
Johns

1
00:00:06,070 --> 00:00:03,909
well good afternoon everybody and uh

2
00:00:08,310 --> 00:00:06,080
welcome to nasa's johnson space center

3
00:00:11,509 --> 00:00:08,320
we're here to talk about the status of

4
00:00:13,830 --> 00:00:11,519
space shuttle discovery in the sts-133

5
00:00:15,910 --> 00:00:13,840
mission uh joining us today is bill

6
00:00:18,790 --> 00:00:15,920
gerstenmaier he is the associate

7
00:00:21,029 --> 00:00:18,800
administrator for space operations based

8
00:00:22,870 --> 00:00:21,039
out of nasa headquarters also joining us

9
00:00:25,109 --> 00:00:22,880
is john shannon he is the space shuttle

10
00:00:26,870 --> 00:00:25,119
program manager we'll hear from both

11
00:00:30,310 --> 00:00:26,880
gentlemen and then we'll take questions

12
00:00:31,990 --> 00:00:30,320
from jsc ksc and then out on the phone

13
00:00:34,229 --> 00:00:32,000

bridge so i'll with that i'll turn it

14
00:00:36,310 --> 00:00:34,239
over to bill all right thanks kyle

15
00:00:38,069 --> 00:00:36,320
um first i'd like to say you know john

16
00:00:40,470 --> 00:00:38,079
and the whole shuttle team have just

17
00:00:41,670 --> 00:00:40,480
done a fantastic job of working through

18
00:00:43,270 --> 00:00:41,680
this problem

19
00:00:45,110 --> 00:00:43,280
you know they're methodically looking at

20
00:00:47,350 --> 00:00:45,120
all the data in the analysis

21
00:00:48,470 --> 00:00:47,360
they've laid out a really excellent plan

22
00:00:51,750 --> 00:00:48,480
to

23
00:00:53,270 --> 00:00:51,760
understand what's going on it's

24
00:00:55,430 --> 00:00:53,280
extremely well ordered plan with the

25
00:00:57,029 --> 00:00:55,440
high priority items first and it looks

26
00:00:59,189 --> 00:00:57,039
looks really good

27
00:01:00,790 --> 00:00:59,199
the teams at ksc have done a great job

28
00:01:03,189 --> 00:01:00,800
you know they've completed repairs on

29
00:01:04,710 --> 00:01:03,199
the tank and completed the x-rays that

30
00:01:06,630 --> 00:01:04,720
will provide critical data to the

31
00:01:08,469 --> 00:01:06,640
analysis teams and to john's folks that

32
00:01:09,910 --> 00:01:08,479
are looking at all this stuff

33
00:01:13,030 --> 00:01:09,920
you know we would have liked to have

34
00:01:13,830 --> 00:01:13,040
found a most probable cause by now and

35
00:01:15,350 --> 00:01:13,840
things would be a lot more

36
00:01:16,630 --> 00:01:15,360
straightforward

37
00:01:18,710 --> 00:01:16,640
this is turning out to be a little more

38
00:01:20,789 --> 00:01:18,720

complicated from an analysis standpoint

39
00:01:22,710 --> 00:01:20,799
and it doesn't ease lend itself to a

40
00:01:24,390 --> 00:01:22,720
very easy answer but again i think the

41
00:01:26,070 --> 00:01:24,400
teams are are working through this

42
00:01:27,830 --> 00:01:26,080
methodically they're not going to rush

43
00:01:29,990 --> 00:01:27,840
to any kind of conclusions or any

44
00:01:31,510 --> 00:01:30,000
decisions that they're not right until

45
00:01:33,429 --> 00:01:31,520
they've really got those supported by

46
00:01:35,270 --> 00:01:33,439
good data and analysis so they're

47
00:01:38,149 --> 00:01:35,280
continuing to do that and we'll see how

48
00:01:39,749 --> 00:01:38,159
things come in the next several days

49
00:01:40,870 --> 00:01:39,759
we thought we'd we'd like to talk to you

50
00:01:42,310 --> 00:01:40,880
today just a little bit to give you a

51
00:01:44,149 --> 00:01:42,320
status of where we are we haven't talked

52
00:01:45,270 --> 00:01:44,159
to you in general for a while

53
00:01:46,870 --> 00:01:45,280
we're not going to be able to answer all

54
00:01:48,550 --> 00:01:46,880
your questions because obviously the

55
00:01:50,069 --> 00:01:48,560
teams are still looking at data we can

56
00:01:51,910 --> 00:01:50,079
kind of tell you where we are what's

57
00:01:54,069 --> 00:01:51,920
going on what's happening john will give

58
00:01:55,830 --> 00:01:54,079
you a lot more details we'll be careful

59
00:01:58,230 --> 00:01:55,840
not to speculate because especially at

60
00:02:00,550 --> 00:01:58,240
this time in an anomaly

61
00:02:02,469 --> 00:02:00,560
resolution activity things change pretty

62
00:02:04,230 --> 00:02:02,479
quickly you know the right analysis

63
00:02:05,830 --> 00:02:04,240

comes in the right data comes in and

64
00:02:07,510 --> 00:02:05,840
then we're off on a slightly different

65
00:02:08,869 --> 00:02:07,520
path so so we'll be careful not to

66
00:02:10,949 --> 00:02:08,879
speculate too much about where we're

67
00:02:12,309 --> 00:02:10,959
going and where things are heading and

68
00:02:13,830 --> 00:02:12,319
again we're going to do like we do with

69
00:02:15,990 --> 00:02:13,840
all these problems we'll let the data

70
00:02:18,550 --> 00:02:16,000
drive where we're heading we won't pick

71
00:02:19,990 --> 00:02:18,560
a particular launch opportunity we'll be

72
00:02:21,430 --> 00:02:20,000
aware of where the launches are but

73
00:02:22,949 --> 00:02:21,440
we'll let the data the analysis and the

74
00:02:24,949 --> 00:02:22,959
work in front of us kind of drive where

75
00:02:26,070 --> 00:02:24,959
we go so with that i'll turn it over to

76
00:02:27,990 --> 00:02:26,080
john and he'll give you some more

77
00:02:31,190 --> 00:02:28,000
details john

78
00:02:33,110 --> 00:02:31,200
okay thanks bill uh yeah like like bill

79
00:02:35,750 --> 00:02:33,120
just said we got out of our

80
00:02:37,750 --> 00:02:35,760
uh last big engineering meeting with

81
00:02:39,270 --> 00:02:37,760
participation from

82
00:02:40,949 --> 00:02:39,280
johnson space center marshall space

83
00:02:43,190 --> 00:02:40,959
flight center kennedy

84
00:02:45,350 --> 00:02:43,200
our independent engineering and safety

85
00:02:46,790 --> 00:02:45,360
groups to talk about this external

86
00:02:48,309 --> 00:02:46,800
stringer crack

87
00:02:50,390 --> 00:02:48,319
and i haven't uh i haven't really talked

88
00:02:54,150 --> 00:02:50,400

to you since since we first had this on

89
00:02:57,670 --> 00:02:54,160
november 5th on our first uh tanking

90
00:02:58,949 --> 00:02:57,680
opportunity for sts-133 so let me let me

91
00:03:00,309 --> 00:02:58,959
just kind of orient you as to what we're

92
00:03:02,070 --> 00:03:00,319
talking about

93
00:03:03,350 --> 00:03:02,080
of course i have the shuttle stack here

94
00:03:05,110 --> 00:03:03,360
and

95
00:03:07,430 --> 00:03:05,120
at the top of the external tank you have

96
00:03:09,110 --> 00:03:07,440
the liquid oxygen tank and you have the

97
00:03:10,710 --> 00:03:09,120
liquid hydrogen tank that's down here

98
00:03:12,070 --> 00:03:10,720
and the structural member between the

99
00:03:13,830 --> 00:03:12,080
two

100
00:03:15,350 --> 00:03:13,840
is called the inner tank and we're

101
00:03:16,390 --> 00:03:15,360
talking about an inner tank stringer

102
00:03:18,309 --> 00:03:16,400
crack

103
00:03:20,630 --> 00:03:18,319
and the way this inner tank is built up

104
00:03:22,229 --> 00:03:20,640
is there are eight rounded panels that

105
00:03:25,670 --> 00:03:22,239
when they're all assembled together they

106
00:03:27,830 --> 00:03:25,680
make the circle uh that will sit on top

107
00:03:30,229 --> 00:03:27,840
of the hydrogen tank and connect it to

108
00:03:32,390 --> 00:03:30,239
the uh to the oxygen tank

109
00:03:34,869 --> 00:03:32,400
and the eight panels that make this up

110
00:03:37,190 --> 00:03:34,879
two of them one on each side of the

111
00:03:39,030 --> 00:03:37,200
solid rocket boosters are called thrust

112
00:03:40,070 --> 00:03:39,040
panels and they're made out of two inch

113
00:03:42,869 --> 00:03:40,080

thick

114
00:03:45,030 --> 00:03:42,879
milled aluminum and they're supported to

115
00:03:46,470 --> 00:03:45,040
a to a beam that goes between the solid

116
00:03:48,869 --> 00:03:46,480
rocket boosters and they carry much the

117
00:03:49,830 --> 00:03:48,879
load when the solid rocket boosters lift

118
00:03:51,750 --> 00:03:49,840
off

119
00:03:53,270 --> 00:03:51,760
and it's transmitted to those thrust

120
00:03:54,869 --> 00:03:53,280
panels and and

121
00:03:56,550 --> 00:03:54,879
throughout the stack

122
00:03:58,949 --> 00:03:56,560
the other six panels there's three on

123
00:04:01,429 --> 00:03:58,959
each side one two three and then on the

124
00:04:05,110 --> 00:04:01,439
back the same one two three

125
00:04:08,550 --> 00:04:05,120
are made of a thin aluminum sheet

126
00:04:11,429 --> 00:04:08,560
and that sheet is stiffened by these

127
00:04:14,070 --> 00:04:11,439
stringers and the stringers are

128
00:04:15,670 --> 00:04:14,080
u-shaped pieces of an aluminum aluminum

129
00:04:19,430 --> 00:04:15,680
lithium material

130
00:04:21,349 --> 00:04:19,440
they're 21 feet long and each of these

131
00:04:23,909 --> 00:04:21,359
panels each of these six panels has 18

132
00:04:25,350 --> 00:04:23,919
stringers about 21 feet long that run

133
00:04:27,590 --> 00:04:25,360
down the length

134
00:04:29,270 --> 00:04:27,600
of the panel to give it stiffness much

135
00:04:33,430 --> 00:04:29,280
like a

136
00:04:35,590 --> 00:04:33,440
corrugated tin roof material or the the

137
00:04:37,670 --> 00:04:35,600
the wavy piece of cardboard inside a

138
00:04:38,710 --> 00:04:37,680

cardboard sheet stiffens it up

139
00:04:42,870 --> 00:04:38,720
that's the

140
00:04:45,749 --> 00:04:42,880
and uh what happened is

141
00:04:48,469 --> 00:04:45,759
these stringers are attached

142
00:04:50,230 --> 00:04:48,479
to a uh a ring at the top and a ring at

143
00:04:52,150 --> 00:04:50,240
the bottom

144
00:04:54,710 --> 00:04:52,160
that is uh supporting

145
00:04:57,430 --> 00:04:54,720
the uh the tank the liquid oxygen tank

146
00:05:00,390 --> 00:04:57,440
up here in the hydrogen tank down here

147
00:05:02,310 --> 00:05:00,400
and what happened on on november 5th is

148
00:05:03,909 --> 00:05:02,320
when we started filling the liquid

149
00:05:07,909 --> 00:05:03,919
oxygen tank

150
00:05:10,070 --> 00:05:07,919
with the minus 300 degree f

151
00:05:11,670 --> 00:05:10,080
liquid oxygen the ring that the

152
00:05:14,710 --> 00:05:11,680
stringers are attached to shrinks

153
00:05:16,230 --> 00:05:14,720
radially about a half of an inch

154
00:05:17,990 --> 00:05:16,240
and i'm not going to point this anymore

155
00:05:19,270 --> 00:05:18,000
so you can we i promise not to do that

156
00:05:22,629 --> 00:05:19,280
anymore

157
00:05:26,230 --> 00:05:22,639
so when that whole ring shrinks you get

158
00:05:28,870 --> 00:05:26,240
a bending at the top of those stringers

159
00:05:30,070 --> 00:05:28,880
and the stringers are fastened by rivets

160
00:05:32,550 --> 00:05:30,080
in the middle and then these special

161
00:05:34,870 --> 00:05:32,560
fasteners up at the top

162
00:05:36,310 --> 00:05:34,880
and as that ring shrinks the the top of

163
00:05:38,310 --> 00:05:36,320

the stringer bends

164
00:05:40,790 --> 00:05:38,320
and the design is such that it just

165
00:05:43,110 --> 00:05:40,800
bends in and and it doesn't really take

166
00:05:44,070 --> 00:05:43,120
much load other than that

167
00:05:45,830 --> 00:05:44,080
um

168
00:05:47,510 --> 00:05:45,840
what happened on the first time we

169
00:05:48,870 --> 00:05:47,520
loaded the tank

170
00:05:51,189 --> 00:05:48,880
is

171
00:05:53,990 --> 00:05:51,199
when that first bending moment started

172
00:05:57,270 --> 00:05:54,000
on the stringer a crack appeared along

173
00:05:58,230 --> 00:05:57,280
one of the the feet of the stringer

174
00:05:59,830 --> 00:05:58,240
and

175
00:06:02,390 --> 00:05:59,840
the stringer basically cracked on the

176
00:06:05,029 --> 00:06:02,400
other side in an overload condition and

177
00:06:06,390 --> 00:06:05,039
popped out about a half of an inch which

178
00:06:07,909 --> 00:06:06,400
you know would mean the stringer was

179
00:06:13,110 --> 00:06:07,919
straight while the rest of the tank bent

180
00:06:17,110 --> 00:06:15,990
now when it popped out it broke the foam

181
00:06:17,990 --> 00:06:17,120
and we saw

182
00:06:34,150 --> 00:06:18,000
a

183
00:06:35,189 --> 00:06:34,160
we went to uh to either side of it uh

184
00:06:37,670 --> 00:06:35,199
found

185
00:06:39,270 --> 00:06:37,680
smaller cracks in the stringer to the uh

186
00:06:41,270 --> 00:06:39,280
to the left of it

187
00:06:43,830 --> 00:06:41,280
and um and then we went out further

188
00:06:46,870 --> 00:06:43,840

until we found you know good stringers

189
00:06:51,029 --> 00:06:46,880
and uh and the investigation started and

190
00:06:52,870 --> 00:06:51,039
um as we started looking at it

191
00:06:54,790 --> 00:06:52,880
the we have had

192
00:06:57,749 --> 00:06:54,800
a history

193
00:07:00,390 --> 00:06:57,759
on these stringers during assembly

194
00:07:02,469 --> 00:07:00,400
occasionally of getting cracks in them

195
00:07:05,510 --> 00:07:02,479
that are caused

196
00:07:07,510 --> 00:07:05,520
we believe by the assembly process

197
00:07:09,830 --> 00:07:07,520
if you look at the design and we've

198
00:07:11,510 --> 00:07:09,840
reviewed over the last week and a half

199
00:07:12,550 --> 00:07:11,520
very closely the design of these

200
00:07:13,670 --> 00:07:12,560
stringers

201
00:07:18,469 --> 00:07:13,680
how they're

202
00:07:21,110 --> 00:07:18,479
they would take in the initial cryo

203
00:07:24,629 --> 00:07:21,120
loading and also during launch

204
00:07:27,589 --> 00:07:24,639
they have plenty of design margin so a

205
00:07:28,629 --> 00:07:27,599
a properly assembled stringer

206
00:07:30,230 --> 00:07:28,639
in the

207
00:07:31,350 --> 00:07:30,240
expected flight environment will not

208
00:07:33,589 --> 00:07:31,360
crack

209
00:07:36,230 --> 00:07:33,599
and when we started looking at the at

210
00:07:41,430 --> 00:07:38,070
these stringers which we changed the

211
00:07:42,550 --> 00:07:41,440
material on about 40 tanks ago 43 tanks

212
00:07:44,790 --> 00:07:42,560
ago we changed the material from

213
00:07:47,990 --> 00:07:44,800

aluminum to an aluminum lithium

214
00:07:50,550 --> 00:07:48,000
which is a more brittle material

215
00:07:52,869 --> 00:07:50,560
so that's over those 43 tanks that's

216
00:07:55,350 --> 00:07:52,879
about 5 000 stringers

217
00:07:58,390 --> 00:07:55,360
that we've assembled and out of those 5

218
00:08:00,230 --> 00:07:58,400
000 during assembly we've had 31 cracks

219
00:08:02,550 --> 00:08:00,240
and we started reviewing those today at

220
00:08:05,270 --> 00:08:02,560
the the engineering review

221
00:08:07,670 --> 00:08:05,280
and it can be due to things like the

222
00:08:10,469 --> 00:08:07,680
fastener misalignment or

223
00:08:12,790 --> 00:08:10,479
damage getting getting hit by something

224
00:08:14,469 --> 00:08:12,800
during the assembly process

225
00:08:16,469 --> 00:08:14,479
mishandling

226
00:08:18,869 --> 00:08:16,479
but all of them have been

227
00:08:20,869 --> 00:08:18,879
known assembly issues that we've had

228
00:08:23,270 --> 00:08:20,879
that have caused those cracks it's not a

229
00:08:24,390 --> 00:08:23,280
it's not a design issue and that's

230
00:08:27,110 --> 00:08:24,400
that's something that we have

231
00:08:28,950 --> 00:08:27,120
re-verified over the last week

232
00:08:31,510 --> 00:08:28,960
again if a stringer is properly

233
00:08:33,509 --> 00:08:31,520
assembled it will carry that load and

234
00:08:35,029 --> 00:08:33,519
not have a problem

235
00:08:36,790 --> 00:08:35,039
so the question was

236
00:08:38,230 --> 00:08:36,800
we had this crack that appeared on the

237
00:08:40,149 --> 00:08:38,240
launch pad is the first time that it

238
00:08:42,550 --> 00:08:40,159

happened

239
00:08:44,230 --> 00:08:42,560
did we have the two questions or did we

240
00:08:47,190 --> 00:08:44,240
have a

241
00:08:48,230 --> 00:08:47,200
a an escape in our inspection

242
00:08:51,990 --> 00:08:48,240
methods

243
00:08:55,030 --> 00:08:52,000
that allowed a flaw to get into the

244
00:08:57,509 --> 00:08:55,040
assembly of the inner tank that was

245
00:08:59,829 --> 00:08:57,519
exposed when we did our cryoloading and

246
00:09:02,230 --> 00:08:59,839
loaded up that piece

247
00:09:05,030 --> 00:09:02,240
or the other

248
00:09:07,430 --> 00:09:05,040
question was did you did you have

249
00:09:09,350 --> 00:09:07,440
some kind of a an assembly misalignment

250
00:09:11,430 --> 00:09:09,360
that could add additional stress to that

251
00:09:13,990 --> 00:09:11,440
piece that when you added the stress of

252
00:09:16,550 --> 00:09:14,000
cryoloading it would overload that piece

253
00:09:18,389 --> 00:09:16,560
and you get get this crack

254
00:09:20,230 --> 00:09:18,399
now the hope last week

255
00:09:22,710 --> 00:09:20,240
and why we

256
00:09:24,550 --> 00:09:22,720
why we were kind of sequentially

257
00:09:27,910 --> 00:09:24,560
slipping launch dates

258
00:09:29,430 --> 00:09:27,920
uh was that we would show that uh there

259
00:09:32,550 --> 00:09:29,440
was a flaw in this material that you

260
00:09:34,550 --> 00:09:32,560
could go find some uh material defect

261
00:09:37,350 --> 00:09:34,560
that got through our process

262
00:09:38,949 --> 00:09:37,360
uh that was a there was a you know very

263
00:09:39,829 --> 00:09:38,959

unexpected event

264
00:09:42,230 --> 00:09:39,839
um

265
00:09:44,710 --> 00:09:42,240
and we also hoped that the initial

266
00:09:47,990 --> 00:09:44,720
cryoloading stress on that part would be

267
00:09:49,750 --> 00:09:48,000
the maximum stress that that part saw

268
00:09:51,590 --> 00:09:49,760
during the entire flight phase the

269
00:09:53,509 --> 00:09:51,600
loading was going to be more than than

270
00:09:56,150 --> 00:09:53,519
the ascent itself

271
00:09:57,670 --> 00:09:56,160
and uh as we're going through the

272
00:10:00,470 --> 00:09:57,680
investigation it's

273
00:10:04,470 --> 00:10:00,480
neither one of those points is as clear

274
00:10:05,990 --> 00:10:04,480
as we need it to be to commit to go fly

275
00:10:08,870 --> 00:10:06,000
to keep our options in front of us we

276
00:10:10,790 --> 00:10:08,880
repaired the the two cracked stringers

277
00:10:12,949 --> 00:10:10,800
with the

278
00:10:15,190 --> 00:10:12,959
certified process that we would use if

279
00:10:16,870 --> 00:10:15,200
we found those cracks at michoud

280
00:10:18,389 --> 00:10:16,880
assembly facility where we put the inner

281
00:10:20,310 --> 00:10:18,399
tank together

282
00:10:22,710 --> 00:10:20,320
and we used our certified process to to

283
00:10:25,030 --> 00:10:22,720
re-foam the area so basically if these

284
00:10:26,230 --> 00:10:25,040
cracks would have happened at mishudd we

285
00:10:27,829 --> 00:10:26,240
would have fixed them exactly like we

286
00:10:29,670 --> 00:10:27,839
fixed them on the pad

287
00:10:30,790 --> 00:10:29,680
and we would be in a position to go

288
00:10:33,030 --> 00:10:30,800

launch

289
00:10:35,269 --> 00:10:33,040
but we have a we have a

290
00:10:36,790 --> 00:10:35,279
an unknown here is how did something get

291
00:10:38,470 --> 00:10:36,800
through our process

292
00:10:40,790 --> 00:10:38,480
and get to the launch pad to allow a

293
00:10:43,110 --> 00:10:40,800
crack and then do you have a

294
00:10:46,630 --> 00:10:43,120
susceptibility to have another one of

295
00:10:48,949 --> 00:10:46,640
those uh kind of conditions

296
00:10:50,790 --> 00:10:48,959
we looked a lot at the uh at the loading

297
00:10:53,190 --> 00:10:50,800
from uh uh

298
00:10:55,030 --> 00:10:53,200
from the cryo shock that you get in that

299
00:10:57,590 --> 00:10:55,040
initial bending and whether that would

300
00:11:00,069 --> 00:10:57,600
envelope uh right now it's not clear

301
00:11:01,910 --> 00:11:00,079
that it envelopes our flight environment

302
00:11:04,069 --> 00:11:01,920
it looks like it does for some part of

303
00:11:06,550 --> 00:11:04,079
the stringer but during

304
00:11:09,110 --> 00:11:06,560
the launch phase you move that stress to

305
00:11:11,030 --> 00:11:09,120
another part of the stringer and crowl

306
00:11:12,550 --> 00:11:11,040
loading does not

307
00:11:14,949 --> 00:11:12,560
appear to

308
00:11:16,389 --> 00:11:14,959
screen that that other area

309
00:11:17,990 --> 00:11:16,399
so if you had a flaw there potentially

310
00:11:19,110 --> 00:11:18,000
you could induce a crack

311
00:11:21,990 --> 00:11:19,120
in the

312
00:11:23,750 --> 00:11:22,000
in that area so that wasn't as clear-cut

313
00:11:26,790 --> 00:11:23,760

as we wanted it to be we used

314
00:11:29,269 --> 00:11:26,800
fractography to look very closely at the

315
00:11:31,269 --> 00:11:29,279
at the stringer to see if the there was

316
00:11:32,230 --> 00:11:31,279
some existing flaw or some pre-existing

317
00:11:34,790 --> 00:11:32,240
crack

318
00:11:36,389 --> 00:11:34,800
and that was inconclusive we could not

319
00:11:38,389 --> 00:11:36,399
find anything in there that said yes

320
00:11:40,470 --> 00:11:38,399
clearly this is where it started and it

321
00:11:42,150 --> 00:11:40,480
propagated out of there so

322
00:11:44,230 --> 00:11:42,160
we're back to looking at you know is

323
00:11:46,870 --> 00:11:44,240
this is this something that uh

324
00:11:48,310 --> 00:11:46,880
uh could have could have uh

325
00:11:50,230 --> 00:11:48,320
been hidden from the guys that were

326
00:11:52,710 --> 00:11:50,240
looking at it like a like an assembly

327
00:11:55,590 --> 00:11:52,720
stress that was was loaded into the uh

328
00:11:56,629 --> 00:11:55,600
into the bending stress at cryoload

329
00:11:59,590 --> 00:11:56,639
so

330
00:12:01,030 --> 00:11:59,600
where are we it's a complex problem the

331
00:12:04,230 --> 00:12:01,040
if you think about it you know you're

332
00:12:05,829 --> 00:12:04,240
putting it through a very uh a very

333
00:12:07,509 --> 00:12:05,839
difficult environment where you have

334
00:12:08,870 --> 00:12:07,519
thermal stresses you have bending

335
00:12:11,269 --> 00:12:08,880
stresses you have tension and

336
00:12:13,030 --> 00:12:11,279
compression when you're lifting off and

337
00:12:14,790 --> 00:12:13,040
the team has done a great job so far of

338
00:12:16,389 --> 00:12:14,800

modeling all that and helping us

339
00:12:18,710 --> 00:12:16,399
understand

340
00:12:22,629 --> 00:12:18,720
where our vulnerabilities are

341
00:12:27,030 --> 00:12:25,030
we have uh worked really hard and i

342
00:12:29,829 --> 00:12:27,040
think the the main focus for the program

343
00:12:32,790 --> 00:12:29,839
right now is to understand the exposure

344
00:12:35,190 --> 00:12:32,800
uh we have to show

345
00:12:36,550 --> 00:12:35,200
a few things one is can you assemble a

346
00:12:38,790 --> 00:12:36,560
part

347
00:12:40,310 --> 00:12:38,800
and not induce a crack that would be

348
00:12:41,509 --> 00:12:40,320
seen by our

349
00:12:43,910 --> 00:12:41,519
our

350
00:12:46,629 --> 00:12:43,920
examination methods

351
00:12:48,550 --> 00:12:46,639
but it would be enough of a stress that

352
00:12:51,829 --> 00:12:48,560
when you cryoloaded

353
00:12:53,590 --> 00:12:51,839
you could induce a crack

354
00:12:55,190 --> 00:12:53,600
when

355
00:12:57,990 --> 00:12:55,200
after we got this

356
00:12:59,750 --> 00:12:58,000
this condition we used an x-ray machine

357
00:13:01,670 --> 00:12:59,760
up on the

358
00:13:03,430 --> 00:13:01,680
up at on the launch pad and we were able

359
00:13:05,590 --> 00:13:03,440
to look at every single stringer on the

360
00:13:07,670 --> 00:13:05,600
orbiter's side to look for additional

361
00:13:09,350 --> 00:13:07,680
cracks and we didn't see any

362
00:13:11,269 --> 00:13:09,360
we've gone through all that data and it

363
00:13:13,030 --> 00:13:11,279

looks really good so what you would have

364
00:13:14,949 --> 00:13:13,040
to have is a

365
00:13:17,509 --> 00:13:14,959
a uh

366
00:13:19,990 --> 00:13:17,519
either an assembly error or a part error

367
00:13:23,350 --> 00:13:20,000
that didn't get through your

368
00:13:24,550 --> 00:13:23,360
through your inspection process

369
00:13:26,790 --> 00:13:24,560
or they got through your inspection

370
00:13:28,069 --> 00:13:26,800
process without being identified

371
00:13:30,710 --> 00:13:28,079
would not have cracked during

372
00:13:32,790 --> 00:13:30,720
cryoloading but could potentially crack

373
00:13:34,230 --> 00:13:32,800
under the stress of a launch

374
00:13:37,110 --> 00:13:34,240
and then you have to talk about your

375
00:13:39,350 --> 00:13:37,120
exposure if that happened could it crack

376
00:13:42,230 --> 00:13:39,360
the foam and then if that could happen

377
00:13:44,310 --> 00:13:42,240
could that foam be dislodged and

378
00:13:47,350 --> 00:13:44,320
hit the vehicle which is which is what

379
00:13:49,829 --> 00:13:47,360
our uh main concern is you also have to

380
00:13:51,110 --> 00:13:49,839
do a fail-safe analysis to say all right

381
00:13:53,910 --> 00:13:51,120
if i

382
00:13:55,910 --> 00:13:53,920
structurally lost one of these stringers

383
00:13:57,670 --> 00:13:55,920
due to a lightened failure

384
00:13:59,030 --> 00:13:57,680
could i induce a crack on another one

385
00:14:01,189 --> 00:13:59,040
and lose that one and could that

386
00:14:03,350 --> 00:14:01,199
propagate down and how many stringers

387
00:14:05,350 --> 00:14:03,360
you know could i lose and and still not

388
00:14:07,269 --> 00:14:05,360

have a structural problem that work is

389
00:14:09,269 --> 00:14:07,279
uh is still

390
00:14:11,269 --> 00:14:09,279
is still going on so

391
00:14:13,350 --> 00:14:11,279
you know the team is looking at uh fault

392
00:14:14,870 --> 00:14:13,360
tree analysis to make sure that we look

393
00:14:17,030 --> 00:14:14,880
at everything from assembly and

394
00:14:19,189 --> 00:14:17,040
production from when the part is

395
00:14:20,870 --> 00:14:19,199
initially made to how it gets to the to

396
00:14:22,949 --> 00:14:20,880
the assembly area how it's treated at

397
00:14:23,990 --> 00:14:22,959
assembly how it's fastened onto the

398
00:14:26,230 --> 00:14:24,000
panels

399
00:14:28,069 --> 00:14:26,240
how it's transported how it's

400
00:14:30,069 --> 00:14:28,079
primed how it's foamed how it's

401
00:14:31,910 --> 00:14:30,079
integrated into the tank how it gets to

402
00:14:33,829 --> 00:14:31,920
kennedy space center you know every

403
00:14:34,790 --> 00:14:33,839
single piece of that that entertains

404
00:14:36,629 --> 00:14:34,800
life

405
00:14:38,870 --> 00:14:36,639
is in the fall tree for how you could

406
00:14:40,310 --> 00:14:38,880
potentially induce some damage

407
00:14:41,910 --> 00:14:40,320
we're doing a lot of data mining on

408
00:14:43,910 --> 00:14:41,920
previous cracks to understand what

409
00:14:46,150 --> 00:14:43,920
assembly methods led to those cracks and

410
00:14:47,670 --> 00:14:46,160
if they were potentially

411
00:14:49,030 --> 00:14:47,680
if they could potentially cause this

412
00:14:51,350 --> 00:14:49,040
crack

413
00:14:53,110 --> 00:14:51,360

we're looking at a lot of testing with

414
00:14:54,150 --> 00:14:53,120
stringer material and inner tank

415
00:14:55,030 --> 00:14:54,160
material

416
00:15:01,030 --> 00:14:55,040
to

417
00:15:02,629 --> 00:15:01,040
environment and see if it can crack as

418
00:15:06,069 --> 00:15:02,639
well

419
00:15:08,629 --> 00:15:06,079
we're doing a imagery review

420
00:15:09,829 --> 00:15:08,639
our flight history on this part of the

421
00:15:12,550 --> 00:15:09,839
tank where

422
00:15:13,990 --> 00:15:12,560
the lox flange is extremely good we have

423
00:15:17,430 --> 00:15:14,000
not lost

424
00:15:18,870 --> 00:15:17,440
foam from that area that we know of

425
00:15:20,310 --> 00:15:18,880
we're going back to make sure that we

426
00:15:22,310 --> 00:15:20,320
look at all of our imagery to see if

427
00:15:23,990 --> 00:15:22,320
we've ever had cracks up there that we

428
00:15:25,509 --> 00:15:24,000
we could not explain

429
00:15:27,350 --> 00:15:25,519
the initial path to that was that we

430
00:15:28,949 --> 00:15:27,360
have not but but we're going to look at

431
00:15:30,310 --> 00:15:28,959
it again

432
00:15:31,990 --> 00:15:30,320
um so

433
00:15:33,910 --> 00:15:32,000
that's the the case we're kind of

434
00:15:36,550 --> 00:15:33,920
pulling all together all this data you

435
00:15:38,389 --> 00:15:36,560
know do you have some kind of a

436
00:15:41,430 --> 00:15:38,399
an assembly error

437
00:15:43,430 --> 00:15:41,440
error or a flaw that could

438
00:15:45,269 --> 00:15:43,440

propagate into a crack

439
00:15:46,230 --> 00:15:45,279
at what point could it propagate into a

440
00:15:49,189 --> 00:15:46,240
crack

441
00:15:51,269 --> 00:15:49,199
what would be the the impacts of that

442
00:15:53,110 --> 00:15:51,279
can you screen it with cryoloading and

443
00:15:54,710 --> 00:15:53,120
this x-ray

444
00:15:56,310 --> 00:15:54,720
you know and then if if you didn't catch

445
00:15:58,710 --> 00:15:56,320
it through all that you know could you

446
00:15:59,829 --> 00:15:58,720
end up losing some foam over the top of

447
00:16:02,389 --> 00:15:59,839
that area

448
00:16:03,829 --> 00:16:02,399
and uh and damaging the vehicle

449
00:16:05,350 --> 00:16:03,839
um so we went through all of that

450
00:16:07,030 --> 00:16:05,360
analysis today

451
00:16:08,949 --> 00:16:07,040
and uh and we're not quite there i

452
00:16:11,670 --> 00:16:08,959
handed out a lot of a lot of homework

453
00:16:14,230 --> 00:16:11,680
assignments to uh to the team

454
00:16:16,790 --> 00:16:14,240
to go collect data and uh and we really

455
00:16:19,269 --> 00:16:16,800
need to understand our risk um

456
00:16:21,590 --> 00:16:19,279
while we had cracks that occurred at the

457
00:16:23,189 --> 00:16:21,600
uh at the assembly plant and were

458
00:16:25,590 --> 00:16:23,199
were

459
00:16:27,269 --> 00:16:25,600
repaired effectively

460
00:16:29,189 --> 00:16:27,279
we don't you know this is the first time

461
00:16:31,269 --> 00:16:29,199
it happened at the at the launch pad so

462
00:16:33,509 --> 00:16:31,279
we have some kind of a process escape

463
00:16:35,509 --> 00:16:33,519

that allowed this to get to the launch

464
00:16:37,269 --> 00:16:35,519
pad in the first place so we need to

465
00:16:38,790 --> 00:16:37,279
understand our risk what is the risk

466
00:16:40,629 --> 00:16:38,800
that something else could have gotten

467
00:16:41,990 --> 00:16:40,639
through our process and gotten out to

468
00:16:44,550 --> 00:16:42,000
the launch pad

469
00:16:46,470 --> 00:16:44,560
and there's a lot of things on the table

470
00:16:48,389 --> 00:16:46,480
we potentially could instrument the

471
00:16:50,949 --> 00:16:48,399
vehicle and do another

472
00:16:52,710 --> 00:16:50,959
tanking test so that we would understand

473
00:16:54,150 --> 00:16:52,720
the stresses in that area even better

474
00:16:56,069 --> 00:16:54,160
and could could further improve our

475
00:16:58,150 --> 00:16:56,079
models to know

476
00:17:00,150 --> 00:16:58,160
what is our exposure to risk

477
00:17:01,189 --> 00:17:00,160
do we really understand what kind of a

478
00:17:03,509 --> 00:17:01,199
screen you get through just the

479
00:17:05,510 --> 00:17:03,519
cryoloading technique

480
00:17:07,669 --> 00:17:05,520
we may end up deciding that we need to

481
00:17:08,710 --> 00:17:07,679
get some x-rays of the back side of the

482
00:17:10,549 --> 00:17:08,720
tank

483
00:17:11,669 --> 00:17:10,559
that's not available to us on the launch

484
00:17:13,110 --> 00:17:11,679
pad

485
00:17:15,429 --> 00:17:13,120
so if we had to do that we would roll

486
00:17:17,750 --> 00:17:15,439
the vehicle back to the vab and

487
00:17:19,029 --> 00:17:17,760
put the platforms around it and get that

488
00:17:20,390 --> 00:17:19,039

data if that's data that we thought

489
00:17:23,110 --> 00:17:20,400
would help us

490
00:17:25,909 --> 00:17:23,120
in determining if this problem is okay

491
00:17:27,990 --> 00:17:25,919
so we're going to to develop the stress

492
00:17:29,830 --> 00:17:28,000
models and do all our testing and look

493
00:17:31,909 --> 00:17:29,840
at all of our assembly methods and pull

494
00:17:33,190 --> 00:17:31,919
together that whole story to understand

495
00:17:35,350 --> 00:17:33,200
what is our

496
00:17:36,070 --> 00:17:35,360
or a risk exposure here

497
00:17:38,070 --> 00:17:36,080
and

498
00:17:40,630 --> 00:17:38,080
if the risk exp if we

499
00:17:43,029 --> 00:17:40,640
can't get enough data to show that our

500
00:17:44,310 --> 00:17:43,039
risk exposure is acceptable

501
00:17:46,470 --> 00:17:44,320
then we're going to have to look at

502
00:17:47,590 --> 00:17:46,480
other options and those might be that

503
00:17:49,750 --> 00:17:47,600
you go in

504
00:17:51,590 --> 00:17:49,760
and you you have to modify some of the

505
00:17:52,630 --> 00:17:51,600
tops of the stringers or you have to do

506
00:17:55,350 --> 00:17:52,640
some

507
00:17:58,150 --> 00:17:55,360
further x-ray methodology or you have to

508
00:18:00,150 --> 00:17:58,160
run some kind of additional tests so

509
00:18:01,669 --> 00:18:00,160
it's uh it's really clear to me that

510
00:18:04,310 --> 00:18:01,679
that um

511
00:18:06,710 --> 00:18:04,320
the team is has identified all the

512
00:18:08,789 --> 00:18:06,720
different areas that we need to

513
00:18:10,789 --> 00:18:08,799

uh to work through either through

514
00:18:13,830 --> 00:18:10,799
analysis or test

515
00:18:15,909 --> 00:18:13,840
uh to identify what our risk exposure is

516
00:18:18,070 --> 00:18:15,919
and what the final results of all that

517
00:18:21,590 --> 00:18:18,080
analysis and test analysis and test will

518
00:18:22,549 --> 00:18:21,600
be i don't know yet and what we told

519
00:18:25,190 --> 00:18:22,559
told the

520
00:18:27,750 --> 00:18:25,200
the agency leadership is clearly we're

521
00:18:29,909 --> 00:18:27,760
not ready for the december 3rd through

522
00:18:31,909 --> 00:18:29,919
7th window that's coming up

523
00:18:33,750 --> 00:18:31,919
over this next week will be

524
00:18:36,549 --> 00:18:33,760
a lot further down the road in each of

525
00:18:38,390 --> 00:18:36,559
those pieces that i identified

526
00:18:39,990 --> 00:18:38,400
we're going to leave the option open for

527
00:18:41,990 --> 00:18:40,000
the next launch window which starts

528
00:18:44,150 --> 00:18:42,000
december 17th

529
00:18:47,029 --> 00:18:44,160
but a lot of a lot of data has to come

530
00:18:49,190 --> 00:18:47,039
together for us to to support that

531
00:18:50,789 --> 00:18:49,200
the team i i don't think the team is

532
00:18:52,070 --> 00:18:50,799
worried about any specific launch date

533
00:18:53,909 --> 00:18:52,080
at all right now

534
00:18:56,549 --> 00:18:53,919
they're just worried about getting the

535
00:18:58,470 --> 00:18:56,559
the proper data so that we can we can

536
00:19:01,350 --> 00:18:58,480
determine what our risk exposure is to

537
00:19:02,870 --> 00:19:01,360
this problem and once we determine that

538
00:19:04,310 --> 00:19:02,880

and determine what the appropriate path

539
00:19:06,630 --> 00:19:04,320
forward is then we'll we'll go off and

540
00:19:08,630 --> 00:19:06,640
pick the right right launch date

541
00:19:11,270 --> 00:19:08,640
and uh that's it

542
00:19:13,830 --> 00:19:11,280
okay great uh well let's see we've got a

543
00:19:16,549 --> 00:19:13,840
limited amount of time for q a so if you

544
00:19:17,909 --> 00:19:16,559
guys would ask your best question we'll

545
00:19:19,430 --> 00:19:17,919
try to get through everybody i've got a

546
00:19:21,510 --> 00:19:19,440
number of people out on the phone bridge

547
00:19:24,470 --> 00:19:21,520
as well and down in ksc but uh we'll

548
00:19:26,630 --> 00:19:24,480
start with mark and then take eric sure

549
00:19:30,950 --> 00:19:26,640
mark carroll for aviation week uh could

550
00:19:33,590 --> 00:19:30,960
you bound the end of the december 17th

551
00:19:35,430 --> 00:19:33,600
launch period and um

552
00:19:36,789 --> 00:19:35,440
maybe bound the next one as best you

553
00:19:38,310 --> 00:19:36,799
know it

554
00:19:41,430 --> 00:19:38,320
yeah the um

555
00:19:44,310 --> 00:19:41,440
the window mark is uh december 17th

556
00:19:46,789 --> 00:19:44,320
through the 20th in in all

557
00:19:48,549 --> 00:19:46,799
uh four of those days are okay

558
00:19:51,510 --> 00:19:48,559
um

559
00:19:53,590 --> 00:19:51,520
if we go past the 20th

560
00:19:56,310 --> 00:19:53,600
we would be flying for a nominal mission

561
00:19:57,590 --> 00:19:56,320
over the year end rollover basically you

562
00:20:00,710 --> 00:19:57,600
go from

563
00:20:03,510 --> 00:20:00,720

from day 365 to day one

564
00:20:05,669 --> 00:20:03,520
and we have procedures to

565
00:20:07,750 --> 00:20:05,679
to be able to configure the on on-orbit

566
00:20:09,830 --> 00:20:07,760
computers appropriately so they can talk

567
00:20:11,669 --> 00:20:09,840
to the ground computers

568
00:20:13,510 --> 00:20:11,679
but we would want to do those procedures

569
00:20:15,029 --> 00:20:13,520
during a quiet period while we're docked

570
00:20:17,590 --> 00:20:15,039
to station so

571
00:20:19,990 --> 00:20:17,600
after the 20th we'll have to look at the

572
00:20:22,789 --> 00:20:20,000
on-orbit timeline and pick out which

573
00:20:24,789 --> 00:20:22,799
days we could launch so that when we

574
00:20:26,470 --> 00:20:24,799
went over the year and roll over it

575
00:20:28,390 --> 00:20:26,480
would be a quiet time on orbit and we

576
00:20:30,230 --> 00:20:28,400
could do our computer reconfiguration

577
00:20:33,590 --> 00:20:30,240
that was required so there are some days

578
00:20:36,710 --> 00:20:33,600
between the 20th and january

579
00:20:38,710 --> 00:20:36,720
december 31st that that we could uh pick

580
00:20:40,310 --> 00:20:38,720
up launch dates but we haven't sat down

581
00:20:42,390 --> 00:20:40,320
with the operations team to define those

582
00:20:44,710 --> 00:20:42,400
yet and we really haven't focused very

583
00:20:46,310 --> 00:20:44,720
much really on the launch stuff we'll do

584
00:20:47,830 --> 00:20:46,320
that later once we get a better handle

585
00:20:49,270 --> 00:20:47,840
on where the problem's going and where

586
00:20:50,470 --> 00:20:49,280
the work is going

587
00:20:51,909 --> 00:20:50,480
and there's some options we could do

588
00:20:53,590 --> 00:20:51,919

even in the beginning if it helps us

589
00:20:56,070 --> 00:20:53,600
some ways we could even potentially

590
00:20:57,909 --> 00:20:56,080
launch before the soyuz docks if that

591
00:21:00,230 --> 00:20:57,919
provides some assistance to us and then

592
00:21:01,750 --> 00:21:00,240
hold off so i wouldn't get hung up on

593
00:21:03,190 --> 00:21:01,760
those specific dates we'll spend a

594
00:21:04,710 --> 00:21:03,200
little bit of time working those at the

595
00:21:06,230 --> 00:21:04,720
right time later once we get a better

596
00:21:07,909 --> 00:21:06,240
understanding of where the the data

597
00:21:09,510 --> 00:21:07,919
analysis is going and where the work is

598
00:21:11,029 --> 00:21:09,520
going and then we'll talk more about

599
00:21:13,350 --> 00:21:11,039
launch dates but that's the general

600
00:21:15,110 --> 00:21:13,360
period that john described

601
00:21:17,029 --> 00:21:15,120
eric

602
00:21:18,630 --> 00:21:17,039
just so i understand the primary concern

603
00:21:20,710 --> 00:21:18,640
is is it that you would get a crack

604
00:21:22,870 --> 00:21:20,720
after the sort of post-tanking

605
00:21:25,190 --> 00:21:22,880
inspection of the tank that would be

606
00:21:26,070 --> 00:21:25,200
invisible and that that

607
00:21:27,750 --> 00:21:26,080
um

608
00:21:29,190 --> 00:21:27,760
crack would would sort of manifest

609
00:21:30,789 --> 00:21:29,200
itself in the foam during the launch

610
00:21:31,909 --> 00:21:30,799
process and break off a piece of foam i

611
00:21:33,909 --> 00:21:31,919
mean is that the primary thing you're

612
00:21:35,830 --> 00:21:33,919
worried about

613
00:21:38,149 --> 00:21:35,840

general terms yes

614
00:21:39,590 --> 00:21:38,159
remember we have tanked this vehicle so

615
00:21:41,669 --> 00:21:39,600
we put a pretty good stress on those

616
00:21:43,190 --> 00:21:41,679
stringers and we've x-rayed them all to

617
00:21:45,750 --> 00:21:43,200
make sure they don't have cracks and

618
00:21:47,510 --> 00:21:45,760
none of them have have cracks on the

619
00:21:51,270 --> 00:21:47,520
on the orbiter side

620
00:21:54,470 --> 00:21:51,280
so what we're worried about is a

621
00:21:56,310 --> 00:21:54,480
a flaw or assembly issue

622
00:21:59,190 --> 00:21:56,320
that did not

623
00:22:01,029 --> 00:21:59,200
crack during the cryoloading but could

624
00:22:02,950 --> 00:22:01,039
potentially crack

625
00:22:05,190 --> 00:22:02,960
during some higher stresses in the

626
00:22:08,149 --> 00:22:05,200
flight environment and then that could

627
00:22:10,470 --> 00:22:08,159
propagate into the stringer

628
00:22:11,909 --> 00:22:10,480
coming off of the skin panel pushing out

629
00:22:13,270 --> 00:22:11,919
the foam and the foam coming off and

630
00:22:15,270 --> 00:22:13,280
hitting the vehicle

631
00:22:16,549 --> 00:22:15,280
so

632
00:22:19,029 --> 00:22:16,559
that's that's what we're trying to

633
00:22:20,630 --> 00:22:19,039
screen for

634
00:22:22,710 --> 00:22:20,640
okay let's go down to the kennedy space

635
00:22:25,590 --> 00:22:22,720
center in florida for some questions

636
00:22:30,070 --> 00:22:27,990
uh marcia done associated press i'm

637
00:22:33,110 --> 00:22:30,080
wondering what happens after december

638
00:22:34,470 --> 00:22:33,120

31st could you take a shot at january

639
00:22:36,390 --> 00:22:34,480
and given

640
00:22:38,070 --> 00:22:36,400
you know christmas new year's holidays

641
00:22:39,909 --> 00:22:38,080
and all the overtime that might entail

642
00:22:42,549 --> 00:22:39,919
why not just put it off now until

643
00:22:44,230 --> 00:22:42,559
january or february whenever that next

644
00:22:46,149 --> 00:22:44,240
window might be

645
00:22:48,950 --> 00:22:46,159
yeah we've kind of looked at all those

646
00:22:51,270 --> 00:22:48,960
uh those options and and there's nothing

647
00:22:53,830 --> 00:22:51,280
there that's again driving us

648
00:22:55,590 --> 00:22:53,840
we're not constrained from a financial

649
00:22:57,270 --> 00:22:55,600
standpoint we're fine from a budget

650
00:22:59,669 --> 00:22:57,280
standpoint we'll do what's right to make

651
00:23:01,510 --> 00:22:59,679
sure we're ready and safe to go fly you

652
00:23:03,430 --> 00:23:01,520
know our primary purpose is we've got

653
00:23:05,029 --> 00:23:03,440
cargo that needs to get to space station

654
00:23:07,430 --> 00:23:05,039
it's critical for space station

655
00:23:09,110 --> 00:23:07,440
operations and and we'll figure out the

656
00:23:10,789 --> 00:23:09,120
the time the shuttle is ready to go and

657
00:23:12,630 --> 00:23:10,799
we've got the right mix of cargo to go

658
00:23:14,310 --> 00:23:12,640
fly and we'll we'll pick the right date

659
00:23:16,470 --> 00:23:14,320
so so we're kind of looking at this

660
00:23:18,470 --> 00:23:16,480
december window first see how that that

661
00:23:19,990 --> 00:23:18,480
fits and then beyond that we've got some

662
00:23:21,350 --> 00:23:20,000
opportunities in january some in

663
00:23:23,029 --> 00:23:21,360

february

664
00:23:25,029 --> 00:23:23,039
another consideration for us is the

665
00:23:27,190 --> 00:23:25,039
shuttle performance ascent performance

666
00:23:29,990 --> 00:23:27,200
generally gets worse as you head towards

667
00:23:31,750 --> 00:23:30,000
february so we have to be careful from a

668
00:23:33,750 --> 00:23:31,760
shuttle lift standpoint we may need to

669
00:23:36,149 --> 00:23:33,760
make some cargo changes on the shuttle

670
00:23:37,990 --> 00:23:36,159
depending on when we launch so so we'll

671
00:23:39,590 --> 00:23:38,000
work that with the station program we'll

672
00:23:41,029 --> 00:23:39,600
work that with the loads people and

673
00:23:42,630 --> 00:23:41,039
we'll make sure we balance all those

674
00:23:44,310 --> 00:23:42,640
things to find the right opportunity to

675
00:23:45,990 --> 00:23:44,320
launch consistent with

676
00:23:49,190 --> 00:23:46,000
having good rationale and good data to

677
00:23:53,830 --> 00:23:51,190
um quick follow-up what's the critical

678
00:23:55,669 --> 00:23:53,840
cargo that's driving all this

679
00:23:56,710 --> 00:23:55,679
there's a you know all the spares that

680
00:23:58,870 --> 00:23:56,720
are on

681
00:24:00,390 --> 00:23:58,880
the uh the shuttle

682
00:24:02,230 --> 00:24:00,400
there's some in the mid deck you know

683
00:24:04,630 --> 00:24:02,240
the permanent mplm is there with a lot

684
00:24:06,390 --> 00:24:04,640
of items on the inside you know some of

685
00:24:08,789 --> 00:24:06,400
the ones that that come to mind or we

686
00:24:11,590 --> 00:24:08,799
have the distiller assembly which is the

687
00:24:13,750 --> 00:24:11,600
piece of the urine processor that helps

688
00:24:15,669 --> 00:24:13,760

make urine into potable water that's an

689
00:24:17,190 --> 00:24:15,679
important piece to go up there's a

690
00:24:19,269 --> 00:24:17,200
catalytic

691
00:24:20,710 --> 00:24:19,279
bed that purifies the water on board

692
00:24:22,870 --> 00:24:20,720
space station that's also another

693
00:24:24,630 --> 00:24:22,880
consideration but there's lots of others

694
00:24:26,390 --> 00:24:24,640
so you know these flights are really

695
00:24:28,390 --> 00:24:26,400
packed with all the critical spares four

696
00:24:29,750 --> 00:24:28,400
station a whole variety of them and we

697
00:24:31,269 --> 00:24:29,760
just need to make sure that these

698
00:24:35,430 --> 00:24:31,279
flights get there with those critical

699
00:24:39,350 --> 00:24:37,909
kevin oliver with wftv in orlando just

700
00:24:40,950 --> 00:24:39,360
curious with the previous cracks that

701
00:24:42,230 --> 00:24:40,960
you've noticed that michoud were any of

702
00:24:43,830 --> 00:24:42,240
them

703
00:24:47,750 --> 00:24:43,840
cracks on stringers that were both next

704
00:24:50,149 --> 00:24:47,760
to each other like on this case

705
00:24:53,029 --> 00:24:50,159
we're still mining the data my

706
00:24:55,830 --> 00:24:53,039
understanding is is no

707
00:24:57,990 --> 00:24:55,840
the cracks we've seen it at the assembly

708
00:25:00,149 --> 00:24:58,000
plant were

709
00:25:01,590 --> 00:25:00,159
assembly related when when they were

710
00:25:03,269 --> 00:25:01,600
putting them together or handling

711
00:25:07,750 --> 00:25:03,279
related you bang it against something

712
00:25:13,430 --> 00:25:09,350
that's another piece of the analysis

713
00:25:18,950 --> 00:25:16,789

is the initial crack related to the

714
00:25:20,950 --> 00:25:18,960
crack and the stringer next to it and

715
00:25:22,149 --> 00:25:20,960
the initial structural models indicate

716
00:25:23,029 --> 00:25:22,159
that it is

717
00:25:24,230 --> 00:25:23,039
um

718
00:25:25,669 --> 00:25:24,240
but there is

719
00:25:27,430 --> 00:25:25,679
there's going to be continuing work on

720
00:25:28,710 --> 00:25:27,440
that to make sure that that's really

721
00:25:30,789 --> 00:25:28,720
true

722
00:25:31,750 --> 00:25:30,799
in the the working theory is that when

723
00:25:33,590 --> 00:25:31,760
you

724
00:25:35,909 --> 00:25:33,600
remember these stringers are attached to

725
00:25:39,510 --> 00:25:35,919
this this big thick

726
00:25:41,669 --> 00:25:39,520
flange at the at the bottom of the tank

727
00:25:43,590 --> 00:25:41,679
and when the one stringer

728
00:25:46,230 --> 00:25:43,600
released its energy that it put enough

729
00:25:48,390 --> 00:25:46,240
of a pulse into that into that flange to

730
00:25:50,870 --> 00:25:48,400
uh to crack the

731
00:25:53,110 --> 00:25:50,880
the stringer next to it

732
00:25:55,029 --> 00:25:53,120
this aluminum lithium material is a very

733
00:25:57,510 --> 00:25:55,039
strong very lightweight material but it

734
00:25:59,430 --> 00:25:57,520
is not ductile at all it's like three

735
00:26:03,029 --> 00:25:59,440
percent ductility so it's a very brittle

736
00:26:03,990 --> 00:26:03,039
material uh and it is not tolerant to

737
00:26:06,149 --> 00:26:04,000
um

738
00:26:07,990 --> 00:26:06,159

to uh uh

739
00:26:11,190 --> 00:26:08,000
impacts or

740
00:26:13,750 --> 00:26:11,200
or a lot of uh

741
00:26:15,990 --> 00:26:13,760
loading beyond the the design of it so

742
00:26:17,909 --> 00:26:16,000
it's it's not a real forgiving material

743
00:26:19,590 --> 00:26:17,919
and if you when you're assembling it if

744
00:26:20,950 --> 00:26:19,600
you if you make a mistake you end up

745
00:26:24,549 --> 00:26:20,960
having to replace

746
00:26:26,310 --> 00:26:24,559
pretty much the whole stringer so

747
00:26:28,630 --> 00:26:26,320
okay well let's take the calls that are

748
00:26:30,310 --> 00:26:28,640
out on the phone bridge and i'll

749
00:26:32,070 --> 00:26:30,320
call on you in order that you called

750
00:26:33,830 --> 00:26:32,080
into the newsroom start with bill

751
00:26:37,190 --> 00:26:33,840
harwood

752
00:26:39,350 --> 00:26:37,200
the kennedy space center uh for john

753
00:26:41,350 --> 00:26:39,360
shannon just to be clear

754
00:26:43,029 --> 00:26:41,360
at this point then you don't think this

755
00:26:44,630 --> 00:26:43,039
is a generic issue with the aluminum

756
00:26:46,630 --> 00:26:44,640
lithium tanks you think it's an assembly

757
00:26:51,510 --> 00:26:46,640
issue of some sort and you're trying to

758
00:26:58,390 --> 00:26:52,390
that's

759
00:27:00,870 --> 00:26:58,400
you look at the design

760
00:27:03,590 --> 00:27:00,880
of the stringers they have

761
00:27:06,470 --> 00:27:03,600
uh they have very good design features

762
00:27:08,710 --> 00:27:06,480
uh and an acceptable capability to

763
00:27:10,950 --> 00:27:08,720

handle the the normal load that you

764
00:27:12,070 --> 00:27:10,960
would expect from cryoloading and

765
00:27:16,230 --> 00:27:12,080
and uh

766
00:27:18,870 --> 00:27:16,240
the only

767
00:27:22,789 --> 00:27:18,880
cracks that we have found at mishudd are

768
00:27:25,269 --> 00:27:22,799
related to assembly or mishandling so

769
00:27:26,789 --> 00:27:25,279
i think that's where the the x-ray of

770
00:27:29,269 --> 00:27:26,799
all of the stringers after we

771
00:27:31,430 --> 00:27:29,279
cryo-loaded it is critical

772
00:27:33,350 --> 00:27:31,440
if we would have found other cracks or

773
00:27:35,190 --> 00:27:33,360
other problems

774
00:27:36,870 --> 00:27:35,200
then we would think that yes we had we

775
00:27:37,909 --> 00:27:36,880
were right on the edge of our design

776
00:27:40,630 --> 00:27:37,919
margin

777
00:27:44,389 --> 00:27:40,640
and and we had had cracks all along

778
00:27:46,710 --> 00:27:44,399
there is nothing to indicate that

779
00:27:48,389 --> 00:27:46,720
we looked with that x-ray at all of

780
00:27:50,789 --> 00:27:48,399
those stringers that had gone through

781
00:27:52,950 --> 00:27:50,799
the same bending moment and we have

782
00:27:54,310 --> 00:27:52,960
sufficient capability through that x-ray

783
00:27:55,750 --> 00:27:54,320
to determine if there are any cracks and

784
00:27:56,630 --> 00:27:55,760
there are none

785
00:27:58,789 --> 00:27:56,640
so

786
00:28:00,710 --> 00:27:58,799
absent the fact that you know the fact

787
00:28:03,029 --> 00:28:00,720
that we don't have any

788
00:28:05,830 --> 00:28:03,039

other cracks in there it makes you think

789
00:28:08,070 --> 00:28:05,840
it's a localized phenomenon

790
00:28:09,750 --> 00:28:08,080
now to for me to sit here and say that

791
00:28:11,590 --> 00:28:09,760
that you know we had a flawed partner we

792
00:28:13,750 --> 00:28:11,600
had an assembly issue is

793
00:28:15,350 --> 00:28:13,760
you know that is that is cutting out

794
00:28:17,110 --> 00:28:15,360
probably 80 percent of the fault tree

795
00:28:19,110 --> 00:28:17,120
that we're going to methodically work

796
00:28:21,110 --> 00:28:19,120
through we want to make sure there is no

797
00:28:23,190 --> 00:28:21,120
nothing specific about this tank nothing

798
00:28:26,070 --> 00:28:23,200
specific about this inner tank nothing

799
00:28:29,190 --> 00:28:26,080
specific about the way we processed it

800
00:28:30,789 --> 00:28:29,200
to to make sure that there's nothing

801
00:28:32,710 --> 00:28:30,799
special that we did in that area that

802
00:28:33,669 --> 00:28:32,720
could have caused this

803
00:28:35,590 --> 00:28:33,679
but

804
00:28:37,590 --> 00:28:35,600
what is fair to say is that

805
00:28:40,310 --> 00:28:37,600
even after cryoloading we've looked with

806
00:28:41,909 --> 00:28:40,320
the x-ray we don't have any other cracks

807
00:28:43,110 --> 00:28:41,919
the cracks that we have seen during

808
00:28:46,549 --> 00:28:43,120
assembly

809
00:28:47,990 --> 00:28:46,559
so

810
00:28:50,149 --> 00:28:48,000
that's the data that we have right now

811
00:28:52,470 --> 00:28:50,159
but we need to really really rigorously

812
00:28:54,470 --> 00:28:52,480
go through our full tree

813
00:28:55,909 --> 00:28:54,480

and just one more quick one can you wait

814
00:28:57,590 --> 00:28:55,919
it's kind of a follow-up to earlier

815
00:28:59,110 --> 00:28:57,600
question uh from the houston chronicle

816
00:29:02,710 --> 00:28:59,120
and in terms of

817
00:29:04,870 --> 00:29:02,720
the the risk of foam separation

818
00:29:06,549 --> 00:29:04,880
and then structural failure i mean

819
00:29:07,750 --> 00:29:06,559
is structural failure really an issue

820
00:29:09,669 --> 00:29:07,760
here i mean i thought that was a pretty

821
00:29:10,710 --> 00:29:09,679
beefy structure and even if you i mean i

822
00:29:12,310 --> 00:29:10,720
realize you don't have the answers to

823
00:29:13,830 --> 00:29:12,320
this yet i'm just trying to understand

824
00:29:16,070 --> 00:29:13,840
if those are equally weighted in your

825
00:29:19,029 --> 00:29:16,080
mind or if the real threat primarily is

826
00:29:21,510 --> 00:29:19,039
the foam debris thanks

827
00:29:22,789 --> 00:29:21,520
um right now we're doing our homework

828
00:29:25,669 --> 00:29:22,799
bill but

829
00:29:28,470 --> 00:29:25,679
what it looks like is that the

830
00:29:30,789 --> 00:29:28,480
the highest stress area of the stringers

831
00:29:32,149 --> 00:29:30,799
in crow loading or in flight is the top

832
00:29:35,029 --> 00:29:32,159
nine inches

833
00:29:37,669 --> 00:29:35,039
and we believe that we could lose

834
00:29:39,909 --> 00:29:37,679
multiple stringers capability and not

835
00:29:41,909 --> 00:29:39,919
have a structural issue

836
00:29:45,269 --> 00:29:41,919
we have to do that work

837
00:29:48,950 --> 00:29:46,470
because you know you don't know what

838
00:29:51,750 --> 00:29:48,960

your exposure to uh to some assembly

839
00:29:53,190 --> 00:29:51,760
process or or materials process or a

840
00:29:56,149 --> 00:29:53,200
flaw is

841
00:29:58,710 --> 00:29:56,159
we'll do that work and understand that

842
00:30:00,470 --> 00:29:58,720
i i believe that it's going to show that

843
00:30:02,710 --> 00:30:00,480
we have quite a lot of capability in

844
00:30:04,870 --> 00:30:02,720
that inner tank area and it's going to

845
00:30:07,190 --> 00:30:04,880
be a discussion on having

846
00:30:08,389 --> 00:30:07,200
an escape that allows a flaw in there

847
00:30:10,389 --> 00:30:08,399
that only

848
00:30:13,510 --> 00:30:10,399
surfaces during flight not during

849
00:30:14,470 --> 00:30:13,520
cryoload and that that

850
00:30:18,549 --> 00:30:14,480
that

851
00:30:19,990 --> 00:30:18,559
cracking causes foam to be exposed which

852
00:30:25,669 --> 00:30:20,000
could be

853
00:30:27,510 --> 00:30:25,679
vehicle and i think that's where

854
00:30:29,269 --> 00:30:27,520
our risk

855
00:30:30,710 --> 00:30:29,279
posture is going to be the highest and

856
00:30:33,350 --> 00:30:30,720
we have a lot of work to make sure that

857
00:30:34,549 --> 00:30:33,360
that's hey that's really true and then

858
00:30:35,430 --> 00:30:34,559
b to

859
00:30:36,950 --> 00:30:35,440
uh

860
00:30:41,190 --> 00:30:36,960
to really

861
00:30:47,990 --> 00:30:42,950
okay let's see

862
00:30:50,870 --> 00:30:48,830
hi

863
00:30:53,669 --> 00:30:50,880

um given

864
00:30:55,750 --> 00:30:53,679
the uh the uncertainty of a launch date

865
00:30:59,190 --> 00:30:55,760
right now can you talk a little bit

866
00:31:00,870 --> 00:30:59,200
about the how training crew preparation

867
00:31:03,110 --> 00:31:00,880
based on changes to the mission and the

868
00:31:05,909 --> 00:31:03,120
flight plan is proceeding i mean

869
00:31:07,590 --> 00:31:05,919
if you when we were launching

870
00:31:08,870 --> 00:31:07,600
during this current window you were

871
00:31:10,389 --> 00:31:08,880
going to only have three people on the

872
00:31:11,750 --> 00:31:10,399
station so there would need to be

873
00:31:14,230 --> 00:31:11,760
changes

874
00:31:16,310 --> 00:31:14,240
to meet that now if you launch on

875
00:31:17,509 --> 00:31:16,320
december 17th you'll have three new crew

876
00:31:20,230 --> 00:31:17,519
members on board who may not have

877
00:31:21,669 --> 00:31:20,240
trained to support this mission how is

878
00:31:22,950 --> 00:31:21,679
how are you managing crew training

879
00:31:24,789 --> 00:31:22,960
thanks

880
00:31:26,870 --> 00:31:24,799
and what the teams have done is they're

881
00:31:29,430 --> 00:31:26,880
they're pretty remarkable when we didn't

882
00:31:30,630 --> 00:31:29,440
do the first launch and

883
00:31:31,990 --> 00:31:30,640
we knew we were going to potentially

884
00:31:34,230 --> 00:31:32,000
launch to a period when there was only

885
00:31:35,430 --> 00:31:34,240
three crew on orbit they went ahead and

886
00:31:37,590 --> 00:31:35,440
took some of the tasks that were going

887
00:31:39,669 --> 00:31:37,600
to be done during the dock time frame

888
00:31:41,430 --> 00:31:39,679

you know for example the carbon dioxide

889
00:31:43,669 --> 00:31:41,440
removal assembly

890
00:31:45,029 --> 00:31:43,679
you saw last week the actual this week i

891
00:31:47,350 --> 00:31:45,039
guess the actual or last week they

892
00:31:49,029 --> 00:31:47,360
actually took that apart and removed the

893
00:31:50,310 --> 00:31:49,039
the beds out of that device that was

894
00:31:52,310 --> 00:31:50,320
going to be done during the docked

895
00:31:54,149 --> 00:31:52,320
mission so they offloaded work that was

896
00:31:55,590 --> 00:31:54,159
kind of occurred during the dock time

897
00:31:57,590 --> 00:31:55,600
frame and moved it up into the time

898
00:31:59,350 --> 00:31:57,600
frame when the shuttle wasn't launching

899
00:32:01,029 --> 00:31:59,360
so they've really optimized and they've

900
00:32:02,710 --> 00:32:01,039
taken many tasks like that and they

901
00:32:04,230 --> 00:32:02,720
moved them forward in the timeline and

902
00:32:06,789 --> 00:32:04,240
they got them completed ahead of the

903
00:32:08,310 --> 00:32:06,799
time so when the shuttle actually comes

904
00:32:10,310 --> 00:32:08,320
up and docks will be in a much better

905
00:32:12,870 --> 00:32:10,320
configuration to support

906
00:32:14,149 --> 00:32:12,880
the transfer activity support the

907
00:32:15,750 --> 00:32:14,159
critical activities that have to occur

908
00:32:17,750 --> 00:32:15,760
while the shuttle is there so the teams

909
00:32:20,070 --> 00:32:17,760
have done a remarkable job of kind of

910
00:32:21,990 --> 00:32:20,080
balancing looking ahead planning ahead

911
00:32:24,230 --> 00:32:22,000
and actually scheduling work earlier to

912
00:32:25,590 --> 00:32:24,240
get it done when they had the time to go

913
00:32:27,990 --> 00:32:25,600

do it so i think they've done a very

914
00:32:29,750 --> 00:32:28,000
good job of balancing it and we provided

915
00:32:31,669 --> 00:32:29,760
you know multiple options to to make

916
00:32:33,029 --> 00:32:31,679
sure we've got the right crews trained

917
00:32:34,870 --> 00:32:33,039
the right folks ready to go do the

918
00:32:36,870 --> 00:32:34,880
activities during the mission you know

919
00:32:39,430 --> 00:32:36,880
they also looked at things

920
00:32:41,750 --> 00:32:39,440
timing wise that you know there's a htv

921
00:32:43,909 --> 00:32:41,760
a japanese transfer vehicle coming up

922
00:32:46,149 --> 00:32:43,919
there's an express

923
00:32:47,750 --> 00:32:46,159
or exposed logistics carrier that sits

924
00:32:50,230 --> 00:32:47,760
in the cargo bay that was going to hold

925
00:32:52,070 --> 00:32:50,240
some of the items from the htv they've

926
00:32:54,070 --> 00:32:52,080
worked out a plan that if that's not

927
00:32:56,230 --> 00:32:54,080
there they can still offload the htv and

928
00:32:58,470 --> 00:32:56,240
work things out so again the teams have

929
00:33:00,070 --> 00:32:58,480
done a remarkable job of planning ahead

930
00:33:01,350 --> 00:33:00,080
looking ahead optimizing to make sure

931
00:33:02,710 --> 00:33:01,360
they're ahead of things so just as the

932
00:33:05,350 --> 00:33:02,720
teams on the ground are doing all this

933
00:33:07,590 --> 00:33:05,360
data analysis getting us ready to go fly

934
00:33:08,950 --> 00:33:07,600
the iss team has been off balancing all

935
00:33:10,389 --> 00:33:08,960
these things to make sure we're still in

936
00:33:12,070 --> 00:33:10,399
a good posture to go do the work that

937
00:33:15,750 --> 00:33:12,080
has to be done when we actually get

938
00:33:19,590 --> 00:33:18,389

okay let's see denise ciao space.com are

939
00:33:22,630 --> 00:33:19,600
you on

940
00:33:24,630 --> 00:33:22,640
hi yeah i'm denise johnson.com

941
00:33:27,350 --> 00:33:24,640
if the data comes back such that a

942
00:33:28,870 --> 00:33:27,360
mid-december launch is possible um would

943
00:33:30,470 --> 00:33:28,880
the 11-day mission and all its

944
00:33:33,430 --> 00:33:30,480
objectives stay intact or would

945
00:33:34,870 --> 00:33:33,440
something need to be altered and also

946
00:33:36,310 --> 00:33:34,880
someone mentioned that there may need to

947
00:33:38,710 --> 00:33:36,320
be cargo changes and i was just

948
00:33:40,389 --> 00:33:38,720
wondering um if you can maybe state what

949
00:33:41,590 --> 00:33:40,399
those might be and what potential

950
00:33:42,549 --> 00:33:41,600
impacts it might have to the space

951
00:33:44,070 --> 00:33:42,559
station

952
00:33:46,149 --> 00:33:44,080
for the for the december flight there'd

953
00:33:47,750 --> 00:33:46,159
be no cargo changes

954
00:33:52,070 --> 00:33:47,760
and the mission duration would be just

955
00:33:53,909 --> 00:33:52,080
the same as we've been discussing before

956
00:33:56,870 --> 00:33:53,919
if it was in february

957
00:33:58,549 --> 00:33:56,880
if it goes to february and we have we

958
00:34:00,549 --> 00:33:58,559
would have to offload some items from

959
00:34:05,590 --> 00:34:00,559
the mid deck or we could potentially

960
00:34:13,430 --> 00:34:08,230
okay let's see john bracken are you on

961
00:34:18,550 --> 00:34:15,669
okay let's see ken kramer are you on the

962
00:34:21,430 --> 00:34:18,560
line with us yeah hello hi ken kramer

963
00:34:23,669 --> 00:34:21,440

for space flight magazine thank you um

964
00:34:25,669 --> 00:34:23,679
just have a question um to clarify you

965
00:34:28,869 --> 00:34:25,679
have checked the entire stringer on the

966
00:34:30,629 --> 00:34:28,879
orbiter side from top to bottom yes and

967
00:34:32,829 --> 00:34:30,639
i'd like to know how certain you are

968
00:34:34,950 --> 00:34:32,839
that these techniques would actually

969
00:34:36,310 --> 00:34:34,960
detect a crack because the way i

970
00:34:37,349 --> 00:34:36,320
understand that these cracks were

971
00:34:39,829 --> 00:34:37,359
detected

972
00:34:45,669 --> 00:34:42,869
okay ken uh what we have done with the

973
00:34:49,190 --> 00:34:45,679
x-ray is we've looked at the top area

974
00:34:51,589 --> 00:34:49,200
along the uh the liquid oxygen tank

975
00:34:53,990 --> 00:34:51,599
uh where the uh where the problem was

976
00:34:55,589 --> 00:34:54,000
we've gone all the way around uh the

977
00:34:57,109 --> 00:34:55,599
orbiter side of the tank we don't have

978
00:34:58,870 --> 00:34:57,119
access on the launch pad to the back

979
00:35:02,069 --> 00:34:58,880
side so we've looked at the liquid

980
00:35:03,910 --> 00:35:02,079
oxygen side uh probably the top two and

981
00:35:05,589 --> 00:35:03,920
a half feet of it

982
00:35:07,190 --> 00:35:05,599
we have started looking at the liquid

983
00:35:08,390 --> 00:35:07,200
hydrogen side just to make sure that

984
00:35:10,710 --> 00:35:08,400
there's no

985
00:35:12,150 --> 00:35:10,720
uh no issues down there that work is

986
00:35:14,150 --> 00:35:12,160
ongoing

987
00:35:15,510 --> 00:35:14,160
we haven't looked at the stringers the

988
00:35:18,870 --> 00:35:15,520

riveted areas of the stringers in here

989
00:35:19,910 --> 00:35:18,880
but they're very low stress areas

990
00:35:23,030 --> 00:35:19,920
of the

991
00:35:26,390 --> 00:35:23,040
the inner tank and what was your second

992
00:35:30,550 --> 00:35:29,030
how certain are you that these

993
00:35:32,150 --> 00:35:30,560
scanning techniques would actually

994
00:35:34,550 --> 00:35:32,160
detect a crack can you see what i

995
00:35:37,670 --> 00:35:34,560
understand it is you um

996
00:35:40,390 --> 00:35:37,680
they were found visually right uh there

997
00:35:42,470 --> 00:35:40,400
are features in the uh in the x-rays

998
00:35:44,310 --> 00:35:42,480
that are very small that give them a lot

999
00:35:45,910 --> 00:35:44,320
of confidence that you have if you have

1000
00:35:47,349 --> 00:35:45,920
an open crack

1001
00:35:48,310 --> 00:35:47,359
that you would easily be able to see

1002
00:35:50,870 --> 00:35:48,320
that

1003
00:35:53,510 --> 00:35:50,880
in the x-ray you're right the the

1004
00:35:55,190 --> 00:35:53,520
initial cracks were found uh visually

1005
00:35:56,310 --> 00:35:55,200
because we didn't have the x-ray system

1006
00:35:58,470 --> 00:35:56,320
out there yet and we knew we were going

1007
00:36:00,550 --> 00:35:58,480
to going of remove the foam and take a

1008
00:36:01,510 --> 00:36:00,560
look at it so we just got on with that

1009
00:36:04,390 --> 00:36:01,520
and

1010
00:36:07,829 --> 00:36:04,400
i will i will tell you the x-rays are

1011
00:36:09,430 --> 00:36:07,839
pretty amazing there was a discussion of

1012
00:36:10,710 --> 00:36:09,440
whether

1013
00:36:11,990 --> 00:36:10,720

there was a feature in one of the

1014
00:36:14,470 --> 00:36:12,000
stringers that we looked at and it was

1015
00:36:15,430 --> 00:36:14,480
actually a primer paint streak that you

1016
00:36:16,630 --> 00:36:15,440
could see

1017
00:36:22,230 --> 00:36:16,640
in the

1018
00:36:24,069 --> 00:36:22,240
of it or the the ability to see very

1019
00:36:27,910 --> 00:36:24,079
small features is is very good with

1020
00:36:35,430 --> 00:36:31,910
okay let's see eugenie reich are you on

1021
00:36:40,790 --> 00:36:38,550
how about james dean florida today

1022
00:36:44,150 --> 00:36:40,800
yes thanks kyle um

1023
00:36:46,150 --> 00:36:44,160
john how fortunate do you feel that that

1024
00:36:47,109 --> 00:36:46,160
foam did crack as as it did on on the

1025
00:36:49,430 --> 00:36:47,119
fifth

1026
00:36:51,190 --> 00:36:49,440
during tanking even though that was uh

1027
00:36:52,870 --> 00:36:51,200
secondary to the reason for the scrub

1028
00:36:54,870 --> 00:36:52,880
obviously it i guess without that

1029
00:36:55,910 --> 00:36:54,880
happening you might

1030
00:36:57,430 --> 00:36:55,920
not have

1031
00:36:58,870 --> 00:36:57,440
found the issue at all before another

1032
00:37:00,870 --> 00:36:58,880
launch attempt

1033
00:37:03,910 --> 00:37:00,880
yeah uh i don't

1034
00:37:06,069 --> 00:37:03,920
fortunate or unfortunate i i wouldn't

1035
00:37:09,349 --> 00:37:06,079
characterize it's just you know if

1036
00:37:11,670 --> 00:37:09,359
something gets through our

1037
00:37:13,910 --> 00:37:11,680
our process if we have a process escape

1038
00:37:17,750 --> 00:37:13,920

you always want to find that

1039
00:37:23,430 --> 00:37:20,550
this you know once we finally determine

1040
00:37:24,390 --> 00:37:23,440
what the root cause of this was

1041
00:37:26,710 --> 00:37:24,400
and

1042
00:37:28,550 --> 00:37:26,720
we go make sure that we don't have any

1043
00:37:30,630 --> 00:37:28,560
other exposure to it that there's no

1044
00:37:32,790 --> 00:37:30,640
other process escape that could

1045
00:37:35,109 --> 00:37:32,800
could

1046
00:37:37,430 --> 00:37:35,119
manifest itself in the same way

1047
00:37:39,990 --> 00:37:37,440
there will be a safer program so

1048
00:37:41,109 --> 00:37:40,000
it's uh it's good that we saw this our

1049
00:37:42,950 --> 00:37:41,119
pre-launch

1050
00:37:45,190 --> 00:37:42,960
scans would have would have definitely

1051
00:37:46,950 --> 00:37:45,200
picked it up even if we had not had the

1052
00:37:49,349 --> 00:37:46,960
the hydrogen

1053
00:37:51,589 --> 00:37:49,359
gaseous umbilical carrier plate

1054
00:37:53,270 --> 00:37:51,599
leak and uh and we would not have

1055
00:37:54,950 --> 00:37:53,280
launched because it was the phone crack

1056
00:37:56,390 --> 00:37:54,960
was in clear violation of our launch

1057
00:38:00,390 --> 00:37:56,400
commit criteria

1058
00:38:03,349 --> 00:38:00,400
and uh and like any violation we go and

1059
00:38:05,589 --> 00:38:03,359
and uh and assess it and make sure that

1060
00:38:06,950 --> 00:38:05,599
uh even though that problem may be fixed

1061
00:38:09,109 --> 00:38:06,960
like we think this

1062
00:38:10,950 --> 00:38:09,119
particular stringer's fixed you make

1063
00:38:12,630 --> 00:38:10,960

sure generically you're not exposed to

1064
00:38:13,910 --> 00:38:12,640
that same risk anywhere else and that's

1065
00:38:16,390 --> 00:38:13,920
the process we're going through right

1066
00:38:18,710 --> 00:38:16,400
now so uh it was it was good that we

1067
00:38:21,510 --> 00:38:18,720
found on the pad i think even though our

1068
00:38:24,310 --> 00:38:21,520
process did not catch this in the

1069
00:38:27,349 --> 00:38:24,320
assembly if that's what it was

1070
00:38:29,589 --> 00:38:27,359
the certainly the launch commit process

1071
00:38:33,670 --> 00:38:29,599
would have caught the the foam

1072
00:38:37,270 --> 00:38:35,190
anything else james

1073
00:38:40,230 --> 00:38:37,280
uh the tanking test

1074
00:38:42,069 --> 00:38:40,240
and uh it sounded like you you

1075
00:38:44,790 --> 00:38:42,079
mentioned that entirely in the context

1076
00:38:47,670 --> 00:38:44,800
of stringer modeling rather than the the

1077
00:38:49,510 --> 00:38:47,680
gup repair and so i was wondering if um

1078
00:38:51,349 --> 00:38:49,520
you could just talk about the reasons

1079
00:38:53,190 --> 00:38:51,359
why you would do a test and and just

1080
00:38:55,030 --> 00:38:53,200
kind of what would be the general time

1081
00:38:57,109 --> 00:38:55,040
frame and pros and cons

1082
00:38:59,589 --> 00:38:57,119
well you know the uh

1083
00:39:02,150 --> 00:38:59,599
we need to nail down our risk exposure

1084
00:39:03,510 --> 00:39:02,160
to this you know and is there uh

1085
00:39:05,510 --> 00:39:03,520
something out there that can get through

1086
00:39:06,630 --> 00:39:05,520
our process that can cause this this

1087
00:39:08,310 --> 00:39:06,640
condition

1088
00:39:10,150 --> 00:39:08,320

and um

1089
00:39:12,069 --> 00:39:10,160
in the interest of you know we have a

1090
00:39:14,390 --> 00:39:12,079
lot we need to determine a lot of

1091
00:39:16,710 --> 00:39:14,400
different data through test and analysis

1092
00:39:19,510 --> 00:39:16,720
i put on the table that if a tanking

1093
00:39:21,829 --> 00:39:19,520
test will help you then let's certainly

1094
00:39:24,230 --> 00:39:21,839
give consideration to doing that

1095
00:39:26,470 --> 00:39:24,240
and in being able to fill in some of the

1096
00:39:28,630 --> 00:39:26,480
unknowns and one of the

1097
00:39:31,510 --> 00:39:28,640
one of the ones i was thinking about was

1098
00:39:32,390 --> 00:39:31,520
that it's very hard to model the stress

1099
00:39:35,190 --> 00:39:32,400
and

1100
00:39:38,950 --> 00:39:35,200
particular part

1101
00:39:39,910 --> 00:39:38,960
um due to due to thermal deformation uh

1102
00:39:42,550 --> 00:39:39,920
due to

1103
00:39:44,390 --> 00:39:42,560
uh compression from the tank filling up

1104
00:39:46,550 --> 00:39:44,400
with liquid oxygen

1105
00:39:48,230 --> 00:39:46,560
it's a it's a pretty complex model and

1106
00:39:49,829 --> 00:39:48,240
they've done a nice job on the finite

1107
00:39:51,270 --> 00:39:49,839
elements model but if we don't

1108
00:39:53,030 --> 00:39:51,280
understand it well enough well let's go

1109
00:39:54,950 --> 00:39:53,040
instrument it let's go inside the tank

1110
00:39:56,710 --> 00:39:54,960
and and put strain gauges in or we

1111
00:39:58,710 --> 00:39:56,720
talked about hey we could remove some

1112
00:40:00,150 --> 00:39:58,720
foam and and go put

1113
00:40:01,750 --> 00:40:00,160

go put instrumentation on those

1114
00:40:03,589 --> 00:40:01,760
stringers and you do a tanking test and

1115
00:40:06,470 --> 00:40:03,599
then you've anchored your model

1116
00:40:08,309 --> 00:40:06,480
anchored your model in really good uh

1117
00:40:10,069 --> 00:40:08,319
accurate data and then you understand

1118
00:40:12,790 --> 00:40:10,079
what the stresses are on that on that

1119
00:40:14,470 --> 00:40:12,800
piece so i did not uh you know i was

1120
00:40:16,069 --> 00:40:14,480
encouraging the team that let's make

1121
00:40:18,309 --> 00:40:16,079
sure that we understand what data we

1122
00:40:19,829 --> 00:40:18,319
need to understand our risk exposure and

1123
00:40:21,510 --> 00:40:19,839
if we need to do something like doing a

1124
00:40:23,349 --> 00:40:21,520
tanking test then we're going to go do

1125
00:40:24,870 --> 00:40:23,359
that if we need to do something like

1126
00:40:26,309 --> 00:40:24,880
rolling the vehicle back and taking a

1127
00:40:28,150 --> 00:40:26,319
look at the back side of the tank with

1128
00:40:30,950 --> 00:40:28,160
the x-rays or

1129
00:40:32,710 --> 00:40:30,960
or anything else i'm trying to leave the

1130
00:40:34,550 --> 00:40:32,720
the options very wide open to the team

1131
00:40:36,470 --> 00:40:34,560
to go identify what data they need and

1132
00:40:38,550 --> 00:40:36,480
then we'll identify the best way to go

1133
00:40:40,309 --> 00:40:38,560
get that data and then we'll uh we'll

1134
00:40:42,390 --> 00:40:40,319
understand what our exposure is to this

1135
00:40:44,230 --> 00:40:42,400
problem

1136
00:40:45,190 --> 00:40:44,240
is there time for a quick follow-up kyle

1137
00:40:47,670 --> 00:40:45,200
sure

1138
00:40:49,270 --> 00:40:47,680

i i just i guess i wanted to clarify if

1139
00:40:50,870 --> 00:40:49,280
do you feel the uh

1140
00:40:52,390 --> 00:40:50,880
what is your confidence that the gup

1141
00:40:54,470 --> 00:40:52,400
issue is completely resolved because

1142
00:40:56,870 --> 00:40:54,480
obviously that was what uh

1143
00:40:59,190 --> 00:40:56,880
initially caused the scrub and you know

1144
00:41:00,470 --> 00:40:59,200
um if that happens again then uh even in

1145
00:41:01,990 --> 00:41:00,480
this next window then it looks like

1146
00:41:05,109 --> 00:41:02,000
you're you're off until

1147
00:41:07,190 --> 00:41:05,119
till february and and then finally um

1148
00:41:09,589 --> 00:41:07,200
what what are you doing with your other

1149
00:41:11,349 --> 00:41:09,599
two tanks to uh assess

1150
00:41:13,670 --> 00:41:11,359
the issue whether the stringer issue

1151
00:41:15,349 --> 00:41:13,680
could be a factor for them as well

1152
00:41:17,030 --> 00:41:15,359
yeah that was i'm going to answer all

1153
00:41:20,390 --> 00:41:17,040
the questions um

1154
00:41:24,069 --> 00:41:20,400
the as far as the gup issue

1155
00:41:25,829 --> 00:41:24,079
we learned a lot because we went slow

1156
00:41:27,430 --> 00:41:25,839
and carefully thought through the

1157
00:41:28,550 --> 00:41:27,440
disassembly and took a lot of

1158
00:41:30,230 --> 00:41:28,560
measurements

1159
00:41:32,230 --> 00:41:30,240
and tested and found out that we had a

1160
00:41:35,430 --> 00:41:32,240
requirements problem

1161
00:41:38,069 --> 00:41:35,440
when we set up the uh the alignment

1162
00:41:40,470 --> 00:41:38,079
between the uh the quick disconnect for

1163
00:41:43,910 --> 00:41:40,480

the gup and putting it through the plate

1164
00:41:48,150 --> 00:41:45,349
requirement

1165
00:41:50,390 --> 00:41:48,160
but we did not require where that where

1166
00:41:51,270 --> 00:41:50,400
in a 360 degree circle that misalignment

1167
00:41:53,829 --> 00:41:51,280
could be

1168
00:41:55,510 --> 00:41:53,839
and it turned out that it was in

1169
00:41:58,309 --> 00:41:55,520
the worst place it could have been so

1170
00:42:00,150 --> 00:41:58,319
that the the gravity loading of the vent

1171
00:42:02,390 --> 00:42:00,160
arm

1172
00:42:04,150 --> 00:42:02,400
exacerbated that misalignment

1173
00:42:05,670 --> 00:42:04,160
and made it even worse so we had a

1174
00:42:07,589 --> 00:42:05,680
requirement for how far off you could be

1175
00:42:09,990 --> 00:42:07,599
but we didn't say where on the 360

1176
00:42:11,589 --> 00:42:10,000
degrees that misalignment could be

1177
00:42:14,870 --> 00:42:11,599
even though we did all that work after

1178
00:42:17,589 --> 00:42:14,880
sts-119 and after sts-127

1179
00:42:19,270 --> 00:42:17,599
we did not clue into that and i think

1180
00:42:20,630 --> 00:42:19,280
that was the root of our problem on on

1181
00:42:22,710 --> 00:42:20,640
133

1182
00:42:24,790 --> 00:42:22,720
and uh i

1183
00:42:26,550 --> 00:42:24,800
the team has come back they've uh

1184
00:42:28,550 --> 00:42:26,560
they're very aware of that now they've

1185
00:42:30,069 --> 00:42:28,560
done all the work required and i'm very

1186
00:42:32,150 --> 00:42:30,079
confident that the gup

1187
00:42:34,550 --> 00:42:32,160
is is fixed and i would not require a

1188
00:42:36,870 --> 00:42:34,560

tanking test before committing to uh to

1189
00:42:38,630 --> 00:42:36,880
a launch attempt just for the gup um if

1190
00:42:40,550 --> 00:42:38,640
we do a tanking test for

1191
00:42:42,630 --> 00:42:40,560
uh to gather data on the stringer

1192
00:42:45,589 --> 00:42:42,640
performance then we'll get the gup for

1193
00:42:47,910 --> 00:42:45,599
free which is which is is always nice

1194
00:42:51,270 --> 00:42:47,920
i would draw a parallel

1195
00:42:56,150 --> 00:42:53,829
when we initially had the problem it was

1196
00:42:59,109 --> 00:42:56,160
on friday

1197
00:43:00,550 --> 00:42:59,119
for the gup problem november 5th i think

1198
00:43:02,309 --> 00:43:00,560
it was we still had a launch opportunity

1199
00:43:04,069 --> 00:43:02,319
we could do on that

1200
00:43:05,750 --> 00:43:04,079
next monday

1201
00:43:06,950 --> 00:43:05,760
and uh the team came and said wow it's a

1202
00:43:08,390 --> 00:43:06,960
big leak you know it's probably

1203
00:43:10,470 --> 00:43:08,400
something obvious we can run out there

1204
00:43:12,230 --> 00:43:10,480
we can just go swap out some stuff and

1205
00:43:14,069 --> 00:43:12,240
and man we can be ready to go and make a

1206
00:43:15,510 --> 00:43:14,079
launch attempt on monday and we sat back

1207
00:43:16,870 --> 00:43:15,520
and thought no you know we have a

1208
00:43:18,390 --> 00:43:16,880
process

1209
00:43:19,589 --> 00:43:18,400
um we're going to go through this very

1210
00:43:21,190 --> 00:43:19,599
methodically we're going to make sure we

1211
00:43:23,270 --> 00:43:21,200
learn as much as we can about it because

1212
00:43:24,710 --> 00:43:23,280
we have a couple more flights that we

1213
00:43:25,670 --> 00:43:24,720

would like to fly

1214
00:43:31,109 --> 00:43:25,680
and

1215
00:43:32,390 --> 00:43:31,119
future

1216
00:43:34,309 --> 00:43:32,400
and

1217
00:43:36,390 --> 00:43:34,319
there was nothing that was

1218
00:43:38,630 --> 00:43:36,400
significantly wrong with the gup it was

1219
00:43:41,270 --> 00:43:38,640
a stack up of tolerance issues that

1220
00:43:42,710 --> 00:43:41,280
caused the leak and by going very slowly

1221
00:43:44,470 --> 00:43:42,720
and thinking about it and being very

1222
00:43:46,870 --> 00:43:44,480
methodical and giving up on a launch

1223
00:43:48,230 --> 00:43:46,880
opportunity we were able to solve that

1224
00:43:52,710 --> 00:43:48,240
problem

1225
00:43:53,990 --> 00:43:52,720
you know you could say hey we're just

1226
00:43:55,349 --> 00:43:54,000
going to go do the repair that we always

1227
00:43:56,710 --> 00:43:55,359
do

1228
00:43:57,910 --> 00:43:56,720
we're going to refolm it we're going to

1229
00:43:59,510 --> 00:43:57,920
go launch you know we're going to be in

1230
00:44:01,349 --> 00:43:59,520
good shape

1231
00:44:03,510 --> 00:44:01,359
we have to understand what our exposure

1232
00:44:05,510 --> 00:44:03,520
is to that problem recurring somewhere

1233
00:44:07,349 --> 00:44:05,520
else on this tank so we're very

1234
00:44:09,190 --> 00:44:07,359
carefully very methodically going

1235
00:44:11,349 --> 00:44:09,200
through it and we're passing up some

1236
00:44:13,030 --> 00:44:11,359
launch opportunities to do that but that

1237
00:44:14,950 --> 00:44:13,040
is appropriate because we want to make

1238
00:44:17,510 --> 00:44:14,960

sure that we fully understand the

1239
00:44:19,349 --> 00:44:17,520
problem before we commit to go fly and

1240
00:44:21,270 --> 00:44:19,359
and that's just the way this team has

1241
00:44:23,190 --> 00:44:21,280
been working is that they do the work

1242
00:44:25,589 --> 00:44:23,200
that is required

1243
00:44:27,750 --> 00:44:25,599
bill doesn't give me any and micro

1244
00:44:28,950 --> 00:44:27,760
suffrage doesn't give me any kind of

1245
00:44:30,710 --> 00:44:28,960
pressure at all that hey we need to

1246
00:44:33,190 --> 00:44:30,720
launch because station needs you know x

1247
00:44:34,870 --> 00:44:33,200
y or z component they always tell me hey

1248
00:44:36,470 --> 00:44:34,880
just get it right when we launch we

1249
00:44:38,069 --> 00:44:36,480
launch and the station will be happy to

1250
00:44:40,710 --> 00:44:38,079
see you when you show up

1251
00:44:42,870 --> 00:44:40,720
so the team has been very methodical

1252
00:44:44,550 --> 00:44:42,880
is working through this very carefully

1253
00:44:45,670 --> 00:44:44,560
they understand

1254
00:44:47,430 --> 00:44:45,680
uh

1255
00:44:49,829 --> 00:44:47,440
completely what

1256
00:44:51,589 --> 00:44:49,839
what i expect of them and that is to

1257
00:44:54,309 --> 00:44:51,599
make sure that we do the absolute best

1258
00:44:55,990 --> 00:44:54,319
risk assessment that we possibly can and

1259
00:44:57,990 --> 00:44:56,000
we'll make the decision after that

1260
00:44:59,990 --> 00:44:58,000
really good risk assessment is done

1261
00:45:01,829 --> 00:45:00,000
whether we can fly with the design we

1262
00:45:04,150 --> 00:45:01,839
have right now or if we need to go make

1263
00:45:06,710 --> 00:45:04,160

some modification to it and if we do we

1264
00:45:08,630 --> 00:45:06,720
do and we'll we'll go execute that and

1265
00:45:10,069 --> 00:45:08,640
we'll fly discovery when we're fully

1266
00:45:11,589 --> 00:45:10,079
confident in the

1267
00:45:13,990 --> 00:45:11,599
the ability of the tank to support the

1268
00:45:17,910 --> 00:45:15,589
okay we're back here for we have time

1269
00:45:19,990 --> 00:45:17,920
for maybe one or two more mark uh thank

1270
00:45:21,829 --> 00:45:20,000
you mark crow for aviation week uh as

1271
00:45:23,349 --> 00:45:21,839
best you can can you sort of

1272
00:45:25,990 --> 00:45:23,359
sketch out at least your sort of

1273
00:45:28,630 --> 00:45:26,000
management level milestones for

1274
00:45:30,230 --> 00:45:28,640
for uh following the process

1275
00:45:31,589 --> 00:45:30,240
sure uh well i'll just tell you what's

1276
00:45:33,670 --> 00:45:31,599
the next week because i don't know past

1277
00:45:36,069 --> 00:45:33,680
this next week right

1278
00:45:37,510 --> 00:45:36,079
i told everybody take tomorrow off

1279
00:45:38,230 --> 00:45:37,520
and a good part of the team is going to

1280
00:45:40,230 --> 00:45:38,240
take

1281
00:45:42,870 --> 00:45:40,240
a friday off as well most of this team

1282
00:45:44,790 --> 00:45:42,880
has been working since the initial

1283
00:45:46,710 --> 00:45:44,800
problem on november 5th so that's like

1284
00:45:48,550 --> 00:45:46,720
four straight weeks you know weekends

1285
00:45:50,069 --> 00:45:48,560
included just just killing themselves

1286
00:45:52,069 --> 00:45:50,079
trying to understand this

1287
00:45:53,750 --> 00:45:52,079
tell them take tomorrow off take take

1288
00:45:54,950 --> 00:45:53,760

friday off if you can we'll start on

1289
00:45:56,150 --> 00:45:54,960
saturday

1290
00:45:58,390 --> 00:45:56,160
we're gonna work through all of the

1291
00:46:00,950 --> 00:45:58,400
homework i gave them on the

1292
00:46:03,750 --> 00:46:00,960
the data mining of the cracks the the

1293
00:46:05,510 --> 00:46:03,760
loads and stress analysis

1294
00:46:07,589 --> 00:46:05,520
the the debris

1295
00:46:09,430 --> 00:46:07,599
potentials

1296
00:46:11,109 --> 00:46:09,440
make sure that they do the fail-safe

1297
00:46:12,950 --> 00:46:11,119
analysis work through the fault tree all

1298
00:46:14,950 --> 00:46:12,960
of that work that i outlined

1299
00:46:17,829 --> 00:46:14,960
we'll start on saturday

1300
00:46:19,829 --> 00:46:17,839
we'll do a checkpoint with the with the

1301
00:46:22,390 --> 00:46:19,839
team next thursday

1302
00:46:25,109 --> 00:46:22,400
at another

1303
00:46:26,309 --> 00:46:25,119
prcb program requirements control board

1304
00:46:28,790 --> 00:46:26,319
and

1305
00:46:30,710 --> 00:46:28,800
what i think we'll probably do is end up

1306
00:46:33,270 --> 00:46:30,720
giving

1307
00:46:35,750 --> 00:46:33,280
bill a heads up on on friday as to as to

1308
00:46:38,230 --> 00:46:35,760
where we think we are in the uh in the

1309
00:46:39,589 --> 00:46:38,240
investigation so it's you know i think

1310
00:46:41,589 --> 00:46:39,599
we've done a really good job of

1311
00:46:42,950 --> 00:46:41,599
outlining exactly what work is required

1312
00:46:44,710 --> 00:46:42,960
now it's just turning the crank and

1313
00:46:47,030 --> 00:46:44,720

making sure that that all that work is

1314
00:46:49,030 --> 00:46:47,040
done we do all of our peer reviews on it

1315
00:46:50,309 --> 00:46:49,040
we do our independent checks on it and

1316
00:46:51,829 --> 00:46:50,319
then make sure it's quality data and

1317
00:46:53,910 --> 00:46:51,839
then then we'll be able to make some

1318
00:46:56,630 --> 00:46:53,920
good decisions

1319
00:46:59,109 --> 00:46:56,640
and eric we'll let you wrap it up eric

1320
00:47:01,349 --> 00:46:59,119
berger with the houston chronicle

1321
00:47:02,790 --> 00:47:01,359
um i guess finally is there any scenario

1322
00:47:05,510 --> 00:47:02,800
under which

1323
00:47:07,270 --> 00:47:05,520
you might find that the existing tank

1324
00:47:08,470 --> 00:47:07,280
has to be changed out i mean i know you

1325
00:47:09,670 --> 00:47:08,480
don't have any

1326
00:47:11,589 --> 00:47:09,680
or

1327
00:47:12,870 --> 00:47:11,599
it would be difficult to replace it but

1328
00:47:15,510 --> 00:47:12,880
is that a possibility or is that

1329
00:47:17,910 --> 00:47:15,520
something you don't foresee happening

1330
00:47:20,390 --> 00:47:17,920
uh i don't know uh right now we have to

1331
00:47:21,270 --> 00:47:20,400
understand our risk exposure with the

1332
00:47:23,510 --> 00:47:21,280
current

1333
00:47:25,430 --> 00:47:23,520
assembly process and design that we have

1334
00:47:26,790 --> 00:47:25,440
all three tanks were built the same way

1335
00:47:29,510 --> 00:47:26,800
so there's no real difference between

1336
00:47:31,430 --> 00:47:29,520
the three tanks

1337
00:47:36,150 --> 00:47:31,440
the only

1338
00:47:38,309 --> 00:47:36,160

would swap tanks

1339
00:47:40,470 --> 00:47:38,319
is if we did all of this homework and we

1340
00:47:42,870 --> 00:47:40,480
decided uh you know what we don't have

1341
00:47:46,309 --> 00:47:42,880
enough information to say

1342
00:47:51,190 --> 00:47:48,549
we don't have an exposure

1343
00:47:53,430 --> 00:47:51,200
to the same thing happening you can't

1344
00:47:55,750 --> 00:47:53,440
screen it well enough you can't show

1345
00:47:58,470 --> 00:47:55,760
through nde well enough so you have to

1346
00:47:59,990 --> 00:47:58,480
go in and do some kind of a modification

1347
00:48:02,470 --> 00:48:00,000
on that flange

1348
00:48:04,069 --> 00:48:02,480
to uh to beef it up somehow

1349
00:48:07,430 --> 00:48:04,079
and i've got a team going off and

1350
00:48:09,109 --> 00:48:07,440
thinking about that well it may be that

1351
00:48:11,109 --> 00:48:09,119
doing one of the other two tanks that

1352
00:48:14,230 --> 00:48:11,119
are at kennedy space center would be

1353
00:48:16,309 --> 00:48:14,240
quicker so we would go and modify a tank

1354
00:48:18,230 --> 00:48:16,319
and then we would fly discovery first on

1355
00:48:20,390 --> 00:48:18,240
that tank that's modified that's a long

1356
00:48:21,910 --> 00:48:20,400
way down the road

1357
00:48:24,069 --> 00:48:21,920
you know if we can't get comfortable

1358
00:48:25,510 --> 00:48:24,079
with our risk exposure potentially we'll

1359
00:48:27,190 --> 00:48:25,520
start talking about that but that's the

1360
00:48:28,630 --> 00:48:27,200
only way really i can see that we would

1361
00:48:30,390 --> 00:48:28,640
we would swap tanks there's no real

1362
00:48:32,150 --> 00:48:30,400
difference between the tanks

1363
00:48:33,589 --> 00:48:32,160

you know i think the good thing is john

1364
00:48:36,630 --> 00:48:33,599
and a team they've laid out a very

1365
00:48:37,589 --> 00:48:36,640
methodical process of which way to go

1366
00:48:39,430 --> 00:48:37,599
and then there's some things they

1367
00:48:41,109 --> 00:48:39,440
pointed out today that look like they're

1368
00:48:42,710 --> 00:48:41,119
pushing us in one direction or another

1369
00:48:44,470 --> 00:48:42,720
but then john asked the team this is

1370
00:48:46,230 --> 00:48:44,480
really critical analysis let's go back

1371
00:48:48,630 --> 00:48:46,240
and make sure we really understand those

1372
00:48:50,309 --> 00:48:48,640
pieces so when they do some double

1373
00:48:52,069 --> 00:48:50,319
checks and triple checks i think out of

1374
00:48:53,910 --> 00:48:52,079
there somewhere more than likely will

1375
00:48:55,510 --> 00:48:53,920
come the answer it's just going to take

1376
00:48:57,109 --> 00:48:55,520
a little bit of time and patience for us

1377
00:48:58,470 --> 00:48:57,119
to get through it you know they've been

1378
00:49:00,470 --> 00:48:58,480
very methodical they went back and

1379
00:49:02,390 --> 00:49:00,480
x-rayed all the tanks in the vab so we

1380
00:49:04,790 --> 00:49:02,400
did the same thing in the vab we looked

1381
00:49:06,710 --> 00:49:04,800
at the oxygen inner tank

1382
00:49:07,910 --> 00:49:06,720
region and the hydrogen entertank region

1383
00:49:09,430 --> 00:49:07,920
to see if there were anything we saw in

1384
00:49:11,430 --> 00:49:09,440
those tanks and we didn't see anything

1385
00:49:13,589 --> 00:49:11,440
there so again i think the teams have a

1386
00:49:15,270 --> 00:49:13,599
very methodical process

1387
00:49:16,630 --> 00:49:15,280
we'll kind of let the data drive us as

1388
00:49:18,630 --> 00:49:16,640

john said if there's some advantage

1389
00:49:20,069 --> 00:49:18,640
potentially from a schedule standpoint

1390
00:49:21,829 --> 00:49:20,079
of swapping orders or things we'll see

1391
00:49:23,829 --> 00:49:21,839
that but i think the thing right now is

1392
00:49:25,430 --> 00:49:23,839
to just kind of let the teams run

1393
00:49:27,190 --> 00:49:25,440
they've got some good work in front of

1394
00:49:28,790 --> 00:49:27,200
them let's take our time make sure we

1395
00:49:30,309 --> 00:49:28,800
really got it right we know what the

1396
00:49:32,470 --> 00:49:30,319
critical analysis is we know where the

1397
00:49:34,390 --> 00:49:32,480
critical tests are can we add some more

1398
00:49:36,230 --> 00:49:34,400
tests to give us more confidence and and

1399
00:49:39,430 --> 00:49:36,240
then i think it'll become pretty obvious

1400
00:49:43,030 --> 00:49:41,030
okay that's all the time we have for

1401
00:49:44,630 --> 00:49:43,040
this briefing but uh shortly if you'll

1402
00:49:46,470 --> 00:49:44,640
stay with us on nasa tv we're going to

1403
00:49:48,150 --> 00:49:46,480
head over to mission control

1404
00:49:50,230 --> 00:49:48,160
up to the international space station

1405
00:49:52,790 --> 00:49:50,240
and climb aboard with the

1406
00:49:55,510 --> 00:49:52,800
expedition 25 crew commander doug

1407
00:49:57,589 --> 00:49:55,520
wheelock of expedition 25

1408
00:49:58,710 --> 00:49:57,599
is just about to hand command over

1409
00:50:01,030 --> 00:49:58,720
officially

1410
00:50:03,829 --> 00:50:01,040
to his colleague scott kelly who will be

1411
00:50:06,150 --> 00:50:03,839
the commander of expedition 26 doug

1412
00:50:08,230 --> 00:50:06,160
wheelock fyodor yurchikhin and shannon

1413
00:50:09,829 --> 00:50:08,240

walker will be heading home tomorrow but

1414
00:50:11,589 --> 00:50:09,839
they'll conduct that change of command

1415
00:50:13,910 --> 00:50:11,599
ceremony here at the top of the hour so

1416
00:50:15,670 --> 00:50:13,920
stay tuned for that and then tomorrow of

1417
00:50:17,270 --> 00:50:15,680
course thanksgiving day

1418
00:50:18,630 --> 00:50:17,280
those three crew members that i

1419
00:50:21,270 --> 00:50:18,640
mentioned are going to be heading home

1420
00:50:23,510 --> 00:50:21,280
in their soyuz spacecraft the coverage

1421
00:50:25,349 --> 00:50:23,520
is uh staged at various points

1422
00:50:28,230 --> 00:50:25,359
throughout the day beginning at 3 30

1423
00:50:30,470 --> 00:50:28,240
eastern central time 4 30 eastern with

1424
00:50:32,390 --> 00:50:30,480
the farewell and hatch closure and

1425
00:50:34,790 --> 00:50:32,400
that'll be followed by the

1426
00:50:37,109 --> 00:50:34,800
undocking and then late at night the

1427
00:50:40,309 --> 00:50:37,119
deorbit burn and landing the the orbit

1428
00:50:42,390 --> 00:50:40,319
burn scheduled for 9 54 p.m with landing

1429
00:50:44,230 --> 00:50:42,400
at 10 46 p.m

1430
00:50:46,470 --> 00:50:44,240
those are central times so stay tuned to

1431
00:50:48,309 --> 00:50:46,480
nasa tv tomorrow while you enjoy visits

1432
00:50:50,309 --> 00:50:48,319
with your family and friends