



1  
00:00:38,380 --> 00:00:36,430  
the launch countdown began at the

2  
00:00:41,830 --> 00:00:38,390  
t-minus forty three hour mark at 5:00

3  
00:00:44,890 --> 00:00:41,840  
p.m. on Monday for this launch there are

4  
00:00:55,569 --> 00:00:44,900  
a total of 30 hours and 57 minutes of

5  
00:01:04,340 --> 00:00:59,110  
Crewe was undergoing suit up and here is

6  
00:01:07,969 --> 00:01:04,350  
commander Creighton giving us good

7  
00:01:19,039 --> 00:01:07,979  
afternoon and he's essentially ready to

8  
00:01:23,240 --> 00:01:19,049  
go at this point and there is pilot Ken

9  
00:01:26,919 --> 00:01:23,250  
right ler also essentially suited up and

10  
00:01:45,800 --> 00:01:32,749  
Sam more mission specialists suspicion

11  
00:01:45,810 --> 00:01:54,170  
and

12  
00:01:54,180 --> 00:01:59,160  
mission specialist Jim Buckley

13  
00:02:07,920 --> 00:02:01,410

and we're now at three hours and

14

00:02:09,900 --> 00:02:07,930

Counting next people to come to the pad

15

00:02:11,449 --> 00:02:09,910

will be the astronauts leaving the

16

00:02:18,320 --> 00:02:11,459

astronaut quarters here in about another

17

00:02:20,730 --> 00:02:18,330

ten minutes or so and all of the

18

00:02:24,390 --> 00:02:20,740

scheduled activities today for the crew

19

00:02:32,119 --> 00:02:24,400

have been right on the money and from

20

00:02:40,710 --> 00:02:37,070

right letter to his duffel James Brown

21

00:03:01,619 --> 00:02:45,290

I am now a company by their usual

22

00:03:24,280 --> 00:03:09,589

Kru now getting off the elevators and

23

00:03:31,479 --> 00:03:28,240

looking ahead to our remaining mission

24

00:03:37,920 --> 00:03:31,489

specialists we'll be entering the

25

00:03:43,360 --> 00:03:41,140

remaining to be seated the seating

26

00:03:45,430 --> 00:03:43,370

arrangement in the crew compartment

27

00:03:47,949 --> 00:03:45,440

commander Creighton of forces sitting in

28

00:03:51,640 --> 00:03:47,959

the left front seat and pilot Ken right

29

00:03:54,119 --> 00:03:51,650

ler is in the right front seat right now

30

00:04:27,000 --> 00:03:54,129

the pequin reported at the last balloon

31

00:04:45,210 --> 00:04:42,900

LP LP all activities are continuing to

32

00:04:48,240 --> 00:04:45,220

go well we're not working any problems

33

00:04:50,790 --> 00:04:48,250

either on the vehicle side the payload

34

00:05:05,230 --> 00:04:50,800

side we now have the access arm retract

35

00:05:12,170 --> 00:05:07,730

discovery Houston contact air-to-ground

36

00:05:13,550 --> 00:05:12,180

one and two Simon here so discovery Audi

37

00:05:15,380 --> 00:05:13,560

r8 over Channel

38

00:05:22,780 --> 00:05:15,390

discovery Houston read you loud and

39

00:05:26,690 --> 00:05:25,010

fuel cell systems now a trailer

40

00:05:33,350 --> 00:05:26,700

transferring to use of their own

41

00:05:35,780 --> 00:05:33,360

internal reactants gaseous oxygen vent

42

00:05:40,580 --> 00:05:35,790

hood now being retracted the orbiter

43

00:05:43,280 --> 00:05:40,590

down one internal power can write ler

44

00:05:44,900 --> 00:05:43,290

has reported that he has now completed

45

00:05:50,720 --> 00:05:44,910

the clearing of the caution and warning

46

00:05:52,160 --> 00:05:50,730

memory system no unexpected errors fifty

47

00:05:59,020 --> 00:05:52,170

minus two minutes the flight crew has

48

00:06:03,250 --> 00:06:01,220

sound suppression water system has

49

00:06:08,680 --> 00:06:03,260

started

50

00:06:14,200 --> 00:06:08,690

t-minus 10 seconds 9 8 7 go for main

51  
00:06:16,570 --> 00:06:14,210  
engine start burning three two one zero

52  
00:06:18,730 --> 00:06:16,580  
and liftoff of the space shuttle

53  
00:06:20,650 --> 00:06:18,740  
discovery and the upper atmosphere we

54  
00:06:25,300 --> 00:06:20,660  
saw itself

55  
00:06:29,270 --> 00:06:27,370  
Roger roll discovery

56  
00:06:33,510 --> 00:06:29,280  
Mission Control Houston now controlling

57  
00:06:37,450 --> 00:06:35,800  
roll program complete

58  
00:07:02,810 --> 00:06:37,460  
discovery now in a heads-down position

59  
00:07:11,900 --> 00:07:05,180  
one minute 10 seconds discoveries now at

60  
00:07:17,720 --> 00:07:11,910  
altitude of 45,000 feet discovery

61  
00:07:19,460 --> 00:07:17,730  
Houston go at throttle up all three

62  
00:07:22,790 --> 00:07:19,470  
engines aboard discovery now back up at

63  
00:07:24,170 --> 00:07:22,800

104 percent of operating pressure three

64

00:07:25,820 --> 00:07:24,180

good hydraulic systems aboard the

65

00:07:29,990 --> 00:07:25,830

vehicle and three good electrical fuel

66

00:07:34,300 --> 00:07:30,000

cells downrange distance 10 nautical

67

00:07:49,010 --> 00:07:44,750

Roger read you the same solid rocket

68

00:07:51,110 --> 00:07:49,020

booster separation from discovery time

69

00:07:55,000 --> 00:07:51,120

now two minutes and 20 seconds discovery

70

00:08:00,430 --> 00:07:55,010

now 30 miles from the launch site

71

00:08:04,520 --> 00:08:03,050

discovery can now read Zaragoza Spain in

72

00:08:06,020 --> 00:08:04,530

the event of a single engine failure

73

00:08:08,540 --> 00:08:06,030

however all three engines are still

74

00:08:09,950 --> 00:08:08,550

operating at 104 percent three good

75

00:08:11,890 --> 00:08:09,960

hydraulic systems and three good

76  
00:08:14,660 --> 00:08:11,900  
electrical systems aboard the vehicle

77  
00:08:15,620 --> 00:08:14,670  
Discovery's now at an altitude of 219

78  
00:08:17,390 --> 00:08:15,630  
thousand feet

79  
00:08:20,210 --> 00:08:17,400  
downrange from the launch site 50

80  
00:08:34,440 --> 00:08:20,220  
nautical miles traveling 4,700 feet per

81  
00:08:41,730 --> 00:08:38,120  
that's right go you go booster we're go

82  
00:08:42,420 --> 00:08:41,740  
fails go ng D Houston flight we're go

83  
00:08:44,550 --> 00:08:42,430  
for launch

84  
00:08:52,710 --> 00:08:44,560  
I copy thank you launch director NTD I

85  
00:08:57,720 --> 00:08:52,720  
copy MPD ready to go Bob

86  
00:08:59,730 --> 00:08:57,730  
I copy engineering director copy safety

87  
00:09:13,570 --> 00:08:59,740  
and quality director safety qualities go

88  
00:09:13,580 --> 00:09:23,950

then let's go it's open

89

00:09:34,620 --> 00:09:29,860

zero that's our big nation let's go

90

00:09:34,630 --> 00:09:47,019

Roger roll discovery

91

00:09:52,499 --> 00:09:50,920

like guns Glenn see a good roll thank

92

00:10:00,840 --> 00:09:52,509

you

93

00:10:00,850 --> 00:10:22,939

rattle down 367 T del confirms throttles

94

00:10:29,509 --> 00:10:25,369

chef's discovery Houston comm checks I'm

95

00:10:29,989 --> 00:10:29,519

oh I got you lost Claire yes and a deer

96

00:10:42,100 --> 00:10:29,999

it up

97

00:10:42,110 --> 00:10:45,730

that's our be SAP

98

00:10:52,329 --> 00:10:49,060

one of three converged that mop returned

99

00:11:19,740 --> 00:10:52,339

jeantel mark discovery Houston - engine

100

00:11:37,139 --> 00:11:22,199

for discovery Houston single-engine

101  
00:11:39,540 --> 00:11:37,149  
Zaragoza 104 explain your point now we

102  
00:11:41,910 --> 00:11:39,550  
do on the AP use we were looking at a

103  
00:11:52,820 --> 00:11:41,920  
good make is ended by four separate that

104  
00:11:59,660 --> 00:11:57,200  
et said now in amico homes are not

105  
00:12:01,520 --> 00:11:59,670  
required and when they'll go for the et

106  
00:12:03,970 --> 00:12:01,530  
photo dto because of lighting right

107  
00:12:07,850 --> 00:12:03,980  
Capcom

108  
00:12:11,090 --> 00:12:07,860  
discovery Houston nominal miko no ohms

109  
00:12:21,590 --> 00:12:11,100  
one required and no go for the et photo

110  
00:12:37,700 --> 00:12:21,600  
DP oh that's good copy Jail 30 seconds -

111  
00:12:42,920 --> 00:12:40,190  
that picture did show that the right

112  
00:12:44,420 --> 00:12:42,930  
hand door of discovery was opened and

113  
00:12:50,030 --> 00:12:44,430

the left hand door now

114

00:12:52,190 --> 00:12:50,040

being open swishing cameras now to the

115

00:12:54,380 --> 00:12:52,200

right hand side of the orbiter looking

116

00:13:01,550 --> 00:12:54,390

toward the tail as the left hand door

117

00:13:03,650 --> 00:13:01,560

opens flight director jeff panel now

118

00:13:05,900 --> 00:13:03,660

pulling the room to get a go for orbit

119

00:13:07,460 --> 00:13:05,910

ops that's a phase in which the crew can

120

00:14:00,750 --> 00:13:07,470

stay on orbit for the remainder of the

121

00:14:14,970 --> 00:14:09,510

right now do rich rigid

122

00:14:23,580 --> 00:14:14,980

our rates around good graphic okay take

123

00:14:30,690 --> 00:14:27,130

flight payload hey dudes the you ours

124

00:14:30,700 --> 00:14:42,650

outstanding

125

00:14:42,660 --> 00:15:47,280

Oh

126

00:15:47,290 --> 00:15:50,620

I actually appreciate

127

00:15:57,520 --> 00:15:53,590

I'm interesting though we've been using

128

00:16:00,060 --> 00:15:57,530

the number of camera to see the RO EU

129

00:16:02,470 --> 00:16:00,070

and when we try to look at it today we

130

00:16:09,640 --> 00:16:02,480

found that it was obscured by the

131

00:16:16,030 --> 00:16:14,150

seemed didn't work you heard this feel

132

00:16:44,090 --> 00:16:16,040

impossible

133

00:16:44,100 --> 00:16:52,730

Oh

134

00:16:52,740 --> 00:17:14,440

but the real here Lord

135

00:17:14,450 --> 00:17:27,360

get any lighting Jim

136

00:17:32,530 --> 00:17:30,160

the view you're seeing now is of the

137

00:17:34,540 --> 00:17:32,540

Goddard payload operation Control Center

138

00:17:37,360 --> 00:17:34,550

at the Goddard Space Flight Center where

139

00:17:38,920 --> 00:17:37,370

controllers are proceeding nicely with

140

00:17:41,530 --> 00:17:38,930

the in Bay checkout and are very very

141

00:18:37,360 --> 00:17:41,540

happy with the progress of things at

142

00:18:44,030 --> 00:18:42,050

things are all relative GNC like

143

00:18:45,830 --> 00:18:44,040

anything looks real good right now okay

144

00:18:48,650 --> 00:18:45,840

redriff right now okay at this mall

145

00:18:51,170 --> 00:18:48,660

we'll go ahead recommend that we'll go

146

00:18:56,660 --> 00:18:51,180

to pick up with relation to ploy he is

147

00:18:58,370 --> 00:18:56,670

go for free drift discovery Houston the

148

00:19:00,440 --> 00:18:58,380

punk is ready to start commanding the

149

00:19:23,090 --> 00:19:00,450

solar array release year ago for free

150

00:19:47,990 --> 00:19:31,260

it's here coming up bright a lot of

151  
00:19:55,770 --> 00:19:50,460  
Roger that and we have a beautiful view

152  
00:20:05,360 --> 00:19:55,780  
of that great I'm not sure we need any

153  
00:20:40,380 --> 00:20:09,230  
milestone payloads looks beautiful fight

154  
00:21:11,650 --> 00:20:43,350  
when you start moving in Lebanon with

155  
00:22:06,680 --> 00:21:13,600  
it will take me an hour to review all

156  
00:22:11,910 --> 00:22:10,020  
and discovery Houston did you copy go

157  
00:22:16,200 --> 00:22:11,920  
for release and also in a time you

158  
00:22:18,570 --> 00:22:16,210  
number-three deselected okay we copy

159  
00:24:03,590 --> 00:22:18,580  
that time go for release these let time

160  
00:24:03,600 --> 00:24:08,360  
probably looking looking good play

161  
00:24:08,370 --> 00:24:14,649  
step1 in progress step 1

162  
00:24:21,730 --> 00:24:17,139  
Capcom look like a good release gets up

163  
00:24:32,230 --> 00:24:21,740

one two three - look like a great

164

00:25:52,070 --> 00:24:32,240

release and step one congratulation our

165

00:25:52,080 --> 00:30:00,340

in the direction of motion

166

00:30:08,049 --> 00:30:04,840

this is Mission Control Buckley and Mark

167

00:30:11,890 --> 00:30:08,059

Brown are assembling the first of the

168

00:30:15,100 --> 00:30:11,900

structural test articles for today's run

169

00:30:20,919 --> 00:30:15,110

on the mid-deck zero-gravity dynamics

170

00:30:22,990 --> 00:30:20,929

experiment this is called a an electable

171

00:31:18,800 --> 00:30:23,000

trust that means that the crew builds it

172

00:31:18,810 --> 00:31:25,490

ready

173

00:31:25,500 --> 00:31:28,430

made hope

174

00:31:28,440 --> 00:31:34,169

and shakin

175

00:31:34,179 --> 00:32:00,580

atención looks good

176

00:32:00,590 --> 00:32:13,860

they're closing

177

00:32:23,010 --> 00:32:16,950

and we'll slowly pan up on you to look

178

00:32:33,280 --> 00:32:25,590

shot magazine

179

00:32:33,290 --> 00:32:37,950

they move your hand back away

180

00:32:37,960 --> 00:33:24,890

this is good

181

00:33:37,040 --> 00:33:28,590

cold weather cops once you let that

182

00:33:37,050 --> 00:34:03,440

thank you

183

00:34:03,450 --> 00:34:14,030

and I like 12 ounces in mine please

184

00:34:14,040 --> 00:34:18,910

okay there's the first date

185

00:34:18,920 --> 00:34:30,020

more

186

00:34:30,030 --> 00:38:57,310

okay

187

00:39:02,260 --> 00:38:59,470

why are you getting our downlink of the

188

00:39:09,790 --> 00:39:02,270

aurora yeah mark it's great wish it was

189

00:39:19,110 --> 00:39:09,800

in color what's it look like to you Jim

190

00:39:26,890 --> 00:39:24,210

the glow over the forward bulkhead of

191

00:39:29,290 --> 00:39:26,900

discovery and occasional flashes are

192

00:39:32,320 --> 00:39:29,300

indications of reaction control system

193

00:39:36,460 --> 00:39:32,330

thrusters firing to maintain attitude as

194

00:39:41,830 --> 00:39:36,470

well as propel discovery forward and

195

00:39:43,810 --> 00:39:41,840

higher discovery Houston looks like a

196

00:39:45,430 --> 00:39:43,820

good burn no trim required and believe

197

00:39:51,220 --> 00:39:45,440

it or not we saw the justifier from the

198

00:39:56,320 --> 00:39:51,230

Charlie cameras just beautiful lots of

199

00:40:03,100 --> 00:39:56,330

bumping a thumpin going on up here a lot

200

00:40:05,410 --> 00:40:03,110

of shakin goin on huh this is Mission

201  
00:40:07,000 --> 00:40:05,420  
Control Houston this television review

202  
00:40:10,300 --> 00:40:07,010  
from the payload Bay cameras aboard

203  
00:40:13,710 --> 00:40:10,310  
discovery is not a star field but the

204  
00:40:17,560 --> 00:40:13,720  
lights of city below as discovery

205  
00:40:20,020 --> 00:40:17,570  
crosses over the North Sea and and

206  
00:40:36,480 --> 00:40:20,030  
across the coast of the northern part of

207  
00:40:47,609 --> 00:40:44,220  
yeah thanks looking out the commander's

208  
00:40:50,970 --> 00:40:47,619  
window is in the direction of our motion

209  
00:40:53,970 --> 00:40:50,980  
I was like a preview of everything yet

210  
00:40:56,010 --> 00:40:53,980  
to come looking straight out here right

211  
00:41:00,390 --> 00:40:56,020  
now looking right down there yes the

212  
00:41:02,370 --> 00:41:00,400  
boot of Italy so that cities there are

213  
00:41:05,670 --> 00:41:02,380

positions along the coast all the way

214

00:41:08,849 --> 00:41:05,680

down the peninsula you could really make

215

00:41:13,020 --> 00:41:08,859

us yeah the prepetition that's where the

216

00:41:20,490 --> 00:41:13,030

land is water is jet black so the

217

00:41:22,410 --> 00:41:20,500

outline of all the Roger that can man we

218

00:41:23,849 --> 00:41:22,420

just took payload Bay cameras because we

219

00:41:34,640 --> 00:41:23,859

wanted to take a look for ourselves and

220

00:41:52,030 --> 00:41:34,650

we can see that that's amazing right now

221

00:42:00,370 --> 00:41:53,530

yeah it looks like a pretty big

222

00:42:19,210 --> 00:42:02,769

and then the other lighting storm went

223

00:42:25,170 --> 00:42:20,980

well that's beautiful here it must

224

00:42:31,270 --> 00:42:28,710

so card to play is sitting over here

225

00:42:34,030 --> 00:42:31,280

that you can look off the horizon and

226

00:43:06,390 --> 00:42:34,040

see the lights with the fire so very

227

00:43:06,400 --> 00:43:14,950

my higher the residuals look really good

228

00:43:18,920 --> 00:43:16,910

that's an excellent burnt

229

00:43:34,870 --> 00:43:18,930

that's a superior burner no doubt about

230

00:43:38,860 --> 00:43:37,210

okay and Capcom follow along with that

231

00:43:41,650 --> 00:43:38,870

we saw a good burn

232

00:43:44,160 --> 00:43:41,660

we like the residuals here stiff you can

233

00:43:47,080 --> 00:43:44,170

hear this but it's completed of time

234

00:43:49,210 --> 00:43:47,090

Roger we copy we saw a good burn with

235

00:43:51,010 --> 00:43:49,220

excellent residuals and for the mode

236

00:43:54,160 --> 00:43:51,020

stirs there we need for them to proceed

237

00:43:56,080 --> 00:43:54,170

to protocol number 30 and they could

238

00:44:11,210 --> 00:43:56,090

start that now and continue it even

239

00:44:16,099 --> 00:44:13,819

okay we understand protocol 30 and just

240

00:44:47,390 --> 00:44:16,109

as a data point did break surface during

241

00:44:49,120 --> 00:44:47,400

the burn just in the view to the right

242

00:44:53,870 --> 00:44:49,130

hand bottom portion of the picture is

243

00:45:29,760 --> 00:44:53,880

Chicago near the southern portion of

244

00:45:40,980 --> 00:45:37,410

Houston discovery yes I would yes Doug

245

00:45:42,810 --> 00:45:40,990

EFE of the images you got down off a

246

00:45:53,420 --> 00:45:42,820

disk gate at Houston was one of the good

247

00:46:04,570 --> 00:45:55,670

and discovery the word is we have great

248

00:46:04,580 --> 00:46:16,950

thank you

249

00:46:24,359 --> 00:46:20,160

this view from Discovery looking from

250

00:46:28,200 --> 00:46:24,369

the north to the south stretching all

251  
00:46:56,600 --> 00:46:28,210  
the way from the Lake Michigan area all

252  
00:47:03,120 --> 00:47:00,690  
Atlanta is now in the middle right-hand

253  
00:47:48,890 --> 00:47:03,130  
portion of the picture just coming into

254  
00:48:01,049 --> 00:47:51,200  
discoveries presently at an altitude of

255  
00:48:16,450 --> 00:48:04,559  
looking southward now the entire state

256  
00:48:24,309 --> 00:48:18,640  
the larger cities are evident by the

257  
00:53:22,540 --> 00:48:24,319  
brightness Jacksonville Orlando Tampa

258  
00:53:26,710 --> 00:53:24,760  
or better now initiating the first roll

259  
00:53:30,340 --> 00:53:26,720  
reversal that's a role reversal to the

260  
00:53:38,470 --> 00:53:30,350  
right to dissipate excess energy of the

261  
00:53:39,820 --> 00:53:38,480  
orbiter Discovery's altitude now one

262  
00:53:41,410 --> 00:53:39,830  
hundred and fifty two thousand feet

263  
00:53:43,600 --> 00:53:41,420

range two hundred and eighty nautical

264

00:53:55,920 --> 00:53:43,610

miles time to touchdown ten minutes

265

00:54:02,349 --> 00:53:58,120

discovery Houston transfer a state

266

00:54:09,660 --> 00:54:02,359

vector to the BFS Roger transfers they

267

00:54:15,329 --> 00:54:12,539

and we're back to about 1300 lo at the

268

00:54:18,390 --> 00:54:15,339

90 converging back to Nam slightly low

269

00:54:19,980 --> 00:54:18,400

at the 90 and converging discovery we

270

00:55:08,750 --> 00:54:19,990

see you slightly low at the 90 and

271

00:55:14,300 --> 00:55:13,700

main gear touchdown and nose gear

272

00:55:16,339 --> 00:55:14,310

touchdown

273

00:55:48,710 --> 00:55:16,349

discovery rolling out on Edwards runway

274

00:55:53,069 --> 00:55:51,029

we're glad to have you back discovery

275

00:55:54,569 --> 00:55:53,079

your mission will save the way for a

276  
00:55:56,339 --> 00:55:54,579  
better understanding of our planet Earth

277  
00:55:57,480 --> 00:55:56,349  
in space and gradually I'll tell down a

278  
00:56:00,539 --> 00:55:57,490  
job well done in jail

279  
00:56:04,620 --> 00:56:00,549  
EPS no Delta Spiegel thank you no

280  
00:56:05,670 --> 00:56:04,630  
Delta's you come none Inc oh no Delta

281  
00:56:08,549 --> 00:56:05,680  
spark back

282  
00:56:10,200 --> 00:56:08,559  
no Delphis plot funny council and we've

283  
00:56:13,260 --> 00:56:10,210  
got about five minutes of cooling gear

284  
00:56:17,940 --> 00:56:13,270  
on the Reds first ammonia controller is

285  
00:56:25,289 --> 00:56:17,950  
going to be ammonia B to prod GPC ok and

286  
00:56:28,260 --> 00:56:25,299  
we'll await your call we're standing by

287  
00:56:31,640 --> 00:56:28,270  
flight ok no we're standing by gotta go

288  
00:56:35,940 --> 00:56:31,650

I think oh we're on an upper antenna now

289

00:57:24,830 --> 00:56:35,950

ok through transport vehicle now moving

290

00:57:31,730 --> 00:57:29,120

crew of discovery now looking over the

291

00:57:34,310 --> 00:57:31,740

vehicle as fairly routine after each

292

00:57:37,220 --> 00:57:34,320

flight greeting the crew is the dryden

293

00:58:46,460 --> 00:57:37,230

flight research facilities center

294

00:58:51,630 --> 00:58:49,440

sts-48 crew members from left to right

295

00:58:53,640 --> 00:58:51,640

mission specialist Marc Brown Sam game

296

00:58:56,309 --> 00:58:53,650

our pilot Ken right ler mission