
Space C
Center

1
00:00:05,329 --> 00:00:03,590
well good day and welcome back to the

2
00:00:06,920 --> 00:00:05,339
Johnson Space Center for today's mission

3
00:00:08,419 --> 00:00:06,930
status briefing on the flight of

4
00:00:11,120 --> 00:00:08,429
Atlantis to the International Space

5
00:00:13,339 --> 00:00:11,130
Station an eventful day on orbit with us

6
00:00:15,189 --> 00:00:13,349
to discuss all of the details the lead

7
00:00:18,710 --> 00:00:15,199
space shuttle flight director for

8
00:00:20,630 --> 00:00:18,720
sts-135 quat dziala Bravo Watson thank

9
00:00:22,880 --> 00:00:20,640
you rob we have had an absolutely

10
00:00:26,269 --> 00:00:22,890
outstanding rendezvous and docking today

11
00:00:29,480 --> 00:00:26,279
the docking was accomplished with very

12
00:00:32,569 --> 00:00:29,490
few issues at all in fact we're right on

13
00:00:34,190 --> 00:00:32,579

schedule and the crew is in breast the

14
00:00:36,440 --> 00:00:34,200
International Space Station and is

15
00:00:38,900 --> 00:00:36,450
preparing to hand off the orbiter boom

16
00:00:41,180 --> 00:00:38,910
sensor system to the space shuttle's

17
00:00:43,580 --> 00:00:41,190
robotic arm the activities of the crew

18
00:00:45,619 --> 00:00:43,590
today started with a powerup of the

19
00:00:47,420 --> 00:00:45,629
primary flight systems that are required

20
00:00:50,060 --> 00:00:47,430
for rendezvous and docking now during

21
00:00:51,680 --> 00:00:50,070
that powerup we did experience a slight

22
00:00:55,369 --> 00:00:51,690
problem with one of our general purpose

23
00:00:58,040 --> 00:00:55,379
computers or g pcs and essentially it

24
00:01:00,950 --> 00:00:58,050
was really just a transient problem that

25
00:01:02,660 --> 00:01:00,960
took one of those computers down for the

26
00:01:04,579 --> 00:01:02,670
rendezvous and and we had to rendezvous

27
00:01:06,649 --> 00:01:04,589
without it but it represented simply a

28
00:01:08,810 --> 00:01:06,659
loss of redundancy now what was going on

29
00:01:11,030 --> 00:01:08,820
with the computer is this when we power

30
00:01:13,520 --> 00:01:11,040
up the flight systems for rendezvous and

31
00:01:16,429 --> 00:01:13,530
docking we fly with three redundant

32
00:01:19,060 --> 00:01:16,439
computers that do all of the

33
00:01:21,620 --> 00:01:19,070
computations of the vehicles trajectory

34
00:01:24,499 --> 00:01:21,630
assess its attitude and help us do

35
00:01:25,730 --> 00:01:24,509
navigation to guide the Space Shuttle to

36
00:01:27,950 --> 00:01:25,740
a rendezvous and dock with the

37
00:01:30,080 --> 00:01:27,960
International Space Station now those

38
00:01:33,140 --> 00:01:30,090

computers all talk on the same flight

39
00:01:35,810 --> 00:01:33,150
critical data buses and they listen to

40
00:01:38,240 --> 00:01:35,820
those data buses and ideally those

41
00:01:41,300 --> 00:01:38,250
computers will be seeing and saying the

42
00:01:43,310 --> 00:01:41,310
exact same things and they also talk to

43
00:01:46,069 --> 00:01:43,320
each other and compare notes if you will

44
00:01:47,719 --> 00:01:46,079
and if any one of the computers is is

45
00:01:50,990 --> 00:01:47,729
outputting something that's different

46
00:01:52,700 --> 00:01:51,000
than the others the the majority

47
00:01:55,160 --> 00:01:52,710
essentially votes that computer into a

48
00:01:57,499 --> 00:01:55,170
failed state now as we're powering up

49
00:02:00,410 --> 00:01:57,509
those computers to prepare for the

50
00:02:02,749 --> 00:02:00,420
rendezvous and dock we physically flip a

51
00:02:05,660 --> 00:02:02,759
switch in the cockpit that takes the

52
00:02:08,570 --> 00:02:05,670
computers that were sleep into an active

53
00:02:10,790 --> 00:02:08,580
state and the switches on those

54
00:02:12,680 --> 00:02:10,800
computers have have detents that can be

55
00:02:12,920 --> 00:02:12,690
a little bit temperamental from time to

56
00:02:16,270 --> 00:02:12,930
time

57
00:02:19,069 --> 00:02:16,280
and if you don't decisively and

58
00:02:21,199 --> 00:02:19,079
carefully move the the switch from one

59
00:02:23,030 --> 00:02:21,209
position to the other there could be a

60
00:02:25,300 --> 00:02:23,040
slight rebounding effect that makes the

61
00:02:28,160 --> 00:02:25,310
contacts the switch come off the v10

62
00:02:30,440 --> 00:02:28,170
ever so slightly and for the briefest of

63
00:02:32,240 --> 00:02:30,450

seconds that happened with our computer

64
00:02:34,849 --> 00:02:32,250
number three is the crew is bringing

65
00:02:36,589 --> 00:02:34,859
that computer to an active state the

66
00:02:38,360 --> 00:02:36,599
switch came off the detent for just a

67
00:02:40,699 --> 00:02:38,370
split second but just long enough for

68
00:02:42,890 --> 00:02:40,709
the other two computers that were up to

69
00:02:45,080 --> 00:02:42,900
to see a change in its state and both

70
00:02:46,399 --> 00:02:45,090
that computer to a failed state we don't

71
00:02:49,280 --> 00:02:46,409
think that there's anything physically

72
00:02:52,670 --> 00:02:49,290
wrong with the computer and in fact we

73
00:02:53,929 --> 00:02:52,680
have to have to load a new new software

74
00:02:55,879 --> 00:02:53,939
image to it we're going to try to do

75
00:02:58,220 --> 00:02:55,889
that tomorrow at the beginning of the

76
00:03:00,649 --> 00:02:58,230
cruise day so we were able to fly the

77
00:03:01,849 --> 00:03:00,659
rendezvous and docking today with two of

78
00:03:04,250 --> 00:03:01,859
the three computers that we normally

79
00:03:06,020 --> 00:03:04,260
have up that's perfectly within our

80
00:03:08,839 --> 00:03:06,030
flight experience and perfectly within

81
00:03:10,789 --> 00:03:08,849
our flight rules just represented a loss

82
00:03:12,890 --> 00:03:10,799
of redundancy but we had absolutely no

83
00:03:15,199 --> 00:03:12,900
other problems with the spacecraft other

84
00:03:17,509 --> 00:03:15,209
than that an interesting thing for you

85
00:03:20,659 --> 00:03:17,519
to note this exact same problem the last

86
00:03:23,629 --> 00:03:20,669
time it happened was on sts-1 22 which

87
00:03:24,890 --> 00:03:23,639
was also a flight of Atlantis and there

88
00:03:26,330 --> 00:03:24,900

were one or two other commonalities

89
00:03:28,189 --> 00:03:26,340
between this flight and that flight

90
00:03:31,039 --> 00:03:28,199
which all I'll let folks research at

91
00:03:33,349 --> 00:03:31,049
their leisure but again this we don't

92
00:03:35,659 --> 00:03:33,359
think was a symptom of a real hardware

93
00:03:37,369 --> 00:03:35,669
problem and we expect to be able to get

94
00:03:41,089 --> 00:03:37,379
this computer back to full functionality

95
00:03:42,920 --> 00:03:41,099
here in in the next day or so after we

96
00:03:44,569 --> 00:03:42,930
got all the rest of the systems powered

97
00:03:47,240 --> 00:03:44,579
up the crew got into the rendezvous

98
00:03:49,759 --> 00:03:47,250
checklist right on schedule and they

99
00:03:52,460 --> 00:03:49,769
were running very well very well on the

100
00:03:55,189 --> 00:03:52,470
pace the whole day the actual rendezvous

101
00:03:57,949 --> 00:03:55,199
was accomplished with with with no

102
00:03:59,839 --> 00:03:57,959
issues the crew managed their on-orbit

103
00:04:02,379 --> 00:03:59,849
tasking very well just as they did

104
00:04:05,589 --> 00:04:02,389
yesterday during the TPS inspections and

105
00:04:08,599 --> 00:04:05,599
it was absolutely spectacular sight when

106
00:04:10,819 --> 00:04:08,609
Atlantis arrived on the r bar which is

107
00:04:12,920 --> 00:04:10,829
basically underneath the the

108
00:04:15,920 --> 00:04:12,930
International Space Station and began

109
00:04:17,509 --> 00:04:15,930
its rbar pitch maneuver in fact we have

110
00:04:18,770 --> 00:04:17,519
some video of the rbar pitch maneuver

111
00:04:21,279 --> 00:04:18,780
which we were able to capture in

112
00:04:25,339 --> 00:04:21,289
real-time and would be happy to show you

113
00:04:26,270 --> 00:04:25,349

when the space shuttle arrives on the r

114
00:04:29,780 --> 00:04:26,280
bar

115
00:04:33,170 --> 00:04:29,790
the commander sort of pitches upward to

116
00:04:36,590 --> 00:04:33,180
begin essentially a backflip if you will

117
00:04:39,740 --> 00:04:36,600
of the space shuttle and when it is

118
00:04:41,450 --> 00:04:39,750
essentially on its back with its belly

119
00:04:45,340 --> 00:04:41,460
facing the International Space Station

120
00:04:48,260 --> 00:04:45,350
the crew onboard the space station today

121
00:04:51,260 --> 00:04:48,270
consisting of three crew members each

122
00:04:53,780 --> 00:04:51,270
with a different resolution camera will

123
00:04:55,640 --> 00:04:53,790
take high-resolution imagery of the

124
00:04:57,800 --> 00:04:55,650
underside of the the space shuttles

125
00:05:01,010 --> 00:04:57,810
thermal protection system to assess the

126
00:05:04,010 --> 00:05:01,020
physical condition of the tiles to make

127
00:05:06,590 --> 00:05:04,020
sure that there was no debris damage on

128
00:05:08,750 --> 00:05:06,600
a scent or during its orbital travel to

129
00:05:11,450 --> 00:05:08,760
the space station that would present a

130
00:05:13,760 --> 00:05:11,460
problem or concern for successful

131
00:05:16,130 --> 00:05:13,770
re-entry and so as the shuttle is

132
00:05:18,260 --> 00:05:16,140
pitching back the way you see in the

133
00:05:20,600 --> 00:05:18,270
video there will be lots of photos

134
00:05:22,909 --> 00:05:20,610
literally hundreds of photos taken with

135
00:05:25,340 --> 00:05:22,919
a high-speed digital camera those photos

136
00:05:28,670 --> 00:05:25,350
will be down linked via the space

137
00:05:30,560 --> 00:05:28,680
station's communication assets and then

138
00:05:33,680 --> 00:05:30,570

the photos will be assessed by

139
00:05:36,110 --> 00:05:33,690
engineering teams and ultimately within

140
00:05:37,550 --> 00:05:36,120
the next few days hopefully the the

141
00:05:39,830 --> 00:05:37,560
entire shuttles thermal protection

142
00:05:42,650 --> 00:05:39,840
system will be cleared and that's that's

143
00:05:45,529 --> 00:05:42,660
about as much of the video as you'll

144
00:05:47,870 --> 00:05:45,539
probably want to see because the rest of

145
00:05:50,300 --> 00:05:47,880
course is just just more more the same

146
00:05:51,680 --> 00:05:50,310
but it really is a spectacular sight we

147
00:05:53,450 --> 00:05:51,690
were very fortunate today with their

148
00:05:56,710 --> 00:05:53,460
trajectory the International Space

149
00:05:59,840 --> 00:05:56,720
Station had the high rate k you band

150
00:06:01,580 --> 00:05:59,850
communications link during the RPM so we

151
00:06:04,040 --> 00:06:01,590
were able to see that in Mission Control

152
00:06:05,830 --> 00:06:04,050
real-time it was a very special moment

153
00:06:08,180 --> 00:06:05,840
for the flight control team that was

154
00:06:10,969 --> 00:06:08,190
watching the the fruit of their labors

155
00:06:12,500 --> 00:06:10,979
as far as guiding Atlantis to its

156
00:06:15,080 --> 00:06:12,510
rendezvous and docking with the space

157
00:06:17,060 --> 00:06:15,090
station and we were very excited to see

158
00:06:19,880 --> 00:06:17,070
that after we completed the rendezvous

159
00:06:23,480 --> 00:06:19,890
pitch maneuver we maneuvered flawlessly

160
00:06:25,550 --> 00:06:23,490
to the v-bar which is essentially

161
00:06:26,779 --> 00:06:25,560
directly in front of the International

162
00:06:29,180 --> 00:06:26,789
Space Station and commander Chris

163
00:06:32,050 --> 00:06:29,190

Ferguson guided the spacecraft to an

164
00:06:35,659 --> 00:06:32,060
absolutely flawless and very smooth

165
00:06:37,850 --> 00:06:35,669
contact and docking at PMA to or the

166
00:06:41,579 --> 00:06:37,860
pressurized mating adapter number two

167
00:06:46,169 --> 00:06:41,589
following that the docking mechanism was

168
00:06:48,719 --> 00:06:46,179
leveraged to to drive the hooks in drive

169
00:06:52,439 --> 00:06:48,729
the ring in so that we got hard mate

170
00:06:54,989 --> 00:06:52,449
between atlantis and the ISS and then we

171
00:06:57,899 --> 00:06:54,999
maneuvered the joint shuttle space

172
00:06:59,519 --> 00:06:57,909
station stack back to its nominal torque

173
00:07:01,559 --> 00:06:59,529
equilibrium attitude or the nominal

174
00:07:03,659 --> 00:07:01,569
attitude that we will fly for the

175
00:07:06,959 --> 00:07:03,669
duration of the mission at the time I

176
00:07:09,809 --> 00:07:06,969
left MCC we had just opened hatches and

177
00:07:11,399 --> 00:07:09,819
at this hour the crew of Atlantis is

178
00:07:13,559 --> 00:07:11,409
onboard the International Space Station

179
00:07:16,379 --> 00:07:13,569
participating in a standard safety

180
00:07:18,600 --> 00:07:16,389
briefing and the rest of the day will be

181
00:07:20,850 --> 00:07:18,610
spent removing the orbiter boom sensor

182
00:07:22,799 --> 00:07:20,860
system from the shuttles payload bay

183
00:07:24,899 --> 00:07:22,809
with the space station robotic arm and

184
00:07:27,299 --> 00:07:24,909
handing that off to the space shuttle's

185
00:07:29,850 --> 00:07:27,309
robotic arm so that that so that that

186
00:07:31,769 --> 00:07:29,860
appendage will be out of the way when we

187
00:07:34,499 --> 00:07:31,779
prepare to install the MPL em in the

188
00:07:36,749 --> 00:07:34,509

morning and so that's that's the day's

189
00:07:39,209 --> 00:07:36,759
activities so far so far everything is

190
00:07:41,189 --> 00:07:39,219
going very well and again just as

191
00:07:43,019 --> 00:07:41,199
yesterday we're not tracking significant

192
00:07:44,609 --> 00:07:43,029
problems just that one issue with the

193
00:07:46,499 --> 00:07:44,619
computer which we think will be able to

194
00:07:48,329 --> 00:07:46,509
resolve in the morning and so that's

195
00:07:50,790 --> 00:07:48,339
that's my summary and I'll be happy to

196
00:07:52,259 --> 00:07:50,800
take questions thanks Kwazii we'll take

197
00:07:54,419 --> 00:07:52,269
questions here in houston we do have a

198
00:07:56,729 --> 00:07:54,429
quartet of reporters on the phone bridge

199
00:07:58,799 --> 00:07:56,739
as well so if you could use the floor

200
00:08:00,719 --> 00:07:58,809
mike appreciate it's right behind robert

201
00:08:03,299 --> 00:08:00,729
there and we'll start off with mark

202
00:08:07,339 --> 00:08:03,309
thank you Mark row for aviation week and

203
00:08:09,839 --> 00:08:07,349
just a quick question on the on the GPC

204
00:08:14,309 --> 00:08:09,849
what do you need it to do for the rest

205
00:08:15,659 --> 00:08:14,319
of the mission and I know you used to

206
00:08:18,179 --> 00:08:15,669
carry spares I don't know whether you

207
00:08:20,579 --> 00:08:18,189
still do or not would you replace it if

208
00:08:24,540 --> 00:08:20,589
you do or can you just work around that

209
00:08:27,719 --> 00:08:24,550
okay great questions right now we we do

210
00:08:30,029 --> 00:08:27,729
not carry spare G pcs on the shuttle for

211
00:08:32,279 --> 00:08:30,039
these missions it was decided some years

212
00:08:34,019 --> 00:08:32,289
ago that with the redundancy that we

213
00:08:36,689 --> 00:08:34,029

have we have five of these computers

214
00:08:39,119 --> 00:08:36,699
onboard that it was not necessary for us

215
00:08:41,939 --> 00:08:39,129
to carry spares we have five of them on

216
00:08:44,790 --> 00:08:41,949
board so that we can sustain failures

217
00:08:47,370 --> 00:08:44,800
and still have sufficient redundancy in

218
00:08:49,439 --> 00:08:47,380
in the flight critical computations to

219
00:08:51,990 --> 00:08:49,449
guide the spacecraft to safe rendezvous

220
00:08:54,180 --> 00:08:52,000
or to a safe

221
00:08:56,040 --> 00:08:54,190
entry so we're not so much concerned

222
00:08:58,800 --> 00:08:56,050
about that now as far as what we need to

223
00:09:00,480 --> 00:08:58,810
do with the computer from here when the

224
00:09:02,340 --> 00:09:00,490
other computers in what we call the

225
00:09:04,350 --> 00:09:02,350
common set that is essentially the the

226
00:09:06,150 --> 00:09:04,360
council of computers that look at each

227
00:09:08,190 --> 00:09:06,160
other and make sure that everyone's

228
00:09:11,250 --> 00:09:08,200
saying the same thing when the common

229
00:09:14,130 --> 00:09:11,260
set essentially votes the the anomalous

230
00:09:15,930 --> 00:09:14,140
computer out of the set we in this

231
00:09:18,540 --> 00:09:15,940
instance given how it happened we have

232
00:09:21,570 --> 00:09:18,550
to essentially reload the computer from

233
00:09:23,670 --> 00:09:21,580
the onboard hard drive so that it's got

234
00:09:25,890 --> 00:09:23,680
a fresh software image all of the

235
00:09:28,290 --> 00:09:25,900
failure flags and air flags are reset

236
00:09:31,020 --> 00:09:28,300
and and so that that computer can then

237
00:09:33,870 --> 00:09:31,030
participate in operations so that what

238
00:09:35,640 --> 00:09:33,880

we call IPL initial program load that

239
00:09:37,560 --> 00:09:35,650
process takes about 25 to 30 minutes

240
00:09:39,630 --> 00:09:37,570
we're trying to carve out some time in

241
00:09:43,100 --> 00:09:39,640
the crews day tomorrow morning to get

242
00:09:45,380 --> 00:09:43,110
that done and once we see a successful

243
00:09:47,400 --> 00:09:45,390
IPL will probably let that computer

244
00:09:49,350 --> 00:09:47,410
probably let that computer run for

245
00:09:52,230 --> 00:09:49,360
several hours and then put it in its

246
00:09:57,360 --> 00:09:52,240
sleep mode which is its normal its

247
00:09:59,730 --> 00:09:57,370
normal state during doc tops yes sir dan

248
00:10:00,870 --> 00:09:59,740
vergano with USA Today is wondering if

249
00:10:03,570 --> 00:10:00,880
you can talk a little bit about this

250
00:10:07,140 --> 00:10:03,580
being the final docking of the shuttle

251
00:10:08,550 --> 00:10:07,150
to the space station do you still need

252
00:10:10,860 --> 00:10:08,560
this particular docking hatch what will

253
00:10:11,730 --> 00:10:10,870
be used for the future and you know you

254
00:10:13,200 --> 00:10:11,740
say a little bit what were your thoughts

255
00:10:14,280 --> 00:10:13,210
knowing that this was the last time this

256
00:10:17,760 --> 00:10:14,290
was going to happen with the shuttle

257
00:10:20,340 --> 00:10:17,770
okay well as far as the use of the

258
00:10:22,230 --> 00:10:20,350
hardware at this particular docking port

259
00:10:26,730 --> 00:10:22,240
the pressurized mating adapter it was

260
00:10:30,690 --> 00:10:26,740
designed to support the the the a PDS

261
00:10:32,520 --> 00:10:30,700
system which is is part of the shuttles

262
00:10:34,740 --> 00:10:32,530
order docking system it's actually a

263
00:10:37,170 --> 00:10:34,750

Russian design so it's designed to be

264
00:10:39,570 --> 00:10:37,180
compatible with with that hardware so we

265
00:10:41,760 --> 00:10:39,580
won't really use this particular port

266
00:10:44,760 --> 00:10:41,770
for a visiting vehicle certainly not for

267
00:10:47,370 --> 00:10:44,770
the foreseeable future not for for quite

268
00:10:50,010 --> 00:10:47,380
a while so this pressurized mating

269
00:10:52,410 --> 00:10:50,020
adapter might be used for a closet

270
00:10:54,660 --> 00:10:52,420
actually when they're not being used to

271
00:10:56,670 --> 00:10:54,670
support that transfer crew back and

272
00:10:58,530 --> 00:10:56,680
forth between the ISS and the space

273
00:11:00,930 --> 00:10:58,540
shuttle sometimes we do use these

274
00:11:03,750 --> 00:11:00,940
pressurized mating adapters to alleviate

275
00:11:05,310 --> 00:11:03,760
some of our stowage concerns on board to

276
00:11:08,670 --> 00:11:05,320
store hardware that we

277
00:11:10,350 --> 00:11:08,680
we don't use as regularly and so we're

278
00:11:11,850 --> 00:11:10,360
thinking about utilizing this this

279
00:11:14,040 --> 00:11:11,860
pressurized mating adapter for that

280
00:11:15,990 --> 00:11:14,050
purpose after the shuttle leaves now

281
00:11:18,150 --> 00:11:16,000
with this being the the final rendezvous

282
00:11:20,220 --> 00:11:18,160
and docking of shuttle to the the space

283
00:11:22,860 --> 00:11:20,230
station i have saying in in my

284
00:11:25,860 --> 00:11:22,870
observation particularly fairly early in

285
00:11:27,930 --> 00:11:25,870
our shift i think everybody on the

286
00:11:30,630 --> 00:11:27,940
flight control team was was feeling it

287
00:11:33,000 --> 00:11:30,640
you know on a typical mission we

288
00:11:35,850 --> 00:11:33,010

exercise rendezvous and docking more

289
00:11:38,010 --> 00:11:35,860
than we exercise most things in the

290
00:11:40,800 --> 00:11:38,020
orbit phase because it tends to be the

291
00:11:44,130 --> 00:11:40,810
most complex a series of operations that

292
00:11:45,900 --> 00:11:44,140
we do on orbit and so this is a day that

293
00:11:47,310 --> 00:11:45,910
we have rehearsed considerably we've

294
00:11:49,650 --> 00:11:47,320
committed more training time to

295
00:11:51,780 --> 00:11:49,660
executing this day well then we have to

296
00:11:54,000 --> 00:11:51,790
to all of the other objectives and so

297
00:11:57,570 --> 00:11:54,010
that's really represented a big game day

298
00:11:59,130 --> 00:11:57,580
if you will for my team and so on the

299
00:12:00,660 --> 00:11:59,140
one hand I know we all felt a great

300
00:12:03,810 --> 00:12:00,670
sense of excitement and a great sense of

301
00:12:06,090 --> 00:12:03,820
anticipation as we came to participate

302
00:12:10,500 --> 00:12:06,100
in in this highly complex highly

303
00:12:12,840 --> 00:12:10,510
technical and very precise series of

304
00:12:15,000 --> 00:12:12,850
operations but at the same time I think

305
00:12:18,840 --> 00:12:15,010
it did start to weigh on on the team in

306
00:12:22,020 --> 00:12:18,850
my in my perception that that it was

307
00:12:23,790 --> 00:12:22,030
going to be the last one and so again

308
00:12:25,290 --> 00:12:23,800
you know my team is filled with

309
00:12:27,630 --> 00:12:25,300
consummate professionals some of the

310
00:12:29,520 --> 00:12:27,640
best I've ever worked with and so there

311
00:12:32,220 --> 00:12:29,530
was certainly no emotional impediment to

312
00:12:35,190 --> 00:12:32,230
good performance today but I think it's

313
00:12:39,120 --> 00:12:35,200

fair to say that that the the finality

314
00:12:44,130 --> 00:12:39,130
of our executing this particular series

315
00:12:46,650 --> 00:12:44,140
of operations was was felled Phillips

316
00:12:48,960 --> 00:12:46,660
lost with NASA Space Flight calm could

317
00:12:51,660 --> 00:12:48,970
you give us an update on where your car

318
00:12:52,940 --> 00:12:51,670
margins look today okay that's that's

319
00:12:57,180 --> 00:12:52,950
great question I'd be happy to do that

320
00:13:00,270 --> 00:12:57,190
right now we have had a chance to to

321
00:13:03,390 --> 00:13:00,280
thoroughly assess how the cryo margins

322
00:13:05,610 --> 00:13:03,400
are shaping up that is the the margin of

323
00:13:08,430 --> 00:13:05,620
cryogenic oxygen and hydrogen hydrogen

324
00:13:10,440 --> 00:13:08,440
that we have to generate power and we

325
00:13:13,380 --> 00:13:10,450
believe that we are looking at about one

326
00:13:16,560 --> 00:13:13,390
day three hours above are nominal 12

327
00:13:19,210 --> 00:13:16,570
plus zero plus two day mission and so if

328
00:13:21,990 --> 00:13:19,220
this continues to persist and

329
00:13:24,699 --> 00:13:22,000
and this amount of margin remains stable

330
00:13:26,710 --> 00:13:24,709
we'll ask the mission management team

331
00:13:30,280 --> 00:13:26,720
probably the day after tomorrow on

332
00:13:32,829 --> 00:13:30,290
flight day 52 to formally give us

333
00:13:34,389 --> 00:13:32,839
permission to extend a day and fill the

334
00:13:35,829 --> 00:13:34,399
additional day with with other

335
00:13:37,660 --> 00:13:35,839
objectives the reason we're going to

336
00:13:39,220 --> 00:13:37,670
wait for another couple of days you know

337
00:13:41,650 --> 00:13:39,230
they're a variety of things that

338
00:13:44,199 --> 00:13:41,660

influence the amount of cryogenics that

339
00:13:46,449 --> 00:13:44,209
that you can see and extract from the

340
00:13:47,949 --> 00:13:46,459
tank you know the cryogenic oxygen

341
00:13:51,790 --> 00:13:47,959
hydrogen is basically liquid oxygen

342
00:13:54,129 --> 00:13:51,800
liquid hydrogen and a variety of factors

343
00:13:56,619 --> 00:13:54,139
including dynamic motion from attitude

344
00:13:59,319 --> 00:13:56,629
maneuvers rendezvous burns can cause

345
00:14:02,290 --> 00:13:59,329
some of that liquid gas to liquid

346
00:14:04,210 --> 00:14:02,300
hydrogen and oxygen to to to go back and

347
00:14:09,100 --> 00:14:04,220
forth between its gaseous state and its

348
00:14:11,710 --> 00:14:09,110
liquid state and so sometimes you you

349
00:14:13,960 --> 00:14:11,720
may see a decrease in the pressure which

350
00:14:16,569 --> 00:14:13,970
suggests a decrease in quantity and so

351
00:14:18,040 --> 00:14:16,579
there's just some variability in in the

352
00:14:21,009 --> 00:14:18,050
quantities that we see from time to time

353
00:14:24,189 --> 00:14:21,019
and so over the course of time these

354
00:14:26,259 --> 00:14:24,199
variable transients stabilize and we're

355
00:14:29,009 --> 00:14:26,269
able to assess them statistically and

356
00:14:30,759 --> 00:14:29,019
determine that we do have the amount of

357
00:14:33,280 --> 00:14:30,769
consumables and the tanks that we

358
00:14:35,679 --> 00:14:33,290
believe we do and so we just want to

359
00:14:36,910 --> 00:14:35,689
give ourselves that additional time to

360
00:14:39,040 --> 00:14:36,920
make sure that we are comfortable with

361
00:14:43,090 --> 00:14:39,050
the margin we have before we commit to

362
00:14:46,749 --> 00:14:43,100
use use that additional resource just a

363
00:14:49,509 --> 00:14:46,759

quick follow to clarify does that that

364
00:14:51,490 --> 00:14:49,519
one plus three hours include the the NP

365
00:14:54,280 --> 00:14:51,500
LM shell here's not buy back that you

366
00:14:56,740 --> 00:14:54,290
were talking about pre-flight that that

367
00:14:58,900 --> 00:14:56,750
revives margin that I quoted you one day

368
00:15:02,559 --> 00:14:58,910
three hours that assumes that we do not

369
00:15:05,199 --> 00:15:02,569
power the MP LM heaters in the shuttle

370
00:15:08,470 --> 00:15:05,209
payload Bay so basically this is the

371
00:15:09,970 --> 00:15:08,480
margin based on the plan we believe or

372
00:15:13,090 --> 00:15:09,980
excuse me based on the plan that we are

373
00:15:15,730 --> 00:15:13,100
executing so this is what we think we'll

374
00:15:17,920 --> 00:15:15,740
have so we think we have sufficient

375
00:15:21,400 --> 00:15:17,930
margin with the plan that we're on right

376
00:15:23,470 --> 00:15:21,410
now to to go ahead and extend the

377
00:15:25,540 --> 00:15:23,480
mission today again that formal decision

378
00:15:27,669 --> 00:15:25,550
won't be made until probably the day

379
00:15:31,059 --> 00:15:27,679
after tomorrow but all of the conditions

380
00:15:32,979 --> 00:15:31,069
are aligning to be able to extend the

381
00:15:36,079 --> 00:15:32,989
mission by one

382
00:15:38,329 --> 00:15:36,089
Denise Chow its face calm since this

383
00:15:40,009 --> 00:15:38,339
will be probably for at least a while

384
00:15:41,590 --> 00:15:40,019
the last time that more than six people

385
00:15:43,489 --> 00:15:41,600
will be at the space station at one time

386
00:15:45,979 --> 00:15:43,499
amazon if you could speak about the

387
00:15:47,150 --> 00:15:45,989
significance of that and particularly in

388
00:15:49,910 --> 00:15:47,160

regard to the importance of this mission

389
00:15:52,729 --> 00:15:49,920
to the future of the space station well

390
00:15:55,669 --> 00:15:52,739
this mission is is very important to the

391
00:15:59,569 --> 00:15:55,679
future of space station because you know

392
00:16:01,789 --> 00:15:59,579
as has been reported before our agency

393
00:16:04,489 --> 00:16:01,799
and our countries is in the midst of a

394
00:16:06,189 --> 00:16:04,499
significant shift in policy when it

395
00:16:09,499 --> 00:16:06,199
comes to to space exploration

396
00:16:12,769 --> 00:16:09,509
particularly our utilization of space in

397
00:16:14,119 --> 00:16:12,779
low-earth orbit we are now moving into a

398
00:16:16,729 --> 00:16:14,129
season where we're attempting to

399
00:16:21,189 --> 00:16:16,739
leverage the services of commercial

400
00:16:24,410 --> 00:16:21,199
providers who heretofore have have not

401
00:16:25,759 --> 00:16:24,420
significantly flown people in space of

402
00:16:28,639 --> 00:16:25,769
course commercial companies have been

403
00:16:31,160 --> 00:16:28,649
flying satellites and other uncrewed

404
00:16:34,759 --> 00:16:31,170
tech in space for some time and so

405
00:16:36,699 --> 00:16:34,769
there's a lot that's new about about the

406
00:16:39,769 --> 00:16:36,709
policy there's a lot that's new about

407
00:16:41,210 --> 00:16:39,779
figuring out how to do operations with

408
00:16:42,619 --> 00:16:41,220
the commercial providers and the

409
00:16:45,230 --> 00:16:42,629
commercial providers themselves are

410
00:16:46,789 --> 00:16:45,240
developing their space systems and

411
00:16:50,030 --> 00:16:46,799
preparing to certify them to carry

412
00:16:53,629 --> 00:16:50,040
people that process is proceeding along

413
00:16:55,309 --> 00:16:53,639

a fairly expected trajectory however one

414
00:16:58,460 --> 00:16:55,319
thing that's absolutely certain in

415
00:17:00,799 --> 00:16:58,470
spaceflight is that the job is is always

416
00:17:03,049 --> 00:17:00,809
going to be harder than it appears to be

417
00:17:04,549 --> 00:17:03,059
at first glance and so the supplies that

418
00:17:07,250 --> 00:17:04,559
this crew is bringing to the

419
00:17:10,370 --> 00:17:07,260
International Space Station really are

420
00:17:12,500 --> 00:17:10,380
sort of insurance because once we retire

421
00:17:14,720 --> 00:17:12,510
the shuttles then until we get the

422
00:17:18,559 --> 00:17:14,730
commercial providers online or or some

423
00:17:22,039 --> 00:17:18,569
other regular cargo and crew delivery

424
00:17:25,010 --> 00:17:22,049
system online then we'll be limited in

425
00:17:26,449 --> 00:17:25,020
how much we can resupply the

426
00:17:28,490 --> 00:17:26,459
International Space Station so these

427
00:17:30,049 --> 00:17:28,500
supplies that we're delivering as well

428
00:17:33,409 --> 00:17:30,059
as the spare parts which is also very

429
00:17:36,350 --> 00:17:33,419
important will enable us to keep the

430
00:17:39,560 --> 00:17:36,360
core systems to keep the crew and to

431
00:17:42,649 --> 00:17:39,570
keep the research that's ongoing on the

432
00:17:45,740 --> 00:17:42,659
space station ongoing at its nominal

433
00:17:48,140 --> 00:17:45,750
planned pace through the end of 22

434
00:17:50,480 --> 00:17:48,150
and so that's that's that's vitally

435
00:17:52,760 --> 00:17:50,490
important to the agency and I think it's

436
00:17:55,160 --> 00:17:52,770
critical to the transition and space

437
00:17:57,260 --> 00:17:55,170
policy that we're attempting to make as

438
00:17:59,300 --> 00:17:57,270

far as the significance I know just

439
00:18:02,120 --> 00:17:59,310
judging from my observation of the crew

440
00:18:04,130 --> 00:18:02,130
the shuttle crew as they greeted the

441
00:18:06,830 --> 00:18:04,140
space station crew I think the

442
00:18:09,290 --> 00:18:06,840
significance of this last visit by a

443
00:18:11,240 --> 00:18:09,300
shuttle crew in this last visit by as

444
00:18:12,770 --> 00:18:11,250
large a crew to the International Space

445
00:18:15,680 --> 00:18:12,780
Station I know the significance of that

446
00:18:17,830 --> 00:18:15,690
is felt by the astronauts on board you

447
00:18:22,340 --> 00:18:17,840
could tell you could you could sense a

448
00:18:24,410 --> 00:18:22,350
palpable increase in emotion from all of

449
00:18:25,850 --> 00:18:24,420
the crew members not just our US

450
00:18:27,980 --> 00:18:25,860
astronauts flying on board the space

451
00:18:29,570 --> 00:18:27,990
shuttle but even our international

452
00:18:31,340 --> 00:18:29,580
partner astronauts on the International

453
00:18:35,000 --> 00:18:31,350
Space Station they were extremely happy

454
00:18:37,130 --> 00:18:35,010
and and really elated to to see their

455
00:18:38,660 --> 00:18:37,140
visitors and I know that they really

456
00:18:42,200 --> 00:18:38,670
recognize and appreciate the

457
00:18:43,970 --> 00:18:42,210
significance of these moments more

458
00:18:45,980 --> 00:18:43,980
questions here in Houston if not we'll

459
00:18:51,590 --> 00:18:45,990
go to the phone bridge Marcia Dunn you

460
00:18:55,520 --> 00:18:51,600
there yes by this is a first of all

461
00:18:57,680 --> 00:18:55,530
tomorrow's Reuters hi can you hear me

462
00:18:59,270 --> 00:18:57,690
well hang on Chris or we're going to get

463
00:19:05,050 --> 00:18:59,280

to you in order but Marcia Dunn goes

464
00:19:07,820 --> 00:19:05,060
first in order perfect I was wondering

465
00:19:10,100 --> 00:19:07,830
what kind of emotion is watched over you

466
00:19:12,860 --> 00:19:10,110
quad see when you thought atlantis up

467
00:19:15,620 --> 00:19:12,870
close for the first time as it was

468
00:19:19,760 --> 00:19:15,630
approaching space station we aren't

469
00:19:21,770 --> 00:19:19,770
going to see that too much for I'll tell

470
00:19:24,800 --> 00:19:21,780
you what what was going through my mind

471
00:19:28,910 --> 00:19:24,810
I was really having a number of

472
00:19:33,050 --> 00:19:28,920
flashbacks my very first experience with

473
00:19:36,560 --> 00:19:33,060
Atlantis was was was really as a trainee

474
00:19:38,540 --> 00:19:36,570
the very first time that that I saw the

475
00:19:41,030 --> 00:19:38,550
operation of Atlantis from Mission

476
00:19:44,990 --> 00:19:41,040
Control was my very first year here at

477
00:19:48,290 --> 00:19:45,000
NASA in 1995 I was doing some on-the-job

478
00:19:51,320 --> 00:19:48,300
training with shuttle life support

479
00:19:53,450 --> 00:19:51,330
systems officer on sts 71 which was the

480
00:19:55,700 --> 00:19:53,460
very first time that a space shuttle has

481
00:19:56,930 --> 00:19:55,710
docked with a space station that was the

482
00:19:59,389 --> 00:19:56,940
very first docking of the space shuttle

483
00:20:02,719 --> 00:19:59,399
with the space station Mir

484
00:20:04,489 --> 00:20:02,729
and so I found myself as i was looking

485
00:20:07,279 --> 00:20:04,499
at this craft particularly as it was up

486
00:20:11,719 --> 00:20:07,289
close and doing the RPM thinking about

487
00:20:15,200 --> 00:20:11,729
the the really the the defining moments

488
00:20:17,419 --> 00:20:15,210

in my career here that have been marked

489
00:20:21,919 --> 00:20:17,429
by the presence in the the flight of

490
00:20:24,979 --> 00:20:21,929
this particular space shuttle and it III

491
00:20:27,229 --> 00:20:24,989
won't say that I got close to close to

492
00:20:30,320 --> 00:20:27,239
welling up in the eyes but but I will

493
00:20:32,479 --> 00:20:30,330
say that it was it was a powerful moment

494
00:20:36,469 --> 00:20:32,489
for me one obviously that I tried to

495
00:20:38,119 --> 00:20:36,479
keep relatively discreet so is not to be

496
00:20:40,219 --> 00:20:38,129
a distraction to the the team of flight

497
00:20:42,169 --> 00:20:40,229
controllers that I was leading but I

498
00:20:45,109 --> 00:20:42,179
know they were all feeling very similar

499
00:20:47,419 --> 00:20:45,119
emotions thinking about where we've come

500
00:20:52,479 --> 00:20:47,429
from how much we've accomplished in the

501
00:20:57,079 --> 00:20:52,489
last you know 15 plus years for me and

502
00:20:58,759 --> 00:20:57,089
it's a I was not feeling sadness but it

503
00:21:05,019 --> 00:20:58,769
but just sort of that that

504
00:21:08,739 --> 00:21:05,029
understandable and and common and sober

505
00:21:11,450 --> 00:21:08,749
anticipation of what's coming next of

506
00:21:12,680 --> 00:21:11,460
what the transition to the next phase of

507
00:21:14,799 --> 00:21:12,690
my career in the next phase of my life

508
00:21:16,810 --> 00:21:14,809
will be that's really what preoccupied

509
00:21:19,849 --> 00:21:16,820
preoccupied my thoughts other than

510
00:21:21,619 --> 00:21:19,859
making sure that my computer problem

511
00:21:26,479 --> 00:21:21,629
really was a switch issue and not

512
00:21:29,779 --> 00:21:26,489
something more nefarious how much okay

513
00:21:33,379 --> 00:21:29,789

next up in order alan Boyle MSNBC you

514
00:21:36,529 --> 00:21:33,389
there yeah hi this is alan Boyle with

515
00:21:38,810 --> 00:21:36,539
MSNBC I wanted to ask whether docked

516
00:21:41,959 --> 00:21:38,820
operations will change the kind that you

517
00:21:44,629 --> 00:21:41,969
were talking about yesterday where the

518
00:21:48,440 --> 00:21:44,639
four astronauts on the crew have more

519
00:21:50,899 --> 00:21:48,450
room things are more comfortable how is

520
00:21:53,599 --> 00:21:50,909
that going to change now that it's ten

521
00:21:55,099 --> 00:21:53,609
people instead of four well one of the

522
00:21:57,440 --> 00:21:55,109
things that's working for us is the

523
00:21:59,239 --> 00:21:57,450
International Space Station is a huge

524
00:22:02,269 --> 00:21:59,249
complex and when you combine that with

525
00:22:04,700 --> 00:22:02,279
the the space that's in the orbiter I

526
00:22:06,889 --> 00:22:04,710
think there will be there will be plenty

527
00:22:10,249 --> 00:22:06,899
of room to operate I think this crew

528
00:22:12,469 --> 00:22:10,259
will continue to be very efficient for

529
00:22:12,649 --> 00:22:12,479
the next several days the name of the

530
00:22:14,899 --> 00:22:12,659
game

531
00:22:17,810 --> 00:22:14,909
will be cargo transfer when you look at

532
00:22:21,739 --> 00:22:17,820
downlink video you're going to see bag

533
00:22:23,659 --> 00:22:21,749
upon bag upon bag you know moving across

534
00:22:25,639 --> 00:22:23,669
the hatches from various stowage

535
00:22:28,339 --> 00:22:25,649
locations on the ISS to the orbiter and

536
00:22:30,619 --> 00:22:28,349
vice versa so I think that's that's

537
00:22:32,930 --> 00:22:30,629
really going to I'm going to dominate

538
00:22:36,409 --> 00:22:32,940

the video I think it'll be like almost

539
00:22:37,729 --> 00:22:36,419
like watching an army of ants moving in

540
00:22:39,799 --> 00:22:37,739
and out of an anthill carrying their

541
00:22:41,479 --> 00:22:39,809
cargo although the astronauts are

542
00:22:43,820 --> 00:22:41,489
obviously considerably considerably

543
00:22:45,799 --> 00:22:43,830
bigger I think the crew will continue to

544
00:22:48,769 --> 00:22:45,809
be very efficient I think we'll make

545
00:22:50,779 --> 00:22:48,779
very good use of of all crew members on

546
00:22:55,279 --> 00:22:50,789
the International Space Station there

547
00:22:56,719 --> 00:22:55,289
will be a break in the transfer the

548
00:23:00,320 --> 00:22:56,729
transfer operations for us to do the

549
00:23:02,930 --> 00:23:00,330
spacewalk on flight day 5 and so they'll

550
00:23:06,919 --> 00:23:02,940
be considerable I focus on on making

551
00:23:09,200 --> 00:23:06,929
sure that that goes well but I think I

552
00:23:12,049 --> 00:23:09,210
think given that we are still going to

553
00:23:14,960 --> 00:23:12,059
end up having fewer crew members on this

554
00:23:19,129 --> 00:23:14,970
both spacecraft than we've had on the

555
00:23:21,619 --> 00:23:19,139
preceding missions we will see some

556
00:23:24,320 --> 00:23:21,629
efficiencies gained just by virtue of

557
00:23:26,509 --> 00:23:24,330
the fact that you're tripping over fewer

558
00:23:28,549 --> 00:23:26,519
people if you will but at the same time

559
00:23:33,560 --> 00:23:28,559
you know will be sort of making up a

560
00:23:36,139 --> 00:23:33,570
relative deficit of crew power with

561
00:23:37,940 --> 00:23:36,149
fewer people so I think after all said

562
00:23:39,619 --> 00:23:37,950
and done we're going to stay on the

563
00:23:41,719 --> 00:23:39,629

timeline maybe get a little bit ahead

564
00:23:44,330 --> 00:23:41,729
this crew obviously is proving

565
00:23:47,239 --> 00:23:44,340
themselves to be incredibly capable so

566
00:23:49,399 --> 00:23:47,249
my money's my money's on us being able

567
00:23:52,639 --> 00:23:49,409
to accomplish just a little bit more

568
00:23:55,249 --> 00:23:52,649
than we even thought we would great

569
00:23:58,219 --> 00:23:55,259
thank you okay now on do you Chris

570
00:23:59,269 --> 00:23:58,229
Baltimore from Reuters yes thank you

571
00:24:01,279 --> 00:23:59,279
Chris Baltimore from Reuters and

572
00:24:05,119 --> 00:24:01,289
apologies for jumping the gun just

573
00:24:08,960 --> 00:24:05,129
another quick question on the GPC if you

574
00:24:10,369 --> 00:24:08,970
could let us know what the flight

575
00:24:12,409 --> 00:24:10,379
parameters are or how many of those

576
00:24:13,759 --> 00:24:12,419
computers need to be operational for the

577
00:24:16,810 --> 00:24:13,769
shuttle to be able to continue its

578
00:24:19,849 --> 00:24:16,820
operations and this so I can understand

579
00:24:23,029 --> 00:24:19,859
how this works there there are five of

580
00:24:25,489 --> 00:24:23,039
these computers onboard and three of

581
00:24:26,330 --> 00:24:25,499
them are running a tandem at any given

582
00:24:29,419 --> 00:24:26,340
time is the

583
00:24:32,630 --> 00:24:29,429
that Breck okay great question let me

584
00:24:34,100 --> 00:24:32,640
let me summarize data processing systems

585
00:24:37,250 --> 00:24:34,110
101 for you and I'll try not to bore

586
00:24:39,680 --> 00:24:37,260
anyone typically during ascent and entry

587
00:24:42,769 --> 00:24:39,690
which are arguably the most complex and

588
00:24:47,090 --> 00:24:42,779

critical phases of flight we have all

589
00:24:50,299 --> 00:24:47,100
five computers up in in a redundant set

590
00:24:52,250 --> 00:24:50,309
all looking and looking at the same

591
00:24:54,049 --> 00:24:52,260
buses monitoring the same buses and

592
00:24:55,880 --> 00:24:54,059
talking to each other to make sure that

593
00:24:58,310 --> 00:24:55,890
they essentially all agree in their

594
00:25:00,139 --> 00:24:58,320
calculations because arguably during a

595
00:25:01,700 --> 00:25:00,149
scent and during entry the the

596
00:25:04,010 --> 00:25:01,710
atmospheric parameters that have to be

597
00:25:05,930 --> 00:25:04,020
managed by the flight control system as

598
00:25:08,779 --> 00:25:05,940
well as the engine performance and

599
00:25:10,220 --> 00:25:08,789
attitude control all of that has to be

600
00:25:12,260 --> 00:25:10,230
done by computer because the parameters

601
00:25:15,110 --> 00:25:12,270
change faster than any human being that

602
00:25:17,810 --> 00:25:15,120
could could really manage in piloting

603
00:25:20,570 --> 00:25:17,820
and so we have five of them running at

604
00:25:23,240 --> 00:25:20,580
the same time the idea is that we could

605
00:25:27,590 --> 00:25:23,250
sustain a failure of two of them and

606
00:25:30,500 --> 00:25:27,600
still have a quorum to vote if you will

607
00:25:33,560 --> 00:25:30,510
as long as you have three computers you

608
00:25:35,389 --> 00:25:33,570
know you could take a failure of one of

609
00:25:37,310 --> 00:25:35,399
them and the two others could could

610
00:25:41,389 --> 00:25:37,320
could could vote that computer out so

611
00:25:43,610 --> 00:25:41,399
five computers is really massively

612
00:25:45,560 --> 00:25:43,620
redundant if you will and we feel we

613
00:25:48,139 --> 00:25:45,570

require that redundancy for a send in

614
00:25:49,970 --> 00:25:48,149
entry now of those five computers one of

615
00:25:51,680 --> 00:25:49,980
the computers runs a completely

616
00:25:53,659 --> 00:25:51,690
different version of the software that

617
00:25:57,110 --> 00:25:53,669
was designed to a different

618
00:25:58,909 --> 00:25:57,120
specification and and run and encoded by

619
00:26:02,570 --> 00:25:58,919
a different different software provider

620
00:26:07,580 --> 00:26:02,580
at our backup flight system to guard

621
00:26:10,100 --> 00:26:07,590
against a endemic and insidious software

622
00:26:12,740 --> 00:26:10,110
issue that would affect the other four

623
00:26:15,580 --> 00:26:12,750
computers so that's generally what we do

624
00:26:18,740 --> 00:26:15,590
now for on-orbit operations particularly

625
00:26:21,710 --> 00:26:18,750
rendezvous and docking because our

626
00:26:24,049 --> 00:26:21,720
rendezvous and docking burns that we do

627
00:26:25,639 --> 00:26:24,059
are often critical their critical from a

628
00:26:28,549 --> 00:26:25,649
trajectory perspective and critical from

629
00:26:31,760 --> 00:26:28,559
a timeline perspective we like to fly

630
00:26:34,039 --> 00:26:31,770
with three of those computers in in a

631
00:26:36,919 --> 00:26:34,049
redundant set again so that we have

632
00:26:39,590 --> 00:26:36,929
enough redundancy to where we could take

633
00:26:40,100 --> 00:26:39,600
one or two failures and still have a

634
00:26:44,600 --> 00:26:40,110
function

635
00:26:46,160 --> 00:26:44,610
computer to fly by now in the instance

636
00:26:47,900 --> 00:26:46,170
that we had today where we lost one of

637
00:26:51,650 --> 00:26:47,910
those computers that simply took away

638
00:26:53,180 --> 00:26:51,660

some of our redundancy and so we just

639
00:26:56,539 --> 00:26:53,190
called that our first failure if you

640
00:26:58,760 --> 00:26:56,549
will and continue to fly on the two the

641
00:27:01,160 --> 00:26:58,770
two computers that we head up now during

642
00:27:05,750 --> 00:27:01,170
docked phases like like where we are

643
00:27:08,210 --> 00:27:05,760
right now we typically only have one GNC

644
00:27:11,090 --> 00:27:08,220
computer up and then another computer

645
00:27:12,710 --> 00:27:11,100
that that does are our systems

646
00:27:15,440 --> 00:27:12,720
management functions for environmental

647
00:27:18,650 --> 00:27:15,450
control thermal control that that sort

648
00:27:20,630 --> 00:27:18,660
of thing so so right now we've got we've

649
00:27:23,750 --> 00:27:20,640
got no impact to orbiter functionality

650
00:27:25,730 --> 00:27:23,760
if on the off chance this computer does

651
00:27:28,159 --> 00:27:25,740
not come back if GPC 3 does not come

652
00:27:31,909 --> 00:27:28,169
back as we expect it to then that

653
00:27:34,190 --> 00:27:31,919
represents essentially a notable loss of

654
00:27:36,320 --> 00:27:34,200
redundancy for entry we can still

655
00:27:38,330 --> 00:27:36,330
perform a safe entry but it's just one

656
00:27:40,340 --> 00:27:38,340
of those things that will have to

657
00:27:42,140 --> 00:27:40,350
identify sooner rather than later so

658
00:27:44,150 --> 00:27:42,150
that the entry flight director Tony

659
00:27:47,330 --> 00:27:44,160
sukashi can start talking about that and

660
00:27:48,770 --> 00:27:47,340
examine any changes to procedures to the

661
00:27:52,520 --> 00:27:48,780
entry of the orbit and entry procedures

662
00:27:54,590 --> 00:27:52,530
that we like might need to look at okay

663
00:27:56,450 --> 00:27:54,600

I just follow up and not to get too

664
00:27:58,070 --> 00:27:56,460
carried away with contingencies of what

665
00:28:01,310 --> 00:27:58,080
if you lose another one after that what

666
00:28:05,659 --> 00:28:01,320
would how does that affect your

667
00:28:09,530 --> 00:28:05,669
procedures losing two computers prior to

668
00:28:12,680 --> 00:28:09,540
entry is again a significant and notable

669
00:28:15,169 --> 00:28:12,690
loss of redundancy you know we'd have to

670
00:28:16,580 --> 00:28:15,179
assess each situation as it as it arose

671
00:28:19,640 --> 00:28:16,590
try to understand what the what the

672
00:28:22,280 --> 00:28:19,650
failures are but from a physical data

673
00:28:24,409 --> 00:28:22,290
processing capability perspective the

674
00:28:26,659 --> 00:28:24,419
shuttle can re-enter with with three

675
00:28:28,280 --> 00:28:26,669
computers and reenter safely but again

676
00:28:29,840 --> 00:28:28,290
you know the thing that would be of

677
00:28:31,310 --> 00:28:29,850
great concern to us is understanding the

678
00:28:34,430 --> 00:28:31,320
nature of the failure losing two

679
00:28:36,860 --> 00:28:34,440
computers in a single flight would is

680
00:28:38,840 --> 00:28:36,870
highly unlikely and of course when

681
00:28:41,780 --> 00:28:38,850
you're talking about computers you want

682
00:28:45,470 --> 00:28:41,790
to examine whether or not there's again

683
00:28:47,630 --> 00:28:45,480
some systemic software issue or or some

684
00:28:49,130 --> 00:28:47,640
systemic operating systems issue that

685
00:28:50,630 --> 00:28:49,140
might affect multiple computers as

686
00:28:52,530 --> 00:28:50,640
opposed to just a discrete hardware

687
00:28:54,600 --> 00:28:52,540
failure

688
00:28:56,310 --> 00:28:54,610

I'm out for your patient you're more

689
00:29:00,630 --> 00:28:56,320
than welcome okay and todd halvorson

690
00:29:04,770 --> 00:29:00,640
from florida today todd halvorson

691
00:29:09,120 --> 00:29:04,780
florida today can you hear me Kenta okay

692
00:29:14,480 --> 00:29:09,130
I just was wondering if the shuttle

693
00:29:19,470 --> 00:29:14,490
could render safely with only one GPC

694
00:29:21,600 --> 00:29:19,480
operating properly and just to make sure

695
00:29:26,930 --> 00:29:21,610
I understand the flight roll if you were

696
00:29:29,370 --> 00:29:26,940
to lose three I guess you would have to

697
00:29:33,570 --> 00:29:29,380
come home at the next opportunity what's

698
00:29:35,520 --> 00:29:33,580
a flight roll on G pcs thanks I think

699
00:29:38,730 --> 00:29:35,530
you've got the the big picture correct

700
00:29:41,940 --> 00:29:38,740
if we lose more than more than two

701
00:29:45,150 --> 00:29:41,950
computers we consider that a significant

702
00:29:49,080 --> 00:29:45,160
loss of redundancy that that that has

703
00:29:50,940 --> 00:29:49,090
safety implications to to the crew we

704
00:29:53,700 --> 00:29:50,950
would be looking at looking at coming

705
00:29:54,930 --> 00:29:53,710
home at earliest opportunity I don't

706
00:29:57,900 --> 00:29:54,940
have the flight rule in front of me Todd

707
00:29:59,820 --> 00:29:57,910
so I'm not gonna going to profess to

708
00:30:02,880 --> 00:29:59,830
quote it from memory although I think

709
00:30:09,900 --> 00:30:02,890
you've captured the spirit of what's in

710
00:30:14,450 --> 00:30:09,910
that rule okay then just to clarify this

711
00:30:17,850 --> 00:30:14,460
show is capable of landing safely on one

712
00:30:19,860 --> 00:30:17,860
GPC tanks theoretically it is it is

713
00:30:22,170 --> 00:30:19,870

certainly capable of landing on one GPC

714
00:30:25,290 --> 00:30:22,180
that's absolutely a situation that we

715
00:30:28,140 --> 00:30:25,300
would never ever want to be in to have

716
00:30:30,000 --> 00:30:28,150
to re-enter on one computer but but

717
00:30:32,430 --> 00:30:30,010
again you know one computer is capable

718
00:30:34,290 --> 00:30:32,440
of driving all of the all of the flight

719
00:30:37,050 --> 00:30:34,300
critical buses it's designed to do that

720
00:30:40,170 --> 00:30:37,060
we have five so that they can all five

721
00:30:44,130 --> 00:30:40,180
drive the flight critical buses and in

722
00:30:46,410 --> 00:30:44,140
in tandem with redundancy but having

723
00:30:49,440 --> 00:30:46,420
only one computer you can land the

724
00:30:51,540 --> 00:30:49,450
spacecraft it's not at all the situation

725
00:30:56,040 --> 00:30:51,550
that we would want to be in but but it

726
00:30:58,440 --> 00:30:56,050
is possible to talk linear oh ok thanks

727
00:31:03,000 --> 00:30:58,450
dad back here in Houston any follow-ups

728
00:31:07,750 --> 00:31:05,740
jenison Sarah ABC News have you had a

729
00:31:12,430 --> 00:31:07,760
situation the password you've lost more

730
00:31:14,440 --> 00:31:12,440
than one GPC that you know of you know I

731
00:31:17,110 --> 00:31:14,450
can't recall off the top of my head at

732
00:31:19,600 --> 00:31:17,120
least not certainly not since I've been

733
00:31:21,700 --> 00:31:19,610
flight director and we have we lost more

734
00:31:23,170 --> 00:31:21,710
than one GPC and at least you know

735
00:31:25,240 --> 00:31:23,180
within the last several years our

736
00:31:26,710 --> 00:31:25,250
experience with these computers is that

737
00:31:28,510 --> 00:31:26,720
they've been very reliable most of the

738
00:31:30,600 --> 00:31:28,520

problems we've had have been the exact

739
00:31:33,940 --> 00:31:30,610
situation we had today which we

740
00:31:36,040 --> 00:31:33,950
affectionately call a switch tease where

741
00:31:37,630 --> 00:31:36,050
where the switchbacks off the d-10 for a

742
00:31:39,840 --> 00:31:37,640
split second and the computer gets

743
00:31:42,670 --> 00:31:39,850
failed out of the out of the common said

744
00:31:44,880 --> 00:31:42,680
but I'd have to get you an answer as far

745
00:31:47,860 --> 00:31:44,890
as if we've had real hardware failures

746
00:31:51,810 --> 00:31:47,870
in the in the distant past but certainly

747
00:31:54,490 --> 00:31:51,820
not in the recent past anything else

748
00:31:57,280 --> 00:31:54,500
okay seeing no further questions so

749
00:31:59,770 --> 00:31:57,290
we'll wrap it up a reminder as this

750
00:32:01,570 --> 00:31:59,780
briefing is ongoing the mission

751
00:32:05,190 --> 00:32:01,580
management team has begun its daily

752
00:32:08,050 --> 00:32:05,200
meeting over in the control center the

753
00:32:09,730 --> 00:32:08,060
chair of the mmt Leroy Cain who's the

754
00:32:11,920 --> 00:32:09,740
deputy shuttle program manager will be

755
00:32:14,460 --> 00:32:11,930
here at three p.m. central time for p.m.

756
00:32:16,900 --> 00:32:14,470
eastern time to conduct his mmt briefing

757
00:32:19,240 --> 00:32:16,910
Atlantis's crew and the station crew

758
00:32:21,880 --> 00:32:19,250
will be heading to bed in about five

759
00:32:23,950 --> 00:32:21,890
hours or so just before six p.m. central

760
00:32:26,110 --> 00:32:23,960
time our flight day three highlights

761
00:32:29,470 --> 00:32:26,120
including all of that spectacular video

762
00:32:30,880 --> 00:32:29,480
of the r-bar pitch maneuver and the

763
00:32:33,370 --> 00:32:30,890

docking and the hatch opening and

764
00:32:35,440 --> 00:32:33,380
everything that has followed will begin

765
00:32:37,210 --> 00:32:35,450
to air at 8 p.m. central time tonight

766
00:32:39,760 --> 00:32:37,220
and will be replayed every hour on the

767
00:32:42,850 --> 00:32:39,770
hour throughout the cruise sleep period

768
00:32:45,310 --> 00:32:42,860
the shuttle station crews will be

769
00:32:47,650 --> 00:32:45,320
awakened just before 2 a.m. central time

770
00:32:49,570 --> 00:32:47,660
and tomorrow of course is the heavy

771
00:32:52,000 --> 00:32:49,580
hauling of the Rafaella multi-purpose

772
00:32:54,460 --> 00:32:52,010
Logistics Module to get cargo operations

773
00:32:56,710 --> 00:32:54,470
underway which is the crux of this

774
00:32:58,300 --> 00:32:56,720
mission you can follow all the

775
00:33:03,010 --> 00:32:58,310
activities on both the shuttle and the

776
00:33:04,330 --> 00:33:03,020
station on our website at WWDC gov until

777
00:33:06,550 --> 00:33:04,340
then we'll see you back here at three