
Center

1
00:00:07,510 --> 00:00:05,349
good morning and welcome to today's

2
00:00:10,150 --> 00:00:07,520
mission status briefing

3
00:00:11,990 --> 00:00:10,160
with us are gary horlocker the sts-134

4
00:00:14,070 --> 00:00:12,000
lead flight director who's just coming

5
00:00:16,950 --> 00:00:14,080
off his orbit one shift his final shift

6
00:00:19,750 --> 00:00:16,960
of the mission and heather henkel henklo

7
00:00:23,910 --> 00:00:19,760
the principal investigator of the storm

8
00:00:25,910 --> 00:00:23,920
test which was concluded today

9
00:00:27,830 --> 00:00:25,920
gary would you begin please

10
00:00:30,150 --> 00:00:27,840
sure thank you very much good morning

11
00:00:33,110 --> 00:00:30,160
everyone it's really great to be here um

12
00:00:35,430 --> 00:00:33,120
absolutely outstanding day today so far

13
00:00:37,750 --> 00:00:35,440

um i think that probably the word i'd

14
00:00:38,470 --> 00:00:37,760
use to sum it up is pretty much flawless

15
00:00:40,310 --> 00:00:38,480
we

16
00:00:42,229 --> 00:00:40,320
obviously undocked today from the space

17
00:00:43,990 --> 00:00:42,239
station

18
00:00:46,310 --> 00:00:44,000
pretty much undocked right on time and

19
00:00:48,549 --> 00:00:46,320
as we talked yesterday uh the pilot greg

20
00:00:50,549 --> 00:00:48,559
johnson was at the controls he backed

21
00:00:52,310 --> 00:00:50,559
endeavor away from the station out to

22
00:00:54,229 --> 00:00:52,320
about 400 feet

23
00:00:56,229 --> 00:00:54,239
and then he initiated the full lap fly

24
00:00:57,910 --> 00:00:56,239
around and uh

25
00:00:59,750 --> 00:00:57,920
so we did the fly around got our

26
00:01:01,670 --> 00:00:59,760
standard photos of the entire outside of

27
00:01:04,390 --> 00:01:01,680
the space station we also

28
00:01:06,310 --> 00:01:04,400
took a few photos specific photos of the

29
00:01:09,109 --> 00:01:06,320
atv vehicle as requested by our

30
00:01:10,469 --> 00:01:09,119
colleagues across the atlantic ocean

31
00:01:12,070 --> 00:01:10,479
and uh

32
00:01:13,590 --> 00:01:12,080
once that fly around was complete the

33
00:01:15,749 --> 00:01:13,600
crew started the

34
00:01:17,429 --> 00:01:15,759
storm trajectory take care of the storm

35
00:01:18,550 --> 00:01:17,439
dto for today

36
00:01:20,550 --> 00:01:18,560
um

37
00:01:23,109 --> 00:01:20,560
all those burns went perfectly as

38
00:01:24,310 --> 00:01:23,119

planned uh the trajectory was was right

39
00:01:25,670 --> 00:01:24,320
on the money

40
00:01:27,350 --> 00:01:25,680
and

41
00:01:28,950 --> 00:01:27,360
everything just went really really well

42
00:01:30,469 --> 00:01:28,960
and and heather's gonna give you more

43
00:01:32,950 --> 00:01:30,479
details about how the the sensor

44
00:01:36,550 --> 00:01:32,960
performance went so so we can

45
00:01:38,950 --> 00:01:36,560
hang on to that for a few minutes um

46
00:01:40,710 --> 00:01:38,960
so we got all that accomplished and uh

47
00:01:42,550 --> 00:01:40,720
so once we we got outside the range of

48
00:01:44,870 --> 00:01:42,560
the sensors we started shifting gears

49
00:01:47,030 --> 00:01:44,880
towards uh thinking about coming home

50
00:01:48,550 --> 00:01:47,040
the crew got right into the uh the water

51
00:01:50,789 --> 00:01:48,560
dumps that we always have right after we

52
00:01:53,350 --> 00:01:50,799
get undocked and those were in progress

53
00:01:55,030 --> 00:01:53,360
as i left the control center

54
00:01:57,030 --> 00:01:55,040
then they'll be also working on getting

55
00:01:59,270 --> 00:01:57,040
the cabin in the right configuration and

56
00:02:01,429 --> 00:01:59,280
start configuring the ship

57
00:02:03,510 --> 00:02:01,439
as a reentry vehicle so

58
00:02:05,190 --> 00:02:03,520
so like i said things so far went really

59
00:02:06,789 --> 00:02:05,200
really great today

60
00:02:08,869 --> 00:02:06,799
we did have one little distraction

61
00:02:10,469 --> 00:02:08,879
during the storm trajectory shortly

62
00:02:12,550 --> 00:02:10,479
after step two

63
00:02:13,430 --> 00:02:12,560

uh the crew got a fuel cell message on

64
00:02:15,750 --> 00:02:13,440
board

65
00:02:17,430 --> 00:02:15,760
fuel cell dealt a volt message

66
00:02:19,110 --> 00:02:17,440
and

67
00:02:21,190 --> 00:02:19,120
so basically the the orbiter has three

68
00:02:23,990 --> 00:02:21,200
fuel cells that's how we generate power

69
00:02:26,229 --> 00:02:24,000
for the for the entire vehicle and uh

70
00:02:28,630 --> 00:02:26,239
each of those fuel cells has 96 cells

71
00:02:31,190 --> 00:02:28,640
within it and those are broken down into

72
00:02:33,509 --> 00:02:31,200
three separate sub stacks so there's 32

73
00:02:35,990 --> 00:02:33,519
cells within a substack

74
00:02:37,990 --> 00:02:36,000
and and the fuel cell has a cell

75
00:02:40,150 --> 00:02:38,000
performance monitor attached to it and

76
00:02:42,390 --> 00:02:40,160
with this it's a very small black

77
00:02:44,229 --> 00:02:42,400
electronic box strictly to monitor the

78
00:02:45,830 --> 00:02:44,239
performance of the fuel cell

79
00:02:48,949 --> 00:02:45,840
and it basically takes each of those sub

80
00:02:51,110 --> 00:02:48,959
stacks and and looks at half of it

81
00:02:53,990 --> 00:02:51,120
16 cells at a time

82
00:02:56,150 --> 00:02:54,000
so it compares the the voltage across

83
00:02:57,830 --> 00:02:56,160
both of those halves of the the stack of

84
00:02:59,830 --> 00:02:57,840
16 cells each

85
00:03:01,030 --> 00:02:59,840
and so ideally you want that you expect

86
00:03:03,270 --> 00:03:01,040
that voltage

87
00:03:05,509 --> 00:03:03,280
delta volts between the two halves to be

88
00:03:07,670 --> 00:03:05,519

zero in an ideal world but obviously you

89
00:03:09,270 --> 00:03:07,680
know it's gonna be very small number in

90
00:03:13,030 --> 00:03:09,280
in the real world

91
00:03:14,070 --> 00:03:13,040
and uh if that delta delta volt

92
00:03:14,869 --> 00:03:14,080
value

93
00:03:17,030 --> 00:03:14,879
uh

94
00:03:18,710 --> 00:03:17,040
climbs to a certain point it starts it's

95
00:03:20,550 --> 00:03:18,720
an indication that the fuel cell's

96
00:03:22,149 --> 00:03:20,560
degrading and you're starting to have

97
00:03:24,550 --> 00:03:22,159
some issues with the fuel cells so

98
00:03:27,110 --> 00:03:24,560
that's that's basically the the purpose

99
00:03:28,309 --> 00:03:27,120
of the cell performance monitor the cpm

100
00:03:30,470 --> 00:03:28,319
box

101
00:03:32,070 --> 00:03:30,480
so it exceeded that that limit it

102
00:03:34,630 --> 00:03:32,080
performs that test every seven and a

103
00:03:37,430 --> 00:03:34,640
half minutes um it exceeded that limit

104
00:03:39,350 --> 00:03:37,440
trip the message crew got it we we were

105
00:03:40,710 --> 00:03:39,360
looking at the fuel cell performance in

106
00:03:42,710 --> 00:03:40,720
real time

107
00:03:45,110 --> 00:03:42,720
had no other indications of any problems

108
00:03:46,789 --> 00:03:45,120
fuel cell was performing great

109
00:03:48,470 --> 00:03:46,799
so we just kept an eye on it next time

110
00:03:49,990 --> 00:03:48,480
it ran the self-test it

111
00:03:51,270 --> 00:03:50,000
turned out nominal

112
00:03:52,390 --> 00:03:51,280
and so basically it was kind of

113
00:03:53,589 --> 00:03:52,400

intermittent throughout the storm

114
00:03:55,830 --> 00:03:53,599
trajectory

115
00:03:57,670 --> 00:03:55,840
i think we had seven

116
00:03:59,589 --> 00:03:57,680
seven self-test failures throughout the

117
00:04:01,110 --> 00:03:59,599
last few hours

118
00:04:03,509 --> 00:04:01,120
and then in between each each of the

119
00:04:04,630 --> 00:04:03,519
other self-tests were just just nominal

120
00:04:08,390 --> 00:04:04,640
so

121
00:04:09,830 --> 00:04:08,400
indication that we're seeing but again

122
00:04:11,589 --> 00:04:09,840
the the fuel cell is performing

123
00:04:13,589 --> 00:04:11,599
absolutely perfectly the way it has all

124
00:04:15,190 --> 00:04:13,599
flight we have no concerns about about

125
00:04:16,949 --> 00:04:15,200
its actual performance we think it's

126
00:04:19,670 --> 00:04:16,959
really just an issue with this

127
00:04:21,509 --> 00:04:19,680
performance monitor box so

128
00:04:24,710 --> 00:04:21,519
it's very similar to a signature we saw

129
00:04:26,390 --> 00:04:24,720
on sts-130 last time endeavour flew

130
00:04:27,990 --> 00:04:26,400
it was actually a indication on a

131
00:04:29,990 --> 00:04:28,000
different sub stack in the same fuel

132
00:04:30,790 --> 00:04:30,000
cell and after that flight they replaced

133
00:04:34,230 --> 00:04:30,800
this

134
00:04:36,310 --> 00:04:34,240
cpm box a performance monitoring box so

135
00:04:37,990 --> 00:04:36,320
so it's very interesting but again the

136
00:04:39,749 --> 00:04:38,000
fuel cell looks like it's it's working

137
00:04:41,990 --> 00:04:39,759
fine so the team's going to be you know

138
00:04:45,030 --> 00:04:42,000

continuing to watch it and talking about

139
00:04:46,550 --> 00:04:45,040
it throughout the day so

140
00:04:47,990 --> 00:04:46,560
i think that's really all i got to add

141
00:04:50,230 --> 00:04:48,000
i'll hand it over to heather to give you

142
00:04:51,909 --> 00:04:50,240
the details on how the storm activity

143
00:04:53,189 --> 00:04:51,919
went today

144
00:04:55,670 --> 00:04:53,199
thanks gary

145
00:04:58,629 --> 00:04:55,680
the storm team had a great night tonight

146
00:05:01,029 --> 00:04:58,639
we were able to get vns data throughout

147
00:05:03,830 --> 00:05:01,039
the entire undock re-rendezvous and

148
00:05:06,550 --> 00:05:03,840
final separation trajectory the software

149
00:05:08,230 --> 00:05:06,560
performed flawlessly drew feu still put

150
00:05:11,029 --> 00:05:08,240
us into all the right

151
00:05:14,230 --> 00:05:11,039
modes right on schedule we had no

152
00:05:17,270 --> 00:05:14,240
anomalies and we're real excited about

153
00:05:19,990 --> 00:05:17,280
getting a lot more vns data

154
00:05:23,189 --> 00:05:20,000
we've accumulated throughout rendezvous

155
00:05:26,469 --> 00:05:23,199
and including today nearly 600 gigabytes

156
00:05:29,189 --> 00:05:26,479
of data so we have a lot of good data

157
00:05:32,870 --> 00:05:29,199
analysis days coming ahead of us once we

158
00:05:34,950 --> 00:05:32,880
get the boxes off the vehicle in florida

159
00:05:37,189 --> 00:05:34,960
and the team will start working together

160
00:05:39,350 --> 00:05:37,199
to analyze all that data

161
00:05:41,510 --> 00:05:39,360
so from a ground perspective during real

162
00:05:44,150 --> 00:05:41,520
time we get to see data over the

163
00:05:45,990 --> 00:05:44,160

sequential still video so we don't get

164
00:05:48,150 --> 00:05:46,000
all the detailed data that i showed

165
00:05:49,029 --> 00:05:48,160
yesterday which had

166
00:05:50,150 --> 00:05:49,039
some

167
00:05:51,590 --> 00:05:50,160
i guess

168
00:05:53,990 --> 00:05:51,600
detailed plots of some of the

169
00:05:58,070 --> 00:05:54,000
performance of the vns so what we get to

170
00:05:58,950 --> 00:05:58,080
see is one snap every 30 seconds versus

171
00:06:02,390 --> 00:05:58,960
the

172
00:06:05,029 --> 00:06:02,400
laser is actually firing

173
00:06:07,110 --> 00:06:05,039
and we do calculate a range estimate

174
00:06:09,110 --> 00:06:07,120
based on that and that looked really

175
00:06:10,870 --> 00:06:09,120
great we compared it against tcs in

176
00:06:13,270 --> 00:06:10,880
close and out further against the

177
00:06:14,710 --> 00:06:13,280
shuttle state vector and that matched

178
00:06:16,469 --> 00:06:14,720
really well we're very happy with what

179
00:06:19,350 --> 00:06:16,479
we saw it looks again like we've

180
00:06:22,469 --> 00:06:19,360
exceeded our five kilometer

181
00:06:24,150 --> 00:06:22,479
goal so that was very exciting

182
00:06:25,670 --> 00:06:24,160
we were lots of smiles and cheers we had

183
00:06:26,710 --> 00:06:25,680
nice words from drew at the end of the

184
00:06:30,070 --> 00:06:26,720
mission

185
00:06:31,510 --> 00:06:30,080
and the storm team has done phenomenally

186
00:06:32,950 --> 00:06:31,520
we were throwing a curveball the other

187
00:06:35,110 --> 00:06:32,960
day with our

188
00:06:37,670 --> 00:06:35,120

docking camera data recorder did not

189
00:06:39,590 --> 00:06:37,680
come up today as we were all kind of

190
00:06:41,830 --> 00:06:39,600
crossing our fingers it might initialize

191
00:06:44,710 --> 00:06:41,840
correctly so there was no new docking

192
00:06:47,670 --> 00:06:44,720
camera data to to collect today

193
00:06:51,350 --> 00:06:47,680
but we did get our primary objective on

194
00:06:54,070 --> 00:06:51,360
the orion mpcv like trajectory for the

195
00:06:55,189 --> 00:06:54,080
re-rendezvous is flown exactly per

196
00:06:57,670 --> 00:06:55,199
design

197
00:07:01,110 --> 00:06:57,680
and we believe we will have met

198
00:07:02,550 --> 00:07:01,120
those objectives we do have all the

199
00:07:04,390 --> 00:07:02,560
docking camera data collected from

200
00:07:06,550 --> 00:07:04,400
rendezvous safely stored on the data

201
00:07:07,990 --> 00:07:06,560
recorders so that should be no problem

202
00:07:10,390 --> 00:07:08,000
when we get it back

203
00:07:11,670 --> 00:07:10,400
and i'd just like to thank the wonderful

204
00:07:14,309 --> 00:07:11,680
storm team

205
00:07:16,230 --> 00:07:14,319
from johnson space center from langley

206
00:07:18,309 --> 00:07:16,240
research center from ball aerospace and

207
00:07:20,629 --> 00:07:18,319
from lockheed martin is a fantastic

208
00:07:21,990 --> 00:07:20,639
group of folks a lot of talent and a

209
00:07:24,629 --> 00:07:22,000
pleasure to have worked with everybody

210
00:07:26,550 --> 00:07:24,639
for the last few years

211
00:07:28,830 --> 00:07:26,560
thank you heather thanks gary we'll

212
00:07:31,270 --> 00:07:28,840
start with questions now first here in

213
00:07:32,950 --> 00:07:31,280

houston if you'd step to the microphone

214
00:07:35,110 --> 00:07:32,960
once you recognize please remember to

215
00:07:37,430 --> 00:07:35,120
say your name and your affiliation

216
00:07:37,440 --> 00:07:41,670
phillips loss with nasaspaceflight.com

217
00:07:45,830 --> 00:07:43,909
how were you able to how far out were

218
00:07:46,950 --> 00:07:45,840
you able to maintain a lock on the

219
00:07:49,510 --> 00:07:46,960
station

220
00:07:51,430 --> 00:07:49,520
going out and then coming back

221
00:07:54,150 --> 00:07:51,440
so again it's a little difficult to tell

222
00:07:55,909 --> 00:07:54,160
especially on the way out it happens to

223
00:07:59,189 --> 00:07:55,919
be a part of space station that has no

224
00:08:02,390 --> 00:07:59,199
visible reflectors on there so data was

225
00:08:04,629 --> 00:08:02,400
showing that that the laser was likely

226
00:08:06,629 --> 00:08:04,639
shooting and timing out for most of that

227
00:08:09,110 --> 00:08:06,639
area but again we are only getting one

228
00:08:11,029 --> 00:08:09,120
frame every 30 seconds and once we get

229
00:08:13,270 --> 00:08:11,039
all the data back on the ground we'll

230
00:08:15,670 --> 00:08:13,280
have the 30 hertz data and we believe

231
00:08:17,430 --> 00:08:15,680
we'll see some intermittent

232
00:08:19,830 --> 00:08:17,440
acquisition of the space station during

233
00:08:21,430 --> 00:08:19,840
that time but without any visible

234
00:08:22,869 --> 00:08:21,440
reflectors when you start getting out at

235
00:08:24,869 --> 00:08:22,879
ranges that far

236
00:08:26,390 --> 00:08:24,879
we'll have to kind of see what happened

237
00:08:29,110 --> 00:08:26,400
with it and how it performed

238
00:08:30,710 --> 00:08:29,120

again one of our objectives for the vns

239
00:08:32,709 --> 00:08:30,720
getting flown is what is the

240
00:08:34,149 --> 00:08:32,719
reflectivity of the space station like

241
00:08:35,190 --> 00:08:34,159
in this wavelength

242
00:08:37,029 --> 00:08:35,200
versus

243
00:08:40,230 --> 00:08:37,039
when you do and do not have reflectors

244
00:08:41,430 --> 00:08:40,240
visible in the field of view

245
00:08:43,110 --> 00:08:41,440
i'll just go and add to that you know

246
00:08:44,470 --> 00:08:43,120
the outbound trajectory was really

247
00:08:46,870 --> 00:08:44,480
designed to set up the inbound

248
00:08:49,269 --> 00:08:46,880
trajectory to meet their prime objective

249
00:08:51,430 --> 00:08:49,279
and uh you know of course station

250
00:08:52,790 --> 00:08:51,440
did reconfigure to to get some power

251
00:08:55,350 --> 00:08:52,800
generation during that time frame as

252
00:08:58,710 --> 00:08:55,360
well so wasn't optimized for the uh

253
00:09:01,430 --> 00:08:58,720
the storm reflectors for that phase so

254
00:09:04,150 --> 00:09:01,440
and then on uh

255
00:09:06,870 --> 00:09:04,160
when do you expect to get your data and

256
00:09:09,509 --> 00:09:06,880
and your hardware back oh yeah so we've

257
00:09:10,870 --> 00:09:09,519
kind of been told by ksc return to

258
00:09:13,030 --> 00:09:10,880
florida plus

259
00:09:15,670 --> 00:09:13,040
about a week we will get to get back in

260
00:09:17,990 --> 00:09:15,680
the vehicle and perform a post-flight um

261
00:09:20,710 --> 00:09:18,000
test we'll just fire everything up and

262
00:09:23,430 --> 00:09:20,720
do a return to earth great just like we

263
00:09:25,509 --> 00:09:23,440

expected to then we'll get the

264
00:09:27,829 --> 00:09:25,519
the sensors and the data recorder

265
00:09:30,550 --> 00:09:27,839
package will get moved over to another

266
00:09:33,509 --> 00:09:30,560
facility at ksc and that will start our

267
00:09:35,670 --> 00:09:33,519
data retrieval if we pulled 24 hours a

268
00:09:36,790 --> 00:09:35,680
day we would get everything off in six

269
00:09:38,949 --> 00:09:36,800
days

270
00:09:41,030 --> 00:09:38,959
so then we'll have that

271
00:09:45,509 --> 00:09:41,040
600 gigabytes of data passed on to all

272
00:09:45,519 --> 00:09:49,590
additional questions robert

273
00:09:53,750 --> 00:09:52,150
uh robert promlin with collectspace.com

274
00:09:55,829 --> 00:09:53,760
um to follow up on that question for

275
00:09:57,990 --> 00:09:55,839
heather uh what's the end product what

276
00:09:59,509 --> 00:09:58,000
do you um what do you have at the end of

277
00:10:01,430 --> 00:09:59,519
all the um

278
00:10:03,670 --> 00:10:01,440
after all the analysis is done

279
00:10:05,269 --> 00:10:03,680
is it an animation of the approach

280
00:10:06,550 --> 00:10:05,279
individual stills what's what are we

281
00:10:08,790 --> 00:10:06,560
going to see

282
00:10:11,269 --> 00:10:08,800
when everything's ready

283
00:10:13,829 --> 00:10:11,279
so i think we'll see all of that

284
00:10:16,470 --> 00:10:13,839
and from a usability of all of that what

285
00:10:18,389 --> 00:10:16,480
will happen is the orion mpcv program

286
00:10:21,030 --> 00:10:18,399
will take in all of this data and

287
00:10:22,949 --> 00:10:21,040
utilize the lessons learned the actual

288
00:10:25,509 --> 00:10:22,959

performance we saw for space station to

289
00:10:28,230 --> 00:10:25,519
update any of the models of the vns that

290
00:10:29,829 --> 00:10:28,240
they use on the ground with those models

291
00:10:31,269 --> 00:10:29,839
that they feed into the relative nav

292
00:10:33,269 --> 00:10:31,279
system and then into the overall

293
00:10:35,670 --> 00:10:33,279
guidance navigation and control they'll

294
00:10:38,389 --> 00:10:35,680
be able to very accurately design around

295
00:10:40,069 --> 00:10:38,399
that for performance of the vehicle for

296
00:10:41,430 --> 00:10:40,079
all their mission planning

297
00:10:46,710 --> 00:10:41,440
and

298
00:10:48,310 --> 00:10:46,720
the docking camera perspective uh the

299
00:10:51,190 --> 00:10:48,320
situational awareness that the crew will

300
00:10:52,710 --> 00:10:51,200
use for flying out angular misalignments

301
00:10:54,470 --> 00:10:52,720
and such just as the shuttle crew does

302
00:10:57,269 --> 00:10:54,480
today

303
00:10:59,750 --> 00:10:57,279
okay thanks and and for gary um

304
00:11:01,750 --> 00:10:59,760
realizing that the the cpm

305
00:11:04,069 --> 00:11:01,760
intermittent failure is not a huge

306
00:11:07,750 --> 00:11:04,079
concern at this point if it did become

307
00:11:10,230 --> 00:11:07,760
more of a concern what are your options

308
00:11:12,230 --> 00:11:10,240
as opposed to just ignoring it

309
00:11:14,790 --> 00:11:12,240
yeah so the cpm is

310
00:11:17,509 --> 00:11:14,800
in simplicity terms it's just telemetry

311
00:11:19,269 --> 00:11:17,519
on how how those fuel cells performing

312
00:11:20,949 --> 00:11:19,279
so so if that box were to fail

313
00:11:22,550 --> 00:11:20,959

completely you know

314
00:11:23,910 --> 00:11:22,560
what we're also talking about doing is

315
00:11:26,630 --> 00:11:23,920
setting up the

316
00:11:28,949 --> 00:11:26,640
fuel cell monitoring system fcms

317
00:11:31,590 --> 00:11:28,959
and that's basically just a application

318
00:11:34,069 --> 00:11:31,600
on the onboard laptop that ties into the

319
00:11:35,670 --> 00:11:34,079
vehicle data system and it'll give us

320
00:11:37,590 --> 00:11:35,680
the next layer of insight we can go down

321
00:11:38,870 --> 00:11:37,600
and look at the each cell level in the

322
00:11:41,350 --> 00:11:38,880
fuel cell and look at each cell

323
00:11:43,190 --> 00:11:41,360
separately which we can't do

324
00:11:46,150 --> 00:11:43,200
at the cpm level so it would be the next

325
00:11:47,670 --> 00:11:46,160
step in data gathering if you will but

326
00:11:49,910 --> 00:11:47,680
again all the all the data coming from

327
00:11:52,310 --> 00:11:49,920
the fuel cell and that we watch in real

328
00:11:54,230 --> 00:11:52,320
time as it's as it's running is is again

329
00:11:55,509 --> 00:11:54,240
looking great

330
00:11:56,470 --> 00:11:55,519
okay additional questions here in

331
00:11:57,910 --> 00:11:56,480
houston

332
00:11:59,910 --> 00:11:57,920
uh saying none we'll go to the phone

333
00:12:02,550 --> 00:11:59,920
bridge uh marcia

334
00:12:04,310 --> 00:12:02,560
yes hi good morning um gary i have a

335
00:12:06,710 --> 00:12:04,320
couple questions for you the first being

336
00:12:09,110 --> 00:12:06,720
i heard you and mark kelly discussing

337
00:12:10,629 --> 00:12:09,120
potentially windy weather here at

338
00:12:12,710 --> 00:12:10,639

kennedy space center on wednesday

339
00:12:15,430 --> 00:12:12,720
morning could you fill us in on what the

340
00:12:17,269 --> 00:12:15,440
latest weather update might be

341
00:12:19,670 --> 00:12:17,279
sure marcia i know the uh the last

342
00:12:21,670 --> 00:12:19,680
forecast i saw was was pretty old and

343
00:12:23,509 --> 00:12:21,680
and of course you know florida is what

344
00:12:25,190 --> 00:12:23,519
it is until you're just about to either

345
00:12:26,470 --> 00:12:25,200
launch or land there so

346
00:12:29,110 --> 00:12:26,480
you know i'm not too excited about it

347
00:12:31,110 --> 00:12:29,120
yet but the forecast was um

348
00:12:33,030 --> 00:12:31,120
outside the flight roll limits for the

349
00:12:35,110 --> 00:12:33,040
for the cross winds

350
00:12:37,670 --> 00:12:35,120
i know we're looking at the data

351
00:12:39,430 --> 00:12:37,680
actually coming off the runways just an

352
00:12:41,110 --> 00:12:39,440
hour or two ago and it was actually

353
00:12:43,430 --> 00:12:41,120
fairly calm so

354
00:12:45,269 --> 00:12:43,440
um again you know until until we get a

355
00:12:47,350 --> 00:12:45,279
little bit closer i'm not too excited

356
00:12:49,590 --> 00:12:47,360
about that forecast

357
00:12:51,350 --> 00:12:49,600
thank you and could you also reflect for

358
00:12:53,750 --> 00:12:51,360
a moment on the fact that this is

359
00:12:55,430 --> 00:12:53,760
endeavors final journey into space and

360
00:12:58,870 --> 00:12:55,440
that there is only one more shuttle

361
00:13:00,790 --> 00:12:58,880
mission left before it all ends

362
00:13:03,030 --> 00:13:00,800
sure you know

363
00:13:06,069 --> 00:13:03,040

it's a long long time coming uh that

364
00:13:07,430 --> 00:13:06,079
it's been an incredible program

365
00:13:09,750 --> 00:13:07,440
you know i've been focused on making

366
00:13:11,829 --> 00:13:09,760
sure we we get this mission accomplished

367
00:13:14,710 --> 00:13:11,839
as fairly aggressive from the beginning

368
00:13:16,310 --> 00:13:14,720
and uh pretty long mission and and we

369
00:13:17,910 --> 00:13:16,320
we met every objective got everything

370
00:13:19,990 --> 00:13:17,920
accomplished so you know right now i'm

371
00:13:21,910 --> 00:13:20,000
just going to take a deep breath and and

372
00:13:22,790 --> 00:13:21,920
enjoy the fact that uh we've gotten

373
00:13:24,629 --> 00:13:22,800
through the

374
00:13:27,269 --> 00:13:24,639
99 of the mission all we got to do is

375
00:13:28,069 --> 00:13:27,279
get the crew in the ship home now so

376
00:13:29,590 --> 00:13:28,079
um

377
00:13:31,030 --> 00:13:29,600
you know i think it will be bittersweet

378
00:13:33,590 --> 00:13:31,040
seeing it on the runway here hopefully

379
00:13:35,430 --> 00:13:33,600
in two days um and then we got atlantis

380
00:13:36,629 --> 00:13:35,440
rolling out that same night to the

381
00:13:38,389 --> 00:13:36,639
launch pad

382
00:13:40,069 --> 00:13:38,399
and then uh one last flight for the

383
00:13:41,670 --> 00:13:40,079
program so uh

384
00:13:43,269 --> 00:13:41,680
so it's kind of sad to see it ending but

385
00:13:44,790 --> 00:13:43,279
it's uh it's time to move on to the next

386
00:13:47,189 --> 00:13:44,800
chapter

387
00:13:50,550 --> 00:13:47,199
thank you

388
00:13:55,829 --> 00:13:52,870

yeah a quick one for gary i'm just just

389
00:13:57,590 --> 00:13:55,839
based on your nav data how far how far

390
00:13:59,430 --> 00:13:57,600
back did you guys fall off and how far

391
00:14:01,509 --> 00:13:59,440
did you come up before the before it

392
00:14:03,509 --> 00:14:01,519
stalled out

393
00:14:05,590 --> 00:14:03,519
oh the uh trajectory you're asking about

394
00:14:07,670 --> 00:14:05,600
trajectory distance um

395
00:14:09,110 --> 00:14:07,680
i believe we got we got right around 29

396
00:14:11,430 --> 00:14:09,120
000 feet which was what we were

397
00:14:13,350 --> 00:14:11,440
targeting on the outbound uh part of the

398
00:14:15,269 --> 00:14:13,360
trajectory and then um

399
00:14:17,590 --> 00:14:15,279
you know coming up in in close to

400
00:14:20,230 --> 00:14:17,600
station after we did the tpi burn which

401
00:14:22,310 --> 00:14:20,240
puts you uh on target for your your

402
00:14:23,189 --> 00:14:22,320
final point just below the the space

403
00:14:24,870 --> 00:14:23,199
station

404
00:14:26,949 --> 00:14:24,880
targeting a thousand feet below and 300

405
00:14:29,590 --> 00:14:26,959
feet behind

406
00:14:31,990 --> 00:14:29,600
we were we got to about 950 feet from

407
00:14:33,750 --> 00:14:32,000
the space station and uh the trajectory

408
00:14:35,670 --> 00:14:33,760
stalled out crew did not have to do any

409
00:14:37,829 --> 00:14:35,680
braking pulses whatsoever

410
00:14:39,189 --> 00:14:37,839
and uh then we just fell away and did

411
00:14:41,110 --> 00:14:39,199
step three so

412
00:14:42,710 --> 00:14:41,120
again the trajectory was was right on

413
00:14:45,509 --> 00:14:42,720

the money almost the whole way tonight

414
00:14:47,030 --> 00:14:45,519
is it is really really outstanding

415
00:14:48,230 --> 00:14:47,040
and one more quick one for me and maybe

416
00:14:50,629 --> 00:14:48,240
this is for heather what is the

417
00:14:51,829 --> 00:14:50,639
advantage of

418
00:14:54,470 --> 00:14:51,839
i guess what do you call this a coal

419
00:14:56,550 --> 00:14:54,480
elliptic approach versus a an r bar or a

420
00:14:57,990 --> 00:14:56,560
v bar approach what is the advantage of

421
00:14:58,870 --> 00:14:58,000
that if there is one or is it just a

422
00:15:06,069 --> 00:14:58,880
different

423
00:15:08,310 --> 00:15:06,079
things and as a matter of fact

424
00:15:10,710 --> 00:15:08,320
once you're past that either stability

425
00:15:13,509 --> 00:15:10,720
rendezvous like the shuttle performs or

426
00:15:15,670 --> 00:15:13,519
eco elliptic the trajectory beyond that

427
00:15:17,430 --> 00:15:15,680
looks pretty similar as far as flying

428
00:15:19,670 --> 00:15:17,440
around to the v-bar and then approaching

429
00:15:20,870 --> 00:15:19,680
along the positive v-bar to the station

430
00:15:24,829 --> 00:15:20,880
for docking

431
00:15:30,230 --> 00:15:27,910
one you get on a trajectory that's a

432
00:15:32,389 --> 00:15:30,240
delta height below the trajectory of the

433
00:15:35,189 --> 00:15:32,399
space station so you could just kind of

434
00:15:38,230 --> 00:15:35,199
stay in that orbit it's a safe orbit

435
00:15:40,470 --> 00:15:38,240
it's a non-collision and you can

436
00:15:42,710 --> 00:15:40,480
kind of approach from below and then you

437
00:15:44,790 --> 00:15:42,720
just make some burns to close that delta

438
00:15:46,629 --> 00:15:44,800

height and then you could come up right

439
00:15:49,189 --> 00:15:46,639
below on the r bar and then fly around

440
00:15:51,110 --> 00:15:49,199
to the v bar so i know uh back in the

441
00:15:53,269 --> 00:15:51,120
days when they were designing the

442
00:15:55,829 --> 00:15:53,279
shuttle trajectory

443
00:15:58,870 --> 00:15:55,839
they did not have that cross feed for

444
00:16:00,550 --> 00:15:58,880
the reaction control system jets and and

445
00:16:03,110 --> 00:16:00,560
it kind of ruled out any kind of an

446
00:16:05,910 --> 00:16:03,120
approach like this it just just the

447
00:16:08,230 --> 00:16:05,920
types of burns that it would require so

448
00:16:10,069 --> 00:16:08,240
with a new vehicle for the orion it was

449
00:16:12,230 --> 00:16:10,079
able to kind of open back up that trade

450
00:16:14,230 --> 00:16:12,240
space and and this was the trajectory

451
00:16:19,670 --> 00:16:14,240
they picked it's a good fuel efficient

452
00:16:25,189 --> 00:16:23,509
okay uh stephen clark

453
00:16:26,790 --> 00:16:25,199
hi just uh one more question i'm

454
00:16:28,790 --> 00:16:26,800
wondering if uh this is stephen clark

455
00:16:30,470 --> 00:16:28,800
with space flight now uh just a quick

456
00:16:31,829 --> 00:16:30,480
question on cost of wondering if you've

457
00:16:33,749 --> 00:16:31,839
had a chance to

458
00:16:35,509 --> 00:16:33,759
go over the cost since uh the question

459
00:16:37,590 --> 00:16:35,519
yesterday of the cost of the storm

460
00:16:39,509 --> 00:16:37,600
experiment thanks

461
00:16:42,629 --> 00:16:39,519
yeah thanks uh we we've been pretty

462
00:16:43,749 --> 00:16:42,639
focused um since we had our dru three

463
00:16:45,670 --> 00:16:43,759

failure

464
00:16:48,230 --> 00:16:45,680
we were pretty much working around the

465
00:16:49,990 --> 00:16:48,240
clock to get new procedures up to drew

466
00:16:52,629 --> 00:16:50,000
he had to take several different actions

467
00:16:54,470 --> 00:16:52,639
to get things powered down so i was not

468
00:16:56,790 --> 00:16:54,480
able to follow up with the project on

469
00:16:59,269 --> 00:16:56,800
getting those final cost numbers for you

470
00:17:01,110 --> 00:16:59,279
but uh and as the principal investigator

471
00:17:03,030 --> 00:17:01,120
i was sort of responsible for the

472
00:17:04,390 --> 00:17:03,040
technical success of the experiment so i

473
00:17:05,590 --> 00:17:04,400
didn't have those numbers readily

474
00:17:07,110 --> 00:17:05,600
available

475
00:17:08,949 --> 00:17:07,120
i'm sure in the days to come we'll be

476
00:17:09,829 --> 00:17:08,959
able to close the loop on that and you

477
00:17:13,029 --> 00:17:09,839
might be able to follow up with the

478
00:17:14,390 --> 00:17:13,039
orion project for a better number

479
00:17:17,029 --> 00:17:14,400
thanks

480
00:17:21,429 --> 00:17:17,039
james dean

481
00:17:23,110 --> 00:17:21,439
today gary i know we have additional

482
00:17:24,470 --> 00:17:23,120
briefings to come but just because the

483
00:17:25,990 --> 00:17:24,480
timing is a little awkward i wondered if

484
00:17:27,270 --> 00:17:26,000
you could say any more about the

485
00:17:30,830 --> 00:17:27,280
preliminary

486
00:17:33,750 --> 00:17:30,840
uh plan for for entry um

487
00:17:35,669 --> 00:17:33,760
if if it would be right to assume that

488
00:17:37,029 --> 00:17:35,679

only ksc will be

489
00:17:39,990 --> 00:17:37,039
active uh

490
00:17:41,590 --> 00:17:40,000
wednesday morning i guess and um

491
00:17:44,470 --> 00:17:41,600
the next day would be your

492
00:17:46,710 --> 00:17:44,480
your landing day if need be

493
00:17:49,029 --> 00:17:46,720
yeah the um the entry flight director

494
00:17:51,110 --> 00:17:49,039
and the program will be discussing that

495
00:17:53,029 --> 00:17:51,120
you know throughout the morning this

496
00:17:54,549 --> 00:17:53,039
morning actually laying out the strategy

497
00:17:56,549 --> 00:17:54,559
and and uh

498
00:17:58,789 --> 00:17:56,559
picking the strategy but uh i would

499
00:18:01,190 --> 00:17:58,799
suspect that that the first the first

500
00:18:03,350 --> 00:18:01,200
night will probably be cassie only and

501
00:18:05,430 --> 00:18:03,360
and uh for whatever reason we can't get

502
00:18:07,830 --> 00:18:05,440
uh lane in that first day that second

503
00:18:09,510 --> 00:18:07,840
day we'll have uh casey and edwards but

504
00:18:11,110 --> 00:18:09,520
again they'll be discussing that here

505
00:18:13,430 --> 00:18:11,120
this morning and coming up with the

506
00:18:15,350 --> 00:18:13,440
final

507
00:18:16,710 --> 00:18:15,360
i strategy it thank you

508
00:18:18,150 --> 00:18:16,720
okay i believe that's it for the phone

509
00:18:19,990 --> 00:18:18,160
bridge do we have additional questions

510
00:18:21,990 --> 00:18:20,000
here in houston

511
00:18:23,789 --> 00:18:22,000
seeing none we'll wrap up the briefing

512
00:18:26,310 --> 00:18:23,799
you can follow the progress of the

513
00:18:28,150 --> 00:18:26,320

sts-134 mission of endeavor

514
00:18:31,830 --> 00:18:28,160
and activities on the international