1
00:00:27,690 --> 00:00:25,710
here we see our sts-80 flight crew not

2
00:00:31,340 --> 00:00:27,700
story Musgrave

3
00:00:35,410 --> 00:00:32,930
you'll be in charge of the Wakefield

4
00:00:39,200 --> 00:00:35,420
facility activity on this mission

5
00:00:42,050 --> 00:00:39,210
there's our flight engineer Tom Jones

6
00:00:46,400 --> 00:00:42,060
you'll be working the remote manipulator

7
00:00:52,290 --> 00:00:46,410
system doing an EBA and there's our

8
00:00:57,810 --> 00:00:54,959
there is mission specialist tamara

9
00:00:59,479 --> 00:00:57,820
jernigan we get on our Orpheus spas

10
00:01:03,650 --> 00:00:59,489
we'll be doing one of the crew

11
00:01:11,300 --> 00:01:07,160
and there is pilot Kent Rominger at the

12
00:01:17,570 --> 00:01:14,410
and the crew just getting ready for

13
00:01:21,260 --> 00:01:17,580

breakfast there's the sts-80 traditional

14
00:01:24,350 --> 00:01:21,270
cake on the table and when breakfast is

15
00:01:25,910 --> 00:01:24,360
over they'll head down to suit up and

16
00:01:30,730 --> 00:01:25,920
head out for the launch pad which is

17
00:01:32,870 --> 00:01:30,740
just about an hour away at this time

18
00:01:35,300 --> 00:01:32,880
here in firing room 3 of the launch

19
00:01:37,039 --> 00:01:35,310
control center all of our activities

20
00:01:59,109 --> 00:01:37,049
continue to go smoothly the final

21
00:02:03,620 --> 00:02:01,429
this is shuttle launch control at

22
00:02:06,289 --> 00:02:03,630
t-minus three hours and holding well

23
00:02:11,449 --> 00:02:06,299
we're in the suit-up room and we see our

24
00:02:16,940 --> 00:02:11,459
commander Ken cockerel his suit up

25
00:02:16,950 --> 00:02:26,910
and originally from Austin Texas

26
00:02:26,920 --> 00:02:36,400
and our pilot control maker

27
00:02:49,940 --> 00:02:41,200
originally from California and sts-80 is

28
00:02:55,530 --> 00:02:52,709
mission specialist dr. Tammy Jernigan

29
00:03:00,780 --> 00:02:55,540
Lee one of our EBA astronauts on this

30
00:03:03,599 --> 00:03:00,790
mission and she will also be the primary

31
00:03:06,539 --> 00:03:03,609
astronaut taking the lead in the Orpheus

32
00:03:11,960 --> 00:03:06,549
spas activities during the two weeks it

33
00:03:16,400 --> 00:03:13,940
and going across the room there is

34
00:03:19,070 --> 00:03:16,410
mission specialist Tom Jones he'd be our

35
00:03:20,950 --> 00:03:19,080
flight engineer on this mission and he

36
00:03:34,199 --> 00:03:20,960
will take the lead and operating the

37
00:03:41,000 --> 00:03:38,130
our suit-up activities are going

38
00:03:43,199 --> 00:03:41,010

smoothly and on time without any

39
00:03:51,980 --> 00:03:43,209
problems leading toward their walk out

40
00:03:59,000 --> 00:03:55,270
and there is story Musgrave making his

41
00:04:00,620 --> 00:03:59,010
sixth flight into space tying the record

42
00:04:05,140 --> 00:04:00,630
and along with veteran astronaut John

43
00:04:06,860 --> 00:04:05,150
Young he will be the lead astronaut

44
00:04:08,810 --> 00:04:06,870
associated with awake shield facility

45
00:04:14,030 --> 00:04:08,820
activities on this flight and we're

46
00:04:31,430 --> 00:04:14,040
providing EBA support while Tom Jones

47
00:04:36,870 --> 00:04:33,720
this is shuttle launch control at

48
00:04:40,620 --> 00:04:36,880
t-minus two hours 55 minutes 25 seconds

49
00:04:43,020 --> 00:04:40,630
and counting here we see the sts-80

50
00:04:47,280 --> 00:04:43,030
astronauts leaving the crew quarters in

51
00:04:51,450 --> 00:04:47,290
route to the elevator to ride down the

52
00:04:57,630 --> 00:04:51,460
third of the first floor to ride the

53
00:04:59,760 --> 00:04:57,640
astronaut van out to pad 39b out of

54
00:05:02,940 --> 00:04:59,770
20-minute ride out to the pad we expect

55
00:05:32,519 --> 00:05:02,950
they'll arrive out there shortly after

56
00:05:32,529 --> 00:05:41,650
I threw down boarding the astronaut van

57
00:05:50,670 --> 00:05:47,980
very short leg there 16-day mission and

58
00:05:52,740 --> 00:05:50,680
here we see the astronaut fan

59
00:05:59,510 --> 00:05:52,750
now approaching the ramp the launchpad

60
00:06:05,310 --> 00:06:02,280
ride the elevator up to the

61
00:06:08,130 --> 00:06:05,320
well got her access arm and one at a

62
00:06:12,290 --> 00:06:08,140
time begin boarding Columbia we're in

63
00:06:18,180 --> 00:06:12,300

parallel preparations continue to

64
00:06:21,780 --> 00:06:18,190
Columbia ready for its asset which take

65
00:06:23,670 --> 00:06:21,790
over all about 40 minutes or so until

66
00:06:28,610 --> 00:06:23,680
it's actually in its final circular

67
00:06:33,090 --> 00:06:30,810
very shortly we'll be loading the

68
00:06:36,060 --> 00:06:33,100
orbiters computers with the proper asset

69
00:06:37,950 --> 00:06:36,070
profile which depends on the upper-level

70
00:06:38,310 --> 00:06:37,960
winds at the time of launch these are

71
00:06:40,950 --> 00:06:38,320
called

72
00:06:44,780 --> 00:06:40,960
eye loads and they tell the vehicle what

73
00:07:02,850 --> 00:06:44,790
angle of attack to use at various times

74
00:07:07,749 --> 00:07:05,110
this is shuttle launch control at

75
00:07:09,700 --> 00:07:07,759
t-minus 2 hours 34 minutes 12 seconds

76
00:07:12,129 --> 00:07:09,710
and counting where we've seen the

77
00:07:14,320 --> 00:07:12,139
astronauts arriving at the crew access

78
00:07:16,480 --> 00:07:14,330
arm walking across the arm now at the

79
00:07:19,270 --> 00:07:16,490
enter the white room some of the crew

80
00:07:23,649 --> 00:07:19,280
members will probably wait outside for

81
00:07:25,899 --> 00:07:23,659
their turn to enter and as commander Ken

82
00:07:27,610 --> 00:07:25,909
cockerel will sit in the left front seat

83
00:07:30,309 --> 00:07:27,620
of course which is traditional and then

84
00:07:32,649 --> 00:07:30,319
Kent Rominger as the pilot will sit in

85
00:07:33,820 --> 00:07:32,659
the right front seat and then as the

86
00:07:36,790 --> 00:07:33,830
other crewmembers board

87
00:07:52,940 --> 00:07:36,800
mission specialists story Musgrave will

88
00:07:56,750 --> 00:07:54,530

this is shuttle launch control at

89
00:07:57,290 --> 00:07:56,760
t-minus 7 minutes 35 seconds and

90
00:07:59,240 --> 00:07:57,300
counting

91
00:08:04,220 --> 00:07:59,250
fairing now to attract the orbiter

92
00:08:20,869 --> 00:08:04,230
access arm put back into position very

93
00:08:25,159 --> 00:08:23,359
so the main engine helium purge sequence

94
00:08:40,469 --> 00:08:25,169
which prepares the engines for main

95
00:09:02,480 --> 00:08:42,389
main engines now being gimballed as a

96
00:09:14,780 --> 00:09:04,970
the beanie cap the gaseous oxygen vent

97
00:09:16,640 --> 00:09:14,790
hood now being retracted sloppy open

98
00:09:18,830 --> 00:09:16,650
please close it watch the visors take

99
00:09:25,930 --> 00:09:18,840
the SOP flow and it's going a weightless

100
00:09:28,670 --> 00:09:25,940
night feeling jealous don't you - I sure

101
00:09:30,140 --> 00:09:28,680
appreciate all your work for this flow

102
00:09:35,630 --> 00:09:30,150
at this morning and we'll see in a

103
00:09:37,520 --> 00:09:35,640
couple weeks I do that ocean of liquid

104
00:09:45,530 --> 00:09:37,530
hydrogen now terminated in the hydrogen

105
00:09:45,540 --> 00:10:00,530
one minute 30 seconds

106
00:10:13,730 --> 00:10:02,600
sound suppression water system now being

107
00:10:19,660 --> 00:10:16,040
on the rocket booster joint here is now

108
00:10:19,670 --> 00:10:27,050
I'll check the booster commands

109
00:10:36,980 --> 00:10:29,870
locks and LH to fill endanger owls are

110
00:10:43,500 --> 00:10:40,800
5:58 continue to counter that NPD you

111
00:10:45,600 --> 00:10:43,510
clear Tuffy that gos into the city on

112
00:10:45,990 --> 00:10:45,610
your mark Philip copy I can zoom on my

113
00:10:51,750 --> 00:10:46,000

mark

114
00:10:59,970 --> 00:10:51,760
three two one Martin pls you go for auto

115
00:11:01,410 --> 00:10:59,980
start 25 Salah hydraulic siphon solid

116
00:11:05,400 --> 00:11:01,420
rocket booster hydraulic power units

117
00:11:11,160 --> 00:11:05,410
I've started sound suppression water

118
00:11:13,170 --> 00:11:11,170
system armed main safety systems are 10

119
00:11:16,410 --> 00:11:13,180
9 8

120
00:11:20,270 --> 00:11:16,420
ignition sequence start seven six three

121
00:11:23,220 --> 00:11:20,280
main engines up and burning two one and

122
00:11:25,350 --> 00:11:23,230
liftoff of space shuttle Columbia on a

123
00:11:33,050 --> 00:11:25,360
diversified mission of astronomy and

124
00:11:40,860 --> 00:11:38,510
for the role program Roger roll Columbia

125
00:11:42,900 --> 00:11:40,870
Houston is now controlling the roll

126
00:11:44,730 --> 00:11:42,910
maneuver it completes Columbia is in a

127
00:11:52,360 --> 00:11:44,740
heads-down we need level position headed

128
00:11:57,040 --> 00:11:54,160
slice Columbia's engines are now

129
00:11:58,930 --> 00:11:57,050
beginning to throttle down to 67% of

130
00:12:00,760 --> 00:11:58,940
rated thrust and the orbiter passes

131
00:12:02,650 --> 00:12:00,770
through the area of maximum aerodynamic

132
00:12:08,850 --> 00:12:02,660
pressure on the vehicle in the lower

133
00:12:13,180 --> 00:12:11,680
Columbia now miles downrange from the

134
00:12:16,510 --> 00:12:13,190
Kennedy Space Center at an altitude of

135
00:12:18,250 --> 00:12:16,520
four miles all three main engines ap use

136
00:12:38,079 --> 00:12:18,260
and fuel cells continuing to perform

137
00:12:46,850 --> 00:12:43,100
jambe Houston go at throttle up Roger go

138
00:12:48,350 --> 00:12:46,860

at throttle up Columbia's three

139
00:12:50,360 --> 00:12:48,360
liquid-fueled engines are now back at

140
00:12:53,090 --> 00:12:50,370
full throttle 104 percent of rated

141
00:12:55,100 --> 00:12:53,100
thrust Columbia now traveling 1,800

142
00:12:56,870 --> 00:12:55,110
miles per hour 15 miles in altitude

143
00:12:59,750 --> 00:12:56,880
downrange from the Kennedy Space Center

144
00:13:11,930 --> 00:12:59,760
13 miles all three main engines

145
00:13:15,500 --> 00:13:13,790
the next event will be the burnout and

146
00:13:33,110 --> 00:13:15,510
separation of Columbia's twin solid

147
00:13:33,120 --> 00:13:39,290
Columbia Houston performance nominal

148
00:13:42,960 --> 00:13:40,920
performance nominal

149
00:13:45,000 --> 00:13:42,970
two minutes 18 seconds into the flight

150
00:13:46,800 --> 00:13:45,010
the booster officer has confirmed good

151
00:13:48,720 --> 00:13:46,810
separation of the solid rocket boosters

152
00:13:51,060 --> 00:13:48,730
and performance onboard Columbia has

153
00:13:53,190 --> 00:13:51,070
been as expected all three main engines

154
00:13:54,900 --> 00:13:53,200
are continuing to perform at 104 percent

155
00:13:56,880 --> 00:13:54,910
of rated thrust the three auxiliary

156
00:13:58,460 --> 00:13:56,890
power units and fuel cells are also

157
00:14:00,510 --> 00:13:58,470
continuing to perform as expected

158
00:14:02,790 --> 00:14:00,520
Columbia now downrange from the Kennedy

159
00:14:06,900 --> 00:14:02,800
Space Center at a distance of 55 miles

160
00:16:50,900 --> 00:14:06,910
an altitude of 42 miles traveling 3,200

161
00:16:50,910 --> 00:20:17,320
okay

162
00:20:23,619 --> 00:20:20,619
yes in Colombia is the on-orbit

163
00:20:26,109 --> 00:20:23,629

multi-axis ICS learn procedure orbit up

164
00:20:28,840 --> 00:20:26,119
we're thinking will probably burn with

165
00:20:35,169 --> 00:20:28,850
that open and up the homes helium if you

166
00:20:36,970 --> 00:20:35,179
could sir we copy and concur okay we're

167
00:20:39,220 --> 00:20:36,980
just going to leave it configured as is

168
00:20:40,960 --> 00:20:39,230
you won't see us going through those if

169
00:20:52,259 --> 00:20:40,970
the interconnect steps we're on the step

170
00:21:41,420 --> 00:20:54,570
wanna be Houston we see good config for

171
00:21:41,430 --> 00:24:17,720
Columbia Houston good burn

172
00:24:17,730 --> 00:26:33,930
that's

173
00:26:38,739 --> 00:26:36,759
the reaction will speed is still out of

174
00:26:41,139 --> 00:26:38,749
limits we'll need to get a goal from

175
00:27:23,620 --> 00:26:41,149
YouTube it over to the sampling position

176
00:27:42,269 --> 00:27:26,740
much more time and to me I would have a

177
00:27:49,419 --> 00:27:46,120
see so at this point the crew has got

178
00:27:52,590 --> 00:27:49,429
this laser which it you they used to

179
00:27:57,220 --> 00:27:52,600
shine on the on the white shield and

180
00:28:00,580 --> 00:27:57,230
they get range and velocity marks every

181
00:28:01,930 --> 00:28:00,590
so often to just keep track of the of

182
00:28:03,700 --> 00:28:01,940
the white shield you can see that it's

183
00:28:06,430 --> 00:28:03,710
going right over the overhead windows

184
00:28:08,409 --> 00:28:06,440
and off to the left of the ship you'll

185
00:28:12,760 --> 00:28:08,419
be heading off towards the nose a little

186
00:28:24,450 --> 00:28:12,770
bit and increasing its distance from the

187
00:28:28,810 --> 00:28:26,620
Houston come here sorry we've been so

188
00:28:30,970 --> 00:28:28,820

quiet it's very difficult to get say

189
00:28:33,780 --> 00:28:30,980
Mars with the attitude that the lakes

190
00:28:36,370 --> 00:28:33,790
filled in with respect to us it has

191
00:28:38,070 --> 00:28:36,380
quite a different trajectory because of

192
00:28:41,440 --> 00:28:38,080
the length of time we spent with it

193
00:28:45,490 --> 00:28:41,450
before turning on the thruster a lot

194
00:28:47,410 --> 00:28:45,500
different from SPS 69 so the position

195
00:28:49,090 --> 00:28:47,420
that we fear over the weapons and the

196
00:28:51,400 --> 00:28:49,100
edge of the problem very difficult to

197
00:28:55,210 --> 00:28:51,410
get apart we didn't really have a part

198
00:28:58,540 --> 00:28:55,220
to give you yet understand taco

199
00:29:15,300 --> 00:28:58,550
and if story had a thruster on time we'd

200
00:29:15,310 --> 00:30:25,090
looking Rama

201
00:30:29,020 --> 00:30:27,340
and Pearson if you can pass on to the

202
00:30:30,910 --> 00:30:29,030
folks who built the troll bag we're

203
00:30:41,710 --> 00:30:30,920
making good use of it during our you do

204
00:34:07,599 --> 00:30:41,720
tool config awesome thanks Tammy we'll

205
00:34:19,660 --> 00:34:13,460
copy that's a good suggestion care to go

206
00:34:25,760 --> 00:34:24,020
and Columbia Houston Columbia Houston we

207
00:34:27,500 --> 00:34:25,770
would suggest while you have the handle

208
00:34:29,540 --> 00:34:27,510
off go ahead and cycle the locking

209
00:34:39,220 --> 00:34:29,550
mechanism to verify that it appears to

210
00:34:46,810 --> 00:34:42,200
if ever you want the equalization bounce

211
00:34:50,390 --> 00:34:46,820
there okay I'm at the outer hat store

212
00:34:52,790 --> 00:34:50,400
okay good cap them and then take there

213
00:34:53,710 --> 00:34:52,800

but you can't simultaneously both to a

214
00:34:56,990 --> 00:34:53,720
personal thing

215
00:34:59,660 --> 00:34:57,000
okay we're going to blow down to thermal

216
00:35:10,550 --> 00:34:59,670
cover and then use the CCTV the debate

217
00:35:17,420 --> 00:35:10,560
to look at the mechanisms okay that

218
00:35:19,820 --> 00:35:17,430
would cap off like you considered videos

219
00:35:26,380 --> 00:35:19,830
enough I didn't think would be doing

220
00:35:26,390 --> 00:35:33,250
okay so I built a station down turn off

221
00:35:42,740 --> 00:35:38,240
the unlock position and you see it has

222
00:35:44,810 --> 00:35:42,750
both these belts to emergency air for

223
00:35:47,000 --> 00:35:44,820
the natural valves will blow down the

224
00:35:49,220 --> 00:35:47,010
purple cover such that we can look at

225
00:35:52,430 --> 00:35:49,230
the hedge mechanism with our business

226
00:35:55,250 --> 00:35:52,440
here exactly so folks the memo to

227
00:36:00,590 --> 00:35:55,260
emergency correct yes

228
00:36:06,680 --> 00:36:00,600
okay you ready ready and at over cover

229
00:36:10,850 --> 00:36:06,690
did pop down okay great like that sound

230
00:36:15,700 --> 00:36:10,860
office Connie you guys with a soldering

231
00:36:56,500 --> 00:36:53,920
I tell you what that's just what mom

232
00:36:59,890 --> 00:36:56,510
ordered what we'd like now is to have

233
00:37:01,930 --> 00:36:59,900
Tammy try to activate the lock and

234
00:37:04,000 --> 00:37:01,940
unlock mechanism and then try the handle

235
00:37:06,040 --> 00:37:04,010
again although you've got a such a good

236
00:37:22,500 --> 00:37:06,050
view we can even read the unlocked on

237
00:37:25,980 --> 00:37:22,510
the tab okay again the unlock position

238
00:37:29,500 --> 00:37:25,990

is about three-quarters of the way to

239
00:37:33,780 --> 00:37:29,510
the handle as I try to get it properly

240
00:37:39,280 --> 00:37:36,640
Tammy what we see is that the outside

241
00:37:42,510 --> 00:37:39,290
handle is in the what is in the unlocked

242
00:37:46,089 --> 00:37:42,520
position what we would recommend is

243
00:37:48,579 --> 00:37:46,099
removing the inside handle putting it in

244
00:37:58,270 --> 00:37:48,589
the unlocked position and then

245
00:38:03,160 --> 00:38:01,600
and Columbia Houston we're ready to

246
00:38:06,010 --> 00:38:03,170
complete the survey and we just saw a

247
00:38:12,220 --> 00:38:06,020
pretty good bit of motion there in the

248
00:38:14,170 --> 00:38:12,230
linkage yeah we see the motion is a

249
00:38:16,450 --> 00:38:14,180
linkage what we discovered so far bill

250
00:38:21,220 --> 00:38:16,460
was a inner hatch handle on the outer

251
00:38:23,890 --> 00:38:21,230
hatch is that it doesn't matter whether

252
00:38:26,170 --> 00:38:23,900
we enter hatch handle is locked or

253
00:38:28,900 --> 00:38:26,180
unlocked we've still got about that same

254
00:38:32,020 --> 00:38:28,910
30 degrees of play on the rotation of

255
00:38:34,330 --> 00:38:32,030
the handle and we see the mechanism for

256
00:38:36,730 --> 00:38:34,340
the linkage is moving in response to

257
00:38:39,130 --> 00:38:36,740
that but at some point at that thirty

258
00:38:40,930 --> 00:38:39,140
three point something jams and right now

259
00:38:44,560 --> 00:38:40,940
we're thinking is that Jam is occurring

260
00:38:53,500 --> 00:38:44,570
at the hub of the the latch handle

261
00:38:56,140 --> 00:38:53,510
Beckenham Eastern Columbia as you

262
00:38:58,750 --> 00:38:56,150
finally walked around slowly throughout

263
00:39:02,290 --> 00:38:58,760

the entire hatch perimeter we can't

264
00:39:05,260 --> 00:39:02,300
detect any displacement laterally and we

265
00:39:06,700 --> 00:39:05,270
certainly see no grouse motion as

266
00:39:09,280 --> 00:39:06,710
measured against the markers and we put

267
00:39:11,770 --> 00:39:09,290
around the door yesterday at Ted too so

268
00:39:22,330 --> 00:39:11,780
we don't have any deltas to show you any

269
00:39:30,260 --> 00:39:26,840
okay we are full closed that is in the

270
00:39:33,790 --> 00:39:30,270
direction of closed and now I'm going as

271
00:39:36,800 --> 00:39:33,800
far open as the handle will go easily

272
00:39:38,390 --> 00:39:36,810
and now I'm going to push those extra

273
00:39:50,520 --> 00:39:38,400
couple of degrees it would really come

274
00:39:55,940 --> 00:39:53,400
okay we really appreciate that okay me

275
00:40:01,680 --> 00:39:58,500
yeah that gave us a very good idea of

276
00:40:03,930 --> 00:40:01,690
what you had told us in words a couple

277
00:40:07,100 --> 00:40:03,940
of days ago so we really appreciated

278
00:40:11,040 --> 00:40:07,110
that and that concludes our our

279
00:40:12,630 --> 00:40:11,050
requirements for for downlink of of the

280
00:40:32,330 --> 00:40:12,640
hatch thank you very much I was

281
00:40:37,780 --> 00:40:35,980
that's either way war

282
00:40:40,150 --> 00:40:37,790
exactly and that's one of the problems

283
00:40:41,890 --> 00:40:40,160
of where that window is that when you're

284
00:40:43,660 --> 00:40:41,900
working the data you're supposed to be

285
00:40:46,560 --> 00:40:43,670
looking at it's not in view most of your

286
00:40:46,570 --> 00:40:49,880
before

287
00:40:49,890 --> 00:40:56,020
yes in my opinion yes

288
00:40:56,030 --> 00:41:00,510

ten

289
00:41:00,520 --> 00:41:14,990
and we want to

290
00:41:15,000 --> 00:47:36,180
verified

291
00:47:40,230 --> 00:47:38,309
this is Mission Control Houston this

292
00:47:42,480 --> 00:47:40,240
television is showing a birthing of the

293
00:47:45,480 --> 00:47:42,490
white shield facility that take took

294
00:47:47,640 --> 00:47:45,490
place about an hour and a half ago to

295
00:47:51,150 --> 00:47:47,650
say a videotape being played back to the

296
00:47:53,069 --> 00:47:51,160
ground from the shuttle Columbia can the

297
00:47:54,960 --> 00:47:53,079
white shield facility was retrieved that

298
00:47:56,940 --> 00:47:54,970
captured using the mechanical arm by

299
00:48:01,470 --> 00:47:56,950
astronauts Tom Jones aboard Columbia and

300
00:48:02,789 --> 00:48:01,480
801 p.m. Central Time all activities

301
00:48:07,049 --> 00:48:02,799
with the rendezvous and retrieval of the

302
00:48:09,870 --> 00:48:07,059
white shield I went just as planned as a

303
00:48:12,150 --> 00:48:09,880
commander Ken cockerel flawlessly flew

304
00:48:18,690 --> 00:48:12,160
Columbia to within the reach of the

305
00:48:26,700 --> 00:48:18,700
satellite all of that going on just as