm was using our EV a

369
00:16:22,680 --> 00:16:20,770
ratchet tool with the socket attached to

370
00:16:26,340 --> 00:16:22,690
it so the crew members put this into the

371
00:16:30,090 --> 00:16:26,350
bolt and it turns out that this time we

372
00:16:32,520 --> 00:16:30,100
also came up with some methods to get

373
00:16:34,350 --> 00:16:32,530
the Box in a neutral position which

374
00:16:36,660 --> 00:16:34,360
allowed them to drive the bolt much more

375
00:16:40,320 --> 00:16:36,670
easily than we saw on the previous e VA

376
00:16:43,050 --> 00:16:40,330
which proves successful and we didn't

377
00:16:45,750 --> 00:16:43,060
have any other issues during the EV a

378
00:16:48,120 --> 00:16:45,760
the suits ran very well and the crew

379
00:16:49,860 --> 00:16:48,130
members had a good fit and they're back

380
00:16:54,420 --> 00:16:49,870
inside right now getting ready for bed

381
00:16:55,890 --> 00:16:54,430
and we're very happy with the EBA ok

382
00:16:58,550 --> 00:16:55,900
we'll start out with questions here at

383
00:17:02,730 --> 00:16:58,560
the Johnson Space and are in Houston

384
00:17:04,680 --> 00:17:02,740
yeah sure if I have time for one so Mike

385
00:17:08,880 --> 00:17:04,690
what point did you breathe a sigh of

386
00:17:13,260 --> 00:17:08,890
relief today Oh Gina you always ask me

387
00:17:16,200 --> 00:17:13,270
these questions let's see I didn't sweat

388
00:17:18,000 --> 00:17:16,210

too much when the NBS you wouldn't go in

389
00:17:20,280 --> 00:17:18,010
because being down two channels wasn't

390
00:17:22,230 --> 00:17:20,290
too bad but the last few days every day

391
00:17:25,770 --> 00:17:22,240
as you were watching we lost to Pat

392
00:17:29,160 --> 00:17:25,780
another power Channel we lost a thermal

393
00:17:30,720 --> 00:17:29,170
loop at least briefly and node 3 and we

394
00:17:32,220 --> 00:17:30,730
had another hiccup that's evading me

395
00:17:35,070 --> 00:17:32,230
right this instant but we had a number

396
00:17:37,710 --> 00:17:35,080
of little gotchas come up we had a

397
00:17:41,670 --> 00:17:37,720
normal health flag on NBS you two over

398
00:17:44,140 --> 00:17:41,680
the course of a few days and so things

399
00:17:46,300 --> 00:17:44,150
seemed like they were adding up so

400
00:17:48,100 --> 00:17:46,310
once the NBS you went in that was nice

401
00:17:49,900 --> 00:17:48,110
but when they powered it up and said it

402
00:17:52,750 --> 00:17:49,910
was a healthy box then I started feel a

403
00:17:54,520 --> 00:17:52,760
little bit better and friend Keith when

404
00:17:59,260 --> 00:17:54,530
did the toothbrush come to play and

405
00:18:01,630 --> 00:17:59,270
whose bright idea was that well you know

406
00:18:03,850 --> 00:18:01,640
what I mean I would that I heard it come

407
00:18:05,590 --> 00:18:03,860
from two different directions so I I

408
00:18:07,660 --> 00:18:05,600
would like to say that at some point I

409
00:18:09,520 --> 00:18:07,670
suggested it and i don't want to take

410
00:18:11,140 --> 00:18:09,530
credit because someone else came in and

411
00:18:13,000 --> 00:18:11,150
said hey we just tried the the

412
00:18:15,130 --> 00:18:13,010
toothbrush over on the fixture and I

413
00:18:16,330 --> 00:18:15,140

thought it's someone hear me say that or

414
00:18:18,280 --> 00:18:16,340
did they come up with it on their own

415
00:18:20,440 --> 00:18:18,290
and and I have to say you know there are

416
00:18:22,450 --> 00:18:20,450
lots and lots of brilliant ideas that

417
00:18:24,760 --> 00:18:22,460
that come up with people and it's always

418
00:18:26,230 --> 00:18:24,770
those ones where you know you take

419
00:18:28,630 --> 00:18:26,240
something common that everybody

420
00:18:31,060 --> 00:18:28,640
understands and and use it in an off

421
00:18:33,640 --> 00:18:31,070
nominal situation that just really makes

422
00:18:36,430 --> 00:18:33,650
you appreciate where you work and what

423
00:18:38,440 --> 00:18:36,440
you do we were concerned that this

424
00:18:40,480 --> 00:18:38,450
wasn't going to pass thermal vacuum

425
00:18:43,150 --> 00:18:40,490
testing so as part of the whole

426
00:18:44,800 --> 00:18:43,160
preparation for the e VA and you know we

427
00:18:46,570 --> 00:18:44,810
send teams all over the place because we

428
00:18:49,630 --> 00:18:46,580
look at every every aspect of things

429
00:18:51,850 --> 00:18:49,640
that could go wrong or how you could get

430
00:18:53,410 --> 00:18:51,860
it stuck or cause more damage with the

431
00:18:56,890 --> 00:18:53,420
piece of hardware that you're taking out

432
00:18:58,840 --> 00:18:56,900
and then good so we did put this in a

433
00:19:00,130 --> 00:18:58,850
thermal vacuum chamber and found out

434
00:19:01,780 --> 00:19:00,140
that it could stand the high

435
00:19:03,310 --> 00:19:01,790
temperatures and low temperatures and

436
00:19:05,080 --> 00:19:03,320
we're still a little nervous about the

437
00:19:06,880 --> 00:19:05,090
the bristles or breaking off but the

438
00:19:12,040 --> 00:19:06,890

crew was very careful with it so we're

439
00:19:14,530 --> 00:19:12,050
very happy about that it was really

440
00:19:16,240 --> 00:19:14,540
amazing to watch the ingenuity of the

441
00:19:19,150 --> 00:19:16,250
engineers involved in the the flight

442
00:19:20,290 --> 00:19:19,160
controllers and they would come up with

443
00:19:22,240 --> 00:19:20,300
this idea of hey let's stick a

444
00:19:23,620 --> 00:19:22,250
toothbrush in there and from there it

445
00:19:25,150 --> 00:19:23,630
was like okay well if we're going to do

446
00:19:27,250 --> 00:19:25,160
that it has to have this it has to be

447
00:19:28,600 --> 00:19:27,260
long enough it has to be tether abul ask

448
00:19:31,510 --> 00:19:28,610
you something that a gloved hand can

449
00:19:33,550 --> 00:19:31,520
interact with we have to be able to to

450
00:19:35,080 --> 00:19:33,560
spin it and keep control of it and in

451
00:19:37,690 --> 00:19:35,090
the right away just a halt this wide

452
00:19:40,030 --> 00:19:37,700
variety of ingenious people oh well if

453
00:19:41,560 --> 00:19:40,040
we put this the tape on it for example

454
00:19:43,480 --> 00:19:41,570
that'll keep it all together and keep it

455
00:19:46,120 --> 00:19:43,490
within the thermal and we'll put this

456
00:19:48,370 --> 00:19:46,130
particular tool on it so it's got a

457
00:19:51,280 --> 00:19:48,380
tether point and it makes it the right

458
00:19:52,810 --> 00:19:51,290
size and then you know we would get go

459
00:19:54,670 --> 00:19:52,820
through a couple prototypes really

460
00:19:56,310 --> 00:19:54,680
quickly and go over to the mock-up

461
00:19:58,360 --> 00:19:56,320
facility and try it out and

462
00:19:59,500 --> 00:19:58,370
there you have it we have the tools that

463
00:20:03,400 --> 00:19:59,510

you see in front of you it was amazing

464
00:20:05,950 --> 00:20:03,410
to watch it all come together Robert

465
00:20:07,840 --> 00:20:05,960
problems collectspace.com so these

466
00:20:10,510 --> 00:20:07,850
makeshift tools now become part of the

467
00:20:12,910 --> 00:20:10,520
permanent spacewalkers arsenal or does

468
00:20:14,590 --> 00:20:12,920
it now inspire the team on earth to go

469
00:20:17,260 --> 00:20:14,600
formalize an actually build a tool that

470
00:20:22,060 --> 00:20:17,270
does the same job they launched on a

471
00:20:24,100 --> 00:20:22,070
future mission linear term at least they

472
00:20:26,140 --> 00:20:24,110
will certainly become what we consider

473
00:20:27,820 --> 00:20:26,150
to be hip pockets we certainly won't

474
00:20:30,820 --> 00:20:27,830
throw away the the good work that we've

475
00:20:32,590 --> 00:20:30,830
done to assemble these if we need them

476
00:20:35,830 --> 00:20:32,600
again my guess is that the crew will

477
00:20:37,030 --> 00:20:35,840
take and keep them somewhere staged on

478
00:20:39,640 --> 00:20:37,040
board the vehicle I don't believe we're

479
00:20:41,710 --> 00:20:39,650
going to build any more before we need

480
00:20:42,910 --> 00:20:41,720
them again I wouldn't be surprised

481
00:20:44,440 --> 00:20:42,920
though if there isn't a team that goes

482
00:20:46,540 --> 00:20:44,450
off and we're going to have a lot of

483
00:20:48,190 --> 00:20:46,550
post flight that goes on with this and

484
00:20:50,200 --> 00:20:48,200
make sure we truly understand what

485
00:20:52,360 --> 00:20:50,210
happened and how we should be postured

486
00:20:54,670 --> 00:20:52,370
and if we decide that this has

487
00:20:57,370 --> 00:20:54,680
applicability across a wide range it if

488
00:20:59,140 --> 00:20:57,380

not go build and fly new tools then

489
00:21:03,040 --> 00:20:59,150
certainly will consider ways to better

490
00:21:04,480 --> 00:21:03,050
our posture in case before it happens

491
00:21:08,050 --> 00:21:04,490
the next time even if it means just

492
00:21:11,110 --> 00:21:08,060
assembling something on board the these

493
00:21:13,420 --> 00:21:11,120
these boxes are very common so the

494
00:21:15,940 --> 00:21:13,430
batteries have this same to acne bolt

495
00:21:18,160 --> 00:21:15,950
solution the the mDM's that are

496
00:21:21,040 --> 00:21:18,170
installed have the in fact this bolt

497
00:21:23,190 --> 00:21:21,050
came from an MDM that's that stored

498
00:21:25,570 --> 00:21:23,200
inside that actually is for use outside

499
00:21:29,050 --> 00:21:25,580
so one of the things we all wished we

500
00:21:31,900 --> 00:21:29,060
had was a tap to follow the threads down

501
00:21:34,450 --> 00:21:31,910
in case they were buggered up and so

502
00:21:37,570 --> 00:21:34,460
that was already on our list in fact we

503
00:21:39,730 --> 00:21:37,580
were planning on flying that on the next

504
00:21:41,110 --> 00:21:39,740
SpaceX flight that was already in our

505
00:21:43,780 --> 00:21:41,120
plan in case other things didn't work

506
00:21:45,340 --> 00:21:43,790
out for so ed said you know you look at

507
00:21:47,530 --> 00:21:45,350
the things you wish you had on orbit

508
00:21:50,380 --> 00:21:47,540
that perhaps we'll do that job better

509
00:21:51,880 --> 00:21:50,390
and will probably think about that in

510
00:21:53,470 --> 00:21:51,890
terms of we have a lot of our use

511
00:21:55,360 --> 00:21:53,480
outside all of them have this same

512
00:21:58,120 --> 00:21:55,370
interface and what are the set of two

513
00:22:00,250 --> 00:21:58,130

tools the crew should have when they go

514
00:22:01,420 --> 00:22:00,260
out to this next one is just to see it

515
00:22:03,100 --> 00:22:01,430
and make sure that you don't have to

516
00:22:04,540 --> 00:22:03,110
come back inside you can do the things

517
00:22:06,269 --> 00:22:04,550
you know you need to do if the threads

518
00:22:09,299 --> 00:22:06,279
are our

519
00:22:12,299 --> 00:22:09,309
not acting right for you add to that

520
00:22:13,919 --> 00:22:12,309
that the tools that we use do in most

521
00:22:16,409 --> 00:22:13,929
cases we try to use ones that are

522
00:22:18,419 --> 00:22:16,419
already EV a certified so these do have

523
00:22:21,899 --> 00:22:18,429
a use for them and will probably d

524
00:22:23,459 --> 00:22:21,909
integrate the what we put together these

525
00:22:24,930 --> 00:22:23,469
are now covered with grease and

526
00:22:27,810 --> 00:22:24,940
particulate that we want to keep

527
00:22:30,810 --> 00:22:27,820
somewhat isolated so we'll take those

528
00:22:32,519 --> 00:22:30,820
probably out of the inventory but at

529
00:22:35,669 --> 00:22:32,529
least consider you know where they are

530
00:22:37,109 --> 00:22:35,679
for a future EBA I'm not sure which

531
00:22:38,369 --> 00:22:37,119
particular crew member the toothbrush

532
00:22:45,749 --> 00:22:38,379
came from but they're going to want it

533
00:22:47,369 --> 00:22:45,759
back so just a larger sense more than

534
00:22:50,820 --> 00:22:47,379
ten years into the station's life and

535
00:22:53,629 --> 00:22:50,830
165 spacewalks did you at all anticipate

536
00:22:56,549 --> 00:22:53,639
that bolts were gonna still be an issue

537
00:22:58,829 --> 00:22:56,559
this far into the program and what does

538
00:23:00,149 --> 00:22:58,839

it say for looking out you know towards

539
00:23:01,649 --> 00:23:00,159
the outers well you know we didn't

540
00:23:05,549 --> 00:23:01,659
really talk to you too much about what

541
00:23:08,639 --> 00:23:05,559
causes what causes this problem so

542
00:23:11,039 --> 00:23:08,649
during the EV a the the team got to the

543
00:23:13,950 --> 00:23:11,049
point where they were trying to use

544
00:23:17,039 --> 00:23:13,960
technique to get the Box down and this

545
00:23:18,749 --> 00:23:17,049
is not the first box like this we we did

546
00:23:22,049 --> 00:23:18,759
six batteries which have the same

547
00:23:24,359 --> 00:23:22,059
interface and and so really this was a

548
00:23:26,399 --> 00:23:24,369
combination of technique but that the

549
00:23:29,070 --> 00:23:26,409
bolts we found this particular bolt as

550
00:23:31,049 --> 00:23:29,080
you may have called what call it noticed

551
00:23:33,599 --> 00:23:31,059
watching the EBA this particular bolt

552
00:23:35,219 --> 00:23:33,609
about four turns in got stuck and we

553
00:23:37,769 --> 00:23:35,229
really couldn't get past about four

554
00:23:40,289 --> 00:23:37,779
turns during the the last dva and when

555
00:23:44,519 --> 00:23:40,299
we ran this bolt down we found this spot

556
00:23:46,109 --> 00:23:44,529
in this area so this doesn't have to do

557
00:23:47,399 --> 00:23:46,119
with how long it's been on orbit it

558
00:23:48,989 --> 00:23:47,409
really has to do with when we install

559
00:23:51,570 --> 00:23:48,999
them when we start and when we installed

560
00:23:53,969 --> 00:23:51,580
these particular NBS use and this one in

561
00:23:55,769 --> 00:23:53,979
particular because of the the face of

562
00:23:58,619 --> 00:23:55,779
the truss it's on I think I mentioned

563
00:24:01,049 --> 00:23:58,629

this before this really we didn't have

564
00:24:03,239 --> 00:24:01,059
we weren't able to rotate the s0 trust

565
00:24:05,369 --> 00:24:03,249
so the crews the ground crews had to get

566
00:24:08,190 --> 00:24:05,379
on scissor jack they lift up as high as

567
00:24:10,079 --> 00:24:08,200
it can to 220 pound oh are you in there

568
00:24:11,399 --> 00:24:10,089
in a 45 degree face facing up and

569
00:24:12,930 --> 00:24:11,409
they're trying to get it up here and

570
00:24:15,599 --> 00:24:12,940
then they're trying to torque it in

571
00:24:18,389 --> 00:24:15,609
wiglet and torque it so we're not

572
00:24:19,740 --> 00:24:18,399
completely surprised that that the the

573
00:24:21,890 --> 00:24:19,750
threads could be a little

574
00:24:24,900 --> 00:24:21,900
gummed up again you can't you can't

575
00:24:26,670 --> 00:24:24,910
cross thread and Acme bolt but but we

576
00:24:28,580 --> 00:24:26,680
think we called the bolt which is not an

577
00:24:32,370 --> 00:24:28,590
uncommon thing to have happen if you put

578
00:24:34,320 --> 00:24:32,380
a torque off-center torque on it while

579
00:24:36,750 --> 00:24:34,330
you're trying to to a torque the bolt

580
00:24:38,580 --> 00:24:36,760
down so so we believe just as a normal

581
00:24:40,200 --> 00:24:38,590
course of installing some of these or

582
00:24:42,330 --> 00:24:40,210
used particularly ones where we couldn't

583
00:24:44,190 --> 00:24:42,340
put the trust in a position where is

584
00:24:45,750 --> 00:24:44,200
easy to lower in case of the batteries

585
00:24:48,240 --> 00:24:45,760
we always rotated the trust and we lower

586
00:24:49,590 --> 00:24:48,250
the batteries down and put them in place

587
00:24:51,570 --> 00:24:49,600
and then torque them down but in the

588
00:24:53,940 --> 00:24:51,580

case these in MBS use and some other

589
00:24:55,320 --> 00:24:53,950
components we weren't able to do that so

590
00:24:56,910 --> 00:24:55,330
part of what will look as the futures

591
00:24:58,590 --> 00:24:56,920
which ones do we expect to have trouble

592
00:25:01,530 --> 00:24:58,600
which ones might have slightly gold

593
00:25:04,350 --> 00:25:01,540
bolts so that will will know to you know

594
00:25:06,330 --> 00:25:04,360
just expect to the plan the EBA around a

595
00:25:08,160 --> 00:25:06,340
you know chasing the threads or whatever

596
00:25:10,560 --> 00:25:08,170
else we think is the the technique we

597
00:25:13,230 --> 00:25:10,570
need to use but but this isn't this

598
00:25:15,720 --> 00:25:13,240
isn't an age issue this is this just has

599
00:25:17,430 --> 00:25:15,730
to do with the the way we had to install

600
00:25:19,590 --> 00:25:17,440
on the ground and and what it ultimately

601
00:25:23,490 --> 00:25:19,600
does to the interface when you install

602
00:25:25,920 --> 00:25:23,500
it that way ok that's all the questions

603
00:25:28,620 --> 00:25:25,930
for now here in houston will go to the

604
00:25:32,910 --> 00:25:28,630
telephone lines i think in order of

605
00:25:36,810 --> 00:25:32,920
Colin Jim Oberg with NBC yeah I might

606
00:25:38,550 --> 00:25:36,820
turn off the TV or below the way I would

607
00:25:45,330 --> 00:25:38,560
ask you to go back look the big picture

608
00:25:47,610 --> 00:25:45,340
of the of the big 14 failures and this

609
00:25:51,090 --> 00:25:47,620
was one of the big 14 that it fixed but

610
00:25:53,210 --> 00:25:51,100
isn't there another big 14 already out

611
00:25:56,790 --> 00:25:53,220
there in the weeds waiting for you and

612
00:25:59,730 --> 00:25:56,800
are these so far the work of your big 14

613
00:26:01,080 --> 00:25:59,740

list the past two years the second third

614
00:26:04,530 --> 00:26:01,090
failures were there some more that we

615
00:26:06,420 --> 00:26:04,540
didn't notice let's see big 12 so that's

616
00:26:10,560 --> 00:26:06,430
an interesting question because it's

617
00:26:15,570 --> 00:26:10,570
it's 12 now by the way and we think we

618
00:26:18,870 --> 00:26:15,580
think we've settled on that number so so

619
00:26:21,570 --> 00:26:18,880
as you rightly recall the NBS you and

620
00:26:24,350 --> 00:26:21,580
the pump module both on the big 12 list

621
00:26:26,880 --> 00:26:24,360
and and we've learned even more about

622
00:26:29,130 --> 00:26:26,890
installing these kinds of boxes we have

623
00:26:32,700 --> 00:26:29,140
particular mDM's that are on the big 12

624
00:26:33,510 --> 00:26:32,710
list we have the fluid hose rotary

625
00:26:38,970 --> 00:26:33,520
coupler with

626
00:26:41,400 --> 00:26:38,980
is them the coupler that the radiators

627
00:26:43,080 --> 00:26:41,410
rotate around it allows the fluid hoses

628
00:26:44,760 --> 00:26:43,090
to rotate around the radiator and get

629
00:26:47,760 --> 00:26:44,770
the fluid to the radiator so that's one

630
00:26:49,440 --> 00:26:47,770
so we so we have this list of 12 we're

631
00:26:51,270 --> 00:26:49,450
working through them now part of what

632
00:26:52,800 --> 00:26:51,280
we're doing is reviewing the procedures

633
00:26:56,460 --> 00:26:52,810
making sure the procedures are well

634
00:26:57,720 --> 00:26:56,470
potted before we we had procedures and

635
00:27:00,030 --> 00:26:57,730
we thought we understood how they went

636
00:27:02,220 --> 00:27:00,040
but we hadn't done a lot of pool runs we

637
00:27:04,320 --> 00:27:02,230
hadn't spent a lot of time trying to

638
00:27:06,780 --> 00:27:04,330

figure out the technique so we we just

639
00:27:08,220 --> 00:27:06,790
made sure we were able to do the steps

640
00:27:11,520 --> 00:27:08,230
we thought were necessary to change out

641
00:27:13,410 --> 00:27:11,530
that component so part of the the work

642
00:27:17,010 --> 00:27:13,420
being done on all the big 12's and we've

643
00:27:18,720 --> 00:27:17,020
got a little ways to go is to run these

644
00:27:21,450 --> 00:27:18,730
in the pool make sure we understand the

645
00:27:23,670 --> 00:27:21,460
techniques and the other to me more

646
00:27:24,930 --> 00:27:23,680
critical is to understand how you're

647
00:27:26,640 --> 00:27:24,940
going to work around that interface

648
00:27:28,470 --> 00:27:26,650
until you make that change so that you

649
00:27:30,330 --> 00:27:28,480
stay in his robusta position remember on

650
00:27:31,980 --> 00:27:30,340
the on the pump module one of the

651
00:27:34,200 --> 00:27:31,990
challenges we had was we couldn't cool

652
00:27:35,880 --> 00:27:34,210
the arm we're supposed to have redundant

653
00:27:37,500 --> 00:27:35,890
power in the arm and we had to do a lot

654
00:27:39,570 --> 00:27:37,510
of work to figure out well actually we

655
00:27:42,330 --> 00:27:39,580
could provide redundant power to the

656
00:27:43,920 --> 00:27:42,340
armed with an uncooled EDC you and we

657
00:27:45,720 --> 00:27:43,930
had certain jumpers we use to put

658
00:27:47,610 --> 00:27:45,730
ourselves a more favorable coming fig so

659
00:27:48,810 --> 00:27:47,620
that's probably one of the biggest

660
00:27:50,460 --> 00:27:48,820
things we're having to work through in

661
00:27:53,970 --> 00:27:50,470
each of these is how do you get yourself

662
00:27:55,740 --> 00:27:53,980
in a more robust posture just to survive

663
00:27:58,320 --> 00:27:55,750

but also to make sure you can go outside

664
00:28:00,570 --> 00:27:58,330
which takes certain power to it to the

665
00:28:02,220 --> 00:28:00,580
airlock and certain systems so you can

666
00:28:04,710 --> 00:28:02,230
get yourself posture go outside use the

667
00:28:07,380 --> 00:28:04,720
systems you normally use to do that do

668
00:28:11,010 --> 00:28:07,390
the change out so whether we've done

669
00:28:12,480 --> 00:28:11,020
more than two of the big 12 I don't

670
00:28:16,320 --> 00:28:12,490
remember off the top of my head I don't

671
00:28:19,140 --> 00:28:16,330
think so but as you can tell here we're

672
00:28:21,300 --> 00:28:19,150
MBS you was on there we've done quite a

673
00:28:24,150 --> 00:28:21,310
bit of work in the SU but we've also

674
00:28:25,890 --> 00:28:24,160
learned along the way I think the CVA

675
00:28:27,500 --> 00:28:25,900
told us more I don't know if that gets

676
00:28:30,840 --> 00:28:27,510
what you were pulling on Jim but

677
00:28:33,060 --> 00:28:30,850
hopefully a betrayal that you've been a

678
00:28:37,400 --> 00:28:33,070
lisp I had but maybe it's been taken off

679
00:28:40,140 --> 00:28:37,410
which one the DC study at the dcs you

680
00:28:41,550 --> 00:28:40,150
know member of the dcs use on their SS

681
00:28:43,170 --> 00:28:41,560
you and dcs you are never took it off

682
00:28:44,730 --> 00:28:43,180
took it off yeah there you go where

683
00:28:45,340 --> 00:28:44,740
we're living through a dcs you down

684
00:28:47,850 --> 00:28:45,350
actually

685
00:28:52,360 --> 00:28:47,860
now yeah it's not completely down but

686
00:28:54,070 --> 00:28:52,370
but an RBI is down but I syst don't

687
00:28:56,500 --> 00:28:54,080
remember the conversation but I suspect

688
00:28:57,880 --> 00:28:56,510

it has to do with prior to that you know

689
00:28:59,950 --> 00:28:57,890
we weren't his robust we had very few

690
00:29:02,110 --> 00:28:59,960
power channels in the early days now

691
00:29:03,340 --> 00:29:02,120
we've got all eight channels so right

692
00:29:04,750 --> 00:29:03,350
now like we're saying we're breathing a

693
00:29:07,390 --> 00:29:04,760
sigh of relief we've got seven to eight

694
00:29:10,299 --> 00:29:07,400
channels and so one channel down it's

695
00:29:12,340 --> 00:29:10,309
not a it's not it's not a position want

696
00:29:14,289 --> 00:29:12,350
to be in but it's you know it doesn't

697
00:29:15,700 --> 00:29:14,299
send you into really worrying and having

698
00:29:18,190 --> 00:29:15,710
to rush out the door I could just check

699
00:29:20,980 --> 00:29:18,200
it out but I'll gain hats off to the ifm

700
00:29:23,380 --> 00:29:20,990
group miracle workers in the great

701
00:29:28,180 --> 00:29:23,390
tradition yeah you know EDD said it

702
00:29:30,039 --> 00:29:28,190
really well and and I've you know I it's

703
00:29:31,960 --> 00:29:30,049
a treat for me to be the program manager

704
00:29:34,750 --> 00:29:31,970
in this program the number of people

705
00:29:38,289 --> 00:29:34,760
that were involved in coming up with

706
00:29:41,830 --> 00:29:38,299
ideas and and the folks that actually

707
00:29:44,320 --> 00:29:41,840
took those ideas and put them in a shape

708
00:29:48,760 --> 00:29:44,330
tools around that what crews could do on

709
00:29:51,100 --> 00:29:48,770
orbit using the stuff we had on orbit it

710
00:29:53,560 --> 00:29:51,110
was an amazing amazing thing to watch

711
00:29:55,960 --> 00:29:53,570
and behold and and it deserves a lot of

712
00:29:57,970 --> 00:29:55,970
credit is he he brought a big team of

713
00:30:00,100 --> 00:29:57,980

folks together not just the ops guys but

714
00:30:01,720 --> 00:30:00,110
the engineering guys in the MER as he

715
00:30:04,419 --> 00:30:01,730
said you know the texts were we called

716
00:30:06,070 --> 00:30:04,429
text one of them was in retirement that

717
00:30:07,600 --> 00:30:06,080
it's been a lot of time talking to us

718
00:30:10,210 --> 00:30:07,610
and explained to us to challenge the

719
00:30:12,039 --> 00:30:10,220
whole Boeing team was involved it was it

720
00:30:15,610 --> 00:30:12,049
was a great effort these guys have the

721
00:30:17,950 --> 00:30:15,620
experience and and the dedication and

722
00:30:19,990 --> 00:30:17,960
the attention to detail that you have to

723
00:30:23,049 --> 00:30:20,000
have to be successful in this

724
00:30:24,669 --> 00:30:23,059
environment and and sometimes they make

725
00:30:28,470 --> 00:30:24,679
it look a lot easier than it really is

726
00:30:31,630 --> 00:30:28,480
yeah and the girls another portal around

727
00:30:34,840 --> 00:30:31,640
thanks Jim on to mark karo with aviation

728
00:30:38,049 --> 00:30:34,850
week you know thank you Mark Corral from

729
00:30:41,590 --> 00:30:38,059
aviation week could you provide kind of

730
00:30:43,960 --> 00:30:41,600
status on the DD s you power trip on

731
00:30:46,480 --> 00:30:43,970
saturday is that something that book

732
00:30:49,390 --> 00:30:46,490
requires spacewalk ultimately to repair

733
00:30:50,980 --> 00:30:49,400
or is it still being evaluated well

734
00:30:54,460 --> 00:30:50,990
first of all we got to figure out

735
00:30:56,799 --> 00:30:54,470
exactly what trip so and it might have

736
00:30:58,870 --> 00:30:56,809
more so it jumps to learn when you're

737
00:31:01,420 --> 00:30:58,880
ready but the

738
00:31:03,400 --> 00:31:01,430

what what happened what did trip was an

739
00:31:05,650 --> 00:31:03,410
RBI in the dcs you but it was a reaction

740
00:31:07,840 --> 00:31:05,660
to something outside the dcs you that

741
00:31:10,570 --> 00:31:07,850
occurred either in the sequential shunt

742
00:31:12,700 --> 00:31:10,580
unit which is the solar rate beast power

743
00:31:14,980 --> 00:31:12,710
through the sequential shunt unit or

744
00:31:17,350 --> 00:31:14,990
it's an actually the the beta gimbal

745
00:31:19,690 --> 00:31:17,360
itself we refer to it as a broom but

746
00:31:21,790 --> 00:31:19,700
it's the rotating device that the power

747
00:31:23,380 --> 00:31:21,800
then goes through on its way to the dcs

748
00:31:26,290 --> 00:31:23,390
you and then at the dcs you it's

749
00:31:27,850 --> 00:31:26,300
distributed to the different locations

750
00:31:30,880 --> 00:31:27,860
to provide power where it's supposed to

751
00:31:33,940 --> 00:31:30,890
and so the dcs you reacted to what

752
00:31:36,430 --> 00:31:33,950
appears to be a short was a very high

753
00:31:38,740 --> 00:31:36,440
negative current short-lived negative

754
00:31:40,690 --> 00:31:38,750
current draw that tripped it now we have

755
00:31:43,600 --> 00:31:40,700
inside and we can see that that short is

756
00:31:45,700 --> 00:31:43,610
not there anymore so the the even though

757
00:31:48,310 --> 00:31:45,710
we're not providing power what we have

758
00:31:52,630 --> 00:31:48,320
to figure out is it was it the SSU or

759
00:31:54,520 --> 00:31:52,640
the or the role ring or is there some

760
00:31:55,950 --> 00:31:54,530
wiring issue in between which is hard to

761
00:31:58,480 --> 00:31:55,960
believe something like that would be

762
00:31:59,980 --> 00:31:58,490
momentary so we have a lot of work in

763
00:32:02,140 --> 00:31:59,990

front of us to try to sort through that

764
00:32:03,970 --> 00:32:02,150
when we kind of set it aside we're

765
00:32:06,190 --> 00:32:03,980
keeping power to the batteries we've got

766
00:32:09,070 --> 00:32:06,200
them charged I assume they're charged it

767
00:32:10,570 --> 00:32:09,080
up now now that we have the insight and

768
00:32:12,370 --> 00:32:10,580
we're keeping the we kept in all the

769
00:32:14,380 --> 00:32:12,380
systems on the iea and in good shape

770
00:32:16,630 --> 00:32:14,390
while we we wanted to get through this

771
00:32:19,750 --> 00:32:16,640
CVA and then think about what we need to

772
00:32:21,010 --> 00:32:19,760
do there so I have to go outside or not

773
00:32:22,540 --> 00:32:21,020
don't know we'll have finished going

774
00:32:25,870 --> 00:32:22,550
through the fault three tree and see

775
00:32:27,640 --> 00:32:25,880
what we think the cause was whether or

776
00:32:29,800 --> 00:32:27,650
not this temporary occurrence is

777
00:32:32,110 --> 00:32:29,810
something that is now we can assume

778
00:32:34,870 --> 00:32:32,120
won't happen again or if it's something

779
00:32:36,520 --> 00:32:34,880
we think is about to happen again what

780
00:32:38,140 --> 00:32:36,530
posture we need to be in for the future

781
00:32:40,630 --> 00:32:38,150
so we've got a little bit of work left

782
00:32:42,220 --> 00:32:40,640
to go on that one that didn't I give you

783
00:32:43,840 --> 00:32:42,230
a little history on the operations that

784
00:32:47,350 --> 00:32:43,850
we went through from the time of the

785
00:32:49,210 --> 00:32:47,360
trip until right right now the first

786
00:32:50,860 --> 00:32:49,220
thing of course the first thing we do

787
00:32:52,510 --> 00:32:50,870
when we see something of that nature is

788
00:32:54,070 --> 00:32:52,520

it puts a big red warning up on our

789
00:32:55,450 --> 00:32:54,080
caution and warning summary and we have

790
00:32:56,830 --> 00:32:55,460
procedures in place for any of those

791
00:32:59,890 --> 00:32:56,840
warnings so we took appropriate action

792
00:33:02,770 --> 00:32:59,900
to first just make sure that the vehicle

793
00:33:06,130 --> 00:33:02,780
was safe the channel was safe and moved

794
00:33:08,530 --> 00:33:06,140
on from there the first thing we wanted

795
00:33:10,660 --> 00:33:08,540
to do was isolate the upstream

796
00:33:12,490 --> 00:33:10,670
components which as mr. siffredi

797
00:33:15,220 --> 00:33:12,500
mentioned is the SSU

798
00:33:17,950 --> 00:33:15,230
the broom from the downstream components

799
00:33:19,570 --> 00:33:17,960
and that is the batteries themselves the

800
00:33:22,960 --> 00:33:19,580
thermal loop that the batteries are

801
00:33:24,820 --> 00:33:22,970
cooled under and then the NBS you and in

802
00:33:27,430 --> 00:33:24,830
this case that was NBS you number three

803
00:33:30,100 --> 00:33:27,440
and in this particular situation we're

804
00:33:33,340 --> 00:33:30,110
talking about dcs u3a is what you're

805
00:33:35,230 --> 00:33:33,350
referring to and the dcs you is the box

806
00:33:38,290 --> 00:33:35,240
out right under the solar array that

807
00:33:40,630 --> 00:33:38,300
routes all the power to down to the

808
00:33:43,090 --> 00:33:40,640
different loads we I wanted to isolate

809
00:33:45,070 --> 00:33:43,100
that box from from the solar array

810
00:33:47,350 --> 00:33:45,080
itself and the battery reason and the

811
00:33:49,440 --> 00:33:47,360
load so once we took care of that we

812
00:33:52,090 --> 00:33:49,450
could make use of a function that is

813
00:33:54,100 --> 00:33:52,100

exists in all of the NBS use and that is

814
00:33:56,350 --> 00:33:54,110
we can actually tie two channels

815
00:33:58,480 --> 00:33:56,360
together so we tied the three breach of

816
00:34:01,150 --> 00:33:58,490
the three be channel to the three a

817
00:34:03,820 --> 00:34:01,160
channel and that way the the fully

818
00:34:06,070 --> 00:34:03,830
functional 3b solar array could provide

819
00:34:07,960 --> 00:34:06,080
power to not only its loads but then

820
00:34:10,119 --> 00:34:07,970
also the loads that are all normally

821
00:34:11,800 --> 00:34:10,129
carried by that three a solar array and

822
00:34:14,619 --> 00:34:11,810
that included not only powering the

823
00:34:16,330 --> 00:34:14,629
loads underneath that MBS you so all of

824
00:34:18,940 --> 00:34:16,340
the end loads but it also let us send

825
00:34:20,710 --> 00:34:18,950
power back up into the the trust and we

826
00:34:23,619 --> 00:34:20,720
could actually like you said charge the

827
00:34:26,409 --> 00:34:23,629
batteries under the the three a solar

828
00:34:28,899 --> 00:34:26,419
array and so everything underneath that

829
00:34:31,899 --> 00:34:28,909
dcs you is currently being provided

830
00:34:33,970 --> 00:34:31,909
power from its next door neighbor its

831
00:34:36,490 --> 00:34:33,980
sibling power Channel the three beep our

832
00:34:39,580 --> 00:34:36,500
Channel and the the solar array itself

833
00:34:42,040 --> 00:34:39,590
is still being controlled it's computers

834
00:34:44,590 --> 00:34:42,050
called the Electra electronics control

835
00:34:46,270 --> 00:34:44,600
unit the ECU and that is still

836
00:34:48,639 --> 00:34:46,280
functional the array is still tracking

837
00:34:51,220 --> 00:34:48,649
but is it currently in a mode that we

838
00:34:53,050 --> 00:34:51,230

call being shunted in that none of its

839
00:34:55,330 --> 00:34:53,060
solar power is actually being routed

840
00:34:58,450 --> 00:34:55,340
anywhere so it's not actually collecting

841
00:35:01,140 --> 00:34:58,460
and converting power for our use but it

842
00:35:03,580 --> 00:35:01,150
is tracking just like we wanted to and

843
00:35:04,870 --> 00:35:03,590
so it's in a safe configuration and

844
00:35:07,210 --> 00:35:04,880
that's what we're really going for to

845
00:35:10,600 --> 00:35:07,220
get ready for the EV a today we wanted

846
00:35:12,820 --> 00:35:10,610
to get three a safe be able to power all

847
00:35:14,050 --> 00:35:12,830
of its loads and then we wanted to

848
00:35:16,300 --> 00:35:14,060
understand how to operate the vehicle

849
00:35:18,460 --> 00:35:16,310
with three power channels offline the

850
00:35:21,010 --> 00:35:18,470
two service by MBS you one and then the

851
00:35:23,230 --> 00:35:21,020
three a channel we got that all of that

852
00:35:24,640 --> 00:35:23,240
worked we looked for any problems that

853
00:35:25,630 --> 00:35:24,650
we might have with that going into this

854
00:35:28,420 --> 00:35:25,640
EBA

855
00:35:30,849 --> 00:35:28,430
it only required some minor changes to

856
00:35:33,240 --> 00:35:30,859
our plans for doing power downs but then

857
00:35:36,430 --> 00:35:33,250
we were able to press into today zva and

858
00:35:38,109 --> 00:35:36,440
the goal was as soon as this EBA was

859
00:35:39,940 --> 00:35:38,119
done start doing all the work that mr.

860
00:35:41,769 --> 00:35:39,950
suffered Ian talked about in assessing

861
00:35:43,269 --> 00:35:41,779
how we can get the three a channel back

862
00:35:45,069 --> 00:35:43,279
of what needs to be done there it

863
00:35:46,779 --> 00:35:45,079

wouldn't be surprising to me if the team

864
00:35:48,549 --> 00:35:46,789
isn't already meeting to start looking

865
00:35:50,920 --> 00:35:48,559
at that problem now that we've got NBS

866
00:35:52,750 --> 00:35:50,930
you one up and running that's just the

867
00:35:54,430 --> 00:35:52,760
the engineers involved in the team

868
00:35:56,319 --> 00:35:54,440
involved is that once the problems

869
00:35:58,420 --> 00:35:56,329
behind us we just move on to the next

870
00:36:04,630 --> 00:35:58,430
thing that we have to take care of and

871
00:36:07,150 --> 00:36:04,640
we keep the laboratory running okay Hank

872
00:36:10,799 --> 00:36:07,160
further from you mark up good thank you

873
00:36:14,500 --> 00:36:10,809
very much ok onda Marcia done with AP

874
00:36:17,980 --> 00:36:14,510
yes hi I was wondering oh when do you

875
00:36:19,870 --> 00:36:17,990
expect to be back up to where you are or

876
00:36:23,650 --> 00:36:19,880
so to speak not counting this latest

877
00:36:25,539 --> 00:36:23,660
problem just you know do you expect have

878
00:36:28,269 --> 00:36:25,549
all the systems back to be on the proper

879
00:36:32,259 --> 00:36:28,279
circuits in a day or are they already on

880
00:36:34,660 --> 00:36:32,269
that way now well I can tuck the near

881
00:36:38,769 --> 00:36:34,670
term plan as far as reconfiguring the

882
00:36:41,109 --> 00:36:38,779
systems the immediate response we've

883
00:36:43,299 --> 00:36:41,119
already got the NBS you up and running

884
00:36:45,549 --> 00:36:43,309
and powering providing power to the DC

885
00:36:48,009 --> 00:36:45,559
DC converter units underneath it and

886
00:36:51,279 --> 00:36:48,019
like we talked about last week some of

887
00:36:53,559 --> 00:36:51,289
those converters are the only provider

888
00:36:56,230 --> 00:36:53,569

of power to some of our avionics and in

889
00:36:58,779 --> 00:36:56,240
other cases those converters share loads

890
00:37:00,279 --> 00:36:58,789
with what we call parallel ddc use being

891
00:37:02,769 --> 00:37:00,289
power from other channels so when you

892
00:37:05,559 --> 00:37:02,779
have the two ddc use together sharing

893
00:37:09,130 --> 00:37:05,569
the loads we have repowered those ddc

894
00:37:11,859 --> 00:37:09,140
use and now that 1a and 1b power is

895
00:37:13,630 --> 00:37:11,869
jointly feeding all of the loads and

896
00:37:17,319 --> 00:37:13,640
that is a nominal configuration that's

897
00:37:21,490 --> 00:37:17,329
that's normal two of our primary load

898
00:37:23,980 --> 00:37:21,500
carriers are ddc you one Bravo and then

899
00:37:26,740 --> 00:37:23,990
also at zero one alpha and what that is

900
00:37:29,319 --> 00:37:26,750
one side powers half of the avionics in

901
00:37:30,819 --> 00:37:29,329
the US lab the other side powers things

902
00:37:32,650 --> 00:37:30,829
like one of our external thermal loop

903
00:37:35,289 --> 00:37:32,660
pumps and one of our s band strings

904
00:37:37,120 --> 00:37:35,299
right now all of those loads are being

905
00:37:38,349 --> 00:37:37,130
powered through jumpers and we talked

906
00:37:38,930 --> 00:37:38,359
about those last week and how we've

907
00:37:41,630 --> 00:37:38,940
rerouted

908
00:37:43,730 --> 00:37:41,640
power through those jumpers now over the

909
00:37:45,530 --> 00:37:43,740
next two days we'll be removing those

910
00:37:47,630 --> 00:37:45,540
jumpers and that will get us back into

911
00:37:49,880 --> 00:37:47,640
the standard configuration so tomorrow

912
00:37:51,440 --> 00:37:49,890
we're going to remove the internal the

913
00:37:54,770 --> 00:37:51,450

the jumper that's providing power to the

914
00:37:57,380 --> 00:37:54,780
internal loads and then on Friday

915
00:37:59,000 --> 00:37:57,390
today's Wednesday and Friday will be

916
00:38:00,800 --> 00:37:59,010
removing the jumper that provides power

917
00:38:04,220 --> 00:38:00,810
to the external loads and then we'll be

918
00:38:08,089 --> 00:38:04,230
back in the normal configuration for the

919
00:38:10,309 --> 00:38:08,099
MBS you one service loads thank you and

920
00:38:13,490 --> 00:38:10,319
one other question I think I may know

921
00:38:15,859 --> 00:38:13,500
the answer but did you say that this was

922
00:38:17,900 --> 00:38:15,869
a defect that was introduced on the

923
00:38:19,190 --> 00:38:17,910
ground prior to launch the fact that all

924
00:38:22,190 --> 00:38:19,200
these metal shavings were in their

925
00:38:24,050 --> 00:38:22,200
jamming the the socket I just went

926
00:38:26,450 --> 00:38:24,060
trying to get a handle on how this

927
00:38:29,000 --> 00:38:26,460
actually happened to begin with well

928
00:38:31,970 --> 00:38:29,010
it's a and I don't know how to call it a

929
00:38:34,640 --> 00:38:31,980
defect as a result of how we had to

930
00:38:36,890 --> 00:38:34,650
install it we think we probably called

931
00:38:39,200 --> 00:38:36,900
the bolt as we were installing it and so

932
00:38:41,569 --> 00:38:39,210
the result of that is you damage the

933
00:38:45,829 --> 00:38:41,579
threads a little bit and leave you leave

934
00:38:48,800 --> 00:38:45,839
shavings behind and that's likely the

935
00:38:52,730 --> 00:38:48,810
source of the shavings that we found in

936
00:38:56,690 --> 00:38:52,740
the and the trouble we had with with the

937
00:38:58,490 --> 00:38:56,700
post threads that speculation but it's

938
00:39:01,250 --> 00:38:58,500

AB it's pretty good guess it'd be hard

939
00:39:04,609 --> 00:39:01,260
to do that kind of we just remove the

940
00:39:08,380 --> 00:39:04,619
bolt on orbit so it'd be hard to leave

941
00:39:12,290 --> 00:39:08,390
that kind of that number of threads I

942
00:39:13,700 --> 00:39:12,300
mean that amount of shavings that we saw

943
00:39:18,200 --> 00:39:13,710
with a little bit of work we did on

944
00:39:22,010 --> 00:39:18,210
orbit so that's the speculation thank

945
00:39:28,570 --> 00:39:22,020
you okay next is todd halvorson from

946
00:39:35,050 --> 00:39:31,000
well not hearing from Todd Denise with

947
00:39:39,240 --> 00:39:35,060
space com hi thank you I think it was

948
00:39:42,190 --> 00:39:39,250
Jack Fisher and Mission Control once the

949
00:39:43,990 --> 00:39:42,200
unit has been installed and powered up

950
00:39:46,180 --> 00:39:44,000
he said that when he was congratulating

951
00:39:49,690 --> 00:39:46,190
curly came that it felt a little bit

952
00:39:51,280 --> 00:39:49,700
like being on the set of Apollo 13 I was

953
00:39:53,920 --> 00:39:51,290
wondering eid or Keith if you could

954
00:39:56,080 --> 00:39:53,930
describe what kind of tension we were

955
00:39:59,220 --> 00:39:56,090
feeling in Mission Control today and

956
00:40:04,090 --> 00:39:59,230
also in the days leading up to the ETA

957
00:40:06,040 --> 00:40:04,100
i'll start you know there's one thing

958
00:40:07,720 --> 00:40:06,050
with apollo 13 and the issues that they

959
00:40:11,050 --> 00:40:07,730
faced obviously that was life

960
00:40:12,550 --> 00:40:11,060
threatening to the crew and the efforts

961
00:40:14,950 --> 00:40:12,560
that they were working through then was

962
00:40:18,490 --> 00:40:14,960
how to get the crew home safely alive we

963
00:40:20,740 --> 00:40:18,500

obviously weren't in that situation but

964
00:40:22,510 --> 00:40:20,750
what the similarities really were there

965
00:40:26,860 --> 00:40:22,520
though to watch how the team came

966
00:40:28,510 --> 00:40:26,870
together just the the the scene that

967
00:40:32,130 --> 00:40:28,520
comes to mind for the movie and we did

968
00:40:34,510 --> 00:40:32,140
make jokes and talk about Apollo 13 and

969
00:40:35,770 --> 00:40:34,520
failure is not an option as certainly is

970
00:40:37,180 --> 00:40:35,780
something that I mentioned a couple of

971
00:40:40,750 --> 00:40:37,190
times because we had to get this thing

972
00:40:43,480 --> 00:40:40,760
installed but the scene where where the

973
00:40:45,580 --> 00:40:43,490
engineers came in and dumped a box full

974
00:40:46,960 --> 00:40:45,590
of here's the stuff they've got on the

975
00:40:49,720 --> 00:40:46,970
vehicle let's figure out how to make

976
00:40:51,760 --> 00:40:49,730
this work for their co2 scrubber we

977
00:40:53,920 --> 00:40:51,770
didn't use any socks but we pretty much

978
00:40:55,660 --> 00:40:53,930
pulled a bunch of different pieces out

979
00:40:59,740 --> 00:40:55,670
of our pantries and put together an

980
00:41:03,940 --> 00:40:59,750
amazing set of tools and the free flow

981
00:41:05,560 --> 00:41:03,950
of ideas from any corner that that might

982
00:41:07,480 --> 00:41:05,570
have helped us it was just like it was

983
00:41:11,590 --> 00:41:07,490
in the in the movie and then also in

984
00:41:13,980 --> 00:41:11,600
real life the the dedication and

985
00:41:16,210 --> 00:41:13,990
professionalism of everyone involved and

986
00:41:17,800 --> 00:41:16,220
something else that I don't know if it's

987
00:41:20,740 --> 00:41:17,810
easy to pick up in the movie but if you

988
00:41:22,270 --> 00:41:20,750

watch the movie or if you know about the

989
00:41:26,290 --> 00:41:22,280
real life story the age of the flight

990
00:41:29,320 --> 00:41:26,300
controllers these are all young kids

991
00:41:33,000 --> 00:41:29,330
that are doing this amazing work and the

992
00:41:35,260 --> 00:41:33,010
same was true in our story the the the

993
00:41:37,470 --> 00:41:35,270
younger generation of flight controllers

994
00:41:39,700 --> 00:41:37,480
that are pulling these things together

995
00:41:40,650 --> 00:41:39,710
assisted by the seasoned veterans that

996
00:41:42,720 --> 00:41:40,660
have been through

997
00:41:44,750 --> 00:41:42,730
things that included first element

998
00:41:47,250 --> 00:41:44,760
launch watching them pull together the

999
00:41:48,539 --> 00:41:47,260
amazing things that we did were that

1000
00:41:51,809 --> 00:41:48,549
they pulled together that allowed us to

1001
00:41:53,579 --> 00:41:51,819
do what we did today really did come

1002
00:41:56,309 --> 00:41:53,589
similar to what it must have been like

1003
00:41:57,420 --> 00:41:56,319
to experience Apollo 13 although we

1004
00:41:59,190 --> 00:41:57,430
didn't weren't allowed to smoke cigars

1005
00:42:06,990 --> 00:41:59,200
in the end so I think they still had it

1006
00:42:08,730 --> 00:42:07,000
a little better no that's it thank you

1007
00:42:11,940 --> 00:42:08,740
all right we'll move on to fill with

1008
00:42:14,250 --> 00:42:11,950
NASA Space Flight com has already

1009
00:42:17,220 --> 00:42:14,260
covered everything for me thanks all

1010
00:42:19,890 --> 00:42:17,230
right bill Harwood CBS yeah just one

1011
00:42:22,200 --> 00:42:19,900
more a dcs you question for it I guess

1012
00:42:24,809 --> 00:42:22,210
are there any operational constraints to

1013
00:42:26,730 --> 00:42:24,819

being one channel down or want to write

1014
00:42:28,559 --> 00:42:26,740
down I guess you have to manage anything

1015
00:42:30,599 --> 00:42:28,569
because you don't have all eight running

1016
00:42:34,020 --> 00:42:30,609
or is it too transparent at this point

1017
00:42:35,760 --> 00:42:34,030
Thanks well you know us so we have

1018
00:42:37,109 --> 00:42:35,770
flight rules for everything some so

1019
00:42:39,359 --> 00:42:37,119
there are there are definitely

1020
00:42:41,660 --> 00:42:39,369
constraints for operating in the

1021
00:42:43,890 --> 00:42:41,670
configuration that we're in right now

1022
00:42:45,900 --> 00:42:43,900
the constraints are a lot lighter now

1023
00:42:47,420 --> 00:42:45,910
that we have MBS you want up and running

1024
00:42:51,450 --> 00:42:47,430
and once we get back into that fully

1025
00:42:53,910 --> 00:42:51,460
normal configuration we will be in good

1026
00:42:56,250 --> 00:42:53,920
shape we talked a lot last week about

1027
00:42:57,029 --> 00:42:56,260
power balance and power loading and

1028
00:42:59,190 --> 00:42:57,039
we're still going to be in that

1029
00:43:01,460 --> 00:42:59,200
situation where we have to manage the

1030
00:43:03,930 --> 00:43:01,470
amount of power that we put on the

1031
00:43:06,750 --> 00:43:03,940
channels and make sure we don't do

1032
00:43:09,799 --> 00:43:06,760
something that might trip off either the

1033
00:43:11,940 --> 00:43:09,809
three a channel or the entire 3a and 3b

1034
00:43:15,000 --> 00:43:11,950
channel because now we have those two

1035
00:43:17,940 --> 00:43:15,010
things tied together we have the power

1036
00:43:21,180 --> 00:43:17,950
recess officers is a it's a group of

1037
00:43:24,240 --> 00:43:21,190
folks that analyze all of our power

1038
00:43:26,760 --> 00:43:24,250

loading the the solar angles where we

1039
00:43:29,250 --> 00:43:26,770
are in the orbit and and they tell us

1040
00:43:30,569 --> 00:43:29,260
what our forecast power usage is

1041
00:43:32,039 --> 00:43:30,579
obviously we've been putting them

1042
00:43:34,289 --> 00:43:32,049
through the grinder for the past week

1043
00:43:36,480 --> 00:43:34,299
and they'll continue to make sure that

1044
00:43:39,569 --> 00:43:36,490
we stay on the on the right path as far

1045
00:43:40,859 --> 00:43:39,579
as our power balance and then we do have

1046
00:43:44,309 --> 00:43:40,869
to make sure that we manage the

1047
00:43:47,010 --> 00:43:44,319
batteries for example we mentioned that

1048
00:43:51,210 --> 00:43:47,020
the the three AAA batteries are being

1049
00:43:53,609 --> 00:43:51,220
charged through the the three be solar

1050
00:43:54,270 --> 00:43:53,619
array but because the 3a and the 3b

1051
00:43:56,790 --> 00:43:54,280
channels are

1052
00:43:58,890 --> 00:43:56,800
tied together the the three a batteries

1053
00:44:01,020 --> 00:43:58,900
aren't going to be taxed as much as they

1054
00:44:03,420 --> 00:44:01,030
otherwise would be because the 3a and 3b

1055
00:44:05,100 --> 00:44:03,430
batteries are sharing the loads and so

1056
00:44:08,010 --> 00:44:05,110
there's actually a potential that we

1057
00:44:09,900 --> 00:44:08,020
could can hit the upper charge limits on

1058
00:44:12,420 --> 00:44:09,910
those batteries if we continue to just

1059
00:44:15,750 --> 00:44:12,430
let them charge so we have insight into

1060
00:44:17,340 --> 00:44:15,760
that and we might force those batteries

1061
00:44:19,800 --> 00:44:17,350
to be used just so we keep their

1062
00:44:22,560 --> 00:44:19,810
charging levels down to where they're I

1063
00:44:23,820 --> 00:44:22,570

think 105 percent is where we try to

1064
00:44:24,960 --> 00:44:23,830
stop them somewhere around there so we

1065
00:44:28,470 --> 00:44:24,970
just keep them make sure they keep

1066
00:44:29,700 --> 00:44:28,480
discharging as we need to on a scale of

1067
00:44:32,040 --> 00:44:29,710
what we've been working through the last

1068
00:44:34,980 --> 00:44:32,050
week though this is going to be a bit

1069
00:44:36,150 --> 00:44:34,990
more manageable for us and we should be

1070
00:44:41,010 --> 00:44:36,160
able to take care of this without any

1071
00:44:44,010 --> 00:44:41,020
problems thank you very much okay last

1072
00:44:46,230 --> 00:44:44,020
but not least Irene Klotz thanks so much

1073
00:44:47,700 --> 00:44:46,240
with my questions have been answered I

1074
00:44:50,490 --> 00:44:47,710
just was curious if you guys have a

1075
00:44:56,520 --> 00:44:50,500
target launch date for the SpaceX right

1076
00:44:59,610 --> 00:44:56,530
thing for SpaceX it's a it's interesting

1077
00:45:02,060 --> 00:44:59,620
it's one of these things where we tried

1078
00:45:04,710 --> 00:45:02,070
to manage our readiness for the vehicle

1079
00:45:06,420 --> 00:45:04,720
given the availability of the range so

1080
00:45:10,050 --> 00:45:06,430
they have the range today on the ninth

1081
00:45:12,900 --> 00:45:10,060
and tenth of October and we're prepared

1082
00:45:15,420 --> 00:45:12,910
to support that however they could fly

1083
00:45:17,820 --> 00:45:15,430
sooner and we prefer them to fly a

1084
00:45:21,810 --> 00:45:17,830
little sooner to just keep ourselves d

1085
00:45:24,210 --> 00:45:21,820
conflicted from the from the the Soyuz

1086
00:45:25,770 --> 00:45:24,220
flight that's coming up and they slip if

1087
00:45:27,360 --> 00:45:25,780
they slip from the 10th we've got to go

1088
00:45:29,070 --> 00:45:27,370

to the other side of the so you slide so

1089
00:45:31,260 --> 00:45:29,080
what we'd like to do is try a little

1090
00:45:34,440 --> 00:45:31,270
earlier if we can think there's an atlas

1091
00:45:36,360 --> 00:45:34,450
on the range so we're ready to fly

1092
00:45:38,940 --> 00:45:36,370
they'll be ready to fly some understands

1093
00:45:40,430 --> 00:45:38,950
early as the fifth of October and will

1094
00:45:43,310 --> 00:45:40,440
be prepared to take them on the fifth of

1095
00:45:45,330 --> 00:45:43,320
October but right now the ranges is

1096
00:45:46,830 --> 00:45:45,340
occupied on that date so if something

1097
00:45:48,660 --> 00:45:46,840
changes on the range then we'll try

1098
00:45:51,180 --> 00:45:48,670
earlier other right otherwise right now

1099
00:45:52,710 --> 00:45:51,190
we've got them there on the range for

1100
00:45:53,490 --> 00:45:52,720
the ninth and we're prepared for them to

1101
00:45:59,940 --> 00:45:53,500
arrive

1102
00:46:01,650 --> 00:45:59,950
after that launch okay well not seeing

1103
00:46:03,690 --> 00:46:01,660
any further follow-ups here in Houston

1104
00:46:05,340 --> 00:46:03,700
will close this briefing out thank you

1105
00:46:07,380 --> 00:46:05,350
very much for being here today remember

1106
00:46:09,150 --> 00:46:07,390
that all the latest information on the

1107
00:46:13,350 --> 00:46:09,160
International Space Station is available