



1
00:00:39,190 --> 00:00:45,510
mission specialist Mary Ellen Webber

2
00:00:50,720 --> 00:00:47,400
she will be working with the deployment

3
00:00:53,820 --> 00:00:50,730
of the tracking and data relay satellite

4
00:00:59,760 --> 00:00:53,830
and our flight engineer mission

5
00:01:12,460 --> 00:01:03,799
our commander for STS 70 Tom Henrik's

6
00:01:18,460 --> 00:01:14,800
and mission specialist dr. Don Thomas

7
00:01:21,220 --> 00:01:18,470
who together with dr. Mary Ellen Weber

8
00:01:24,160 --> 00:01:21,230
will be working later today about six

9
00:01:29,080 --> 00:01:24,170
hours after launch to deploy the tigris

10
00:01:30,490 --> 00:01:29,090
G tracking and data relay satellite and

11
00:01:33,570 --> 00:01:30,500
the suit up activities are about

12
00:01:35,650 --> 00:01:33,580
completed so that the crew will be

13
00:01:41,230 --> 00:01:35,660

headed out for the pad here in about

14

00:01:49,360 --> 00:01:41,240

another 15 minutes pilot Kevin Kregel

15

00:01:52,300 --> 00:01:49,370

it's also ready to go Adam and mission

16

00:01:55,230 --> 00:01:52,310

specialist dr. Don Thomas

17

00:01:57,609 --> 00:01:55,240

you will be busy later this afternoon

18

00:02:00,069 --> 00:01:57,619

working with the deployment of the

19

00:02:05,660 --> 00:02:00,079

tracking and data relay satellite which

20

00:02:16,370 --> 00:02:08,480

and our flight engineer mission

21

00:02:18,580 --> 00:02:16,380

specialist Nancy Curie dr. Mary Ellen

22

00:02:20,830 --> 00:02:18,590

Weber

23

00:02:22,930 --> 00:02:20,840

working with dr. Thomas later this

24

00:02:28,210 --> 00:02:22,940

afternoon on the deployment of the iust

25

00:02:30,430 --> 00:02:28,220

dress and our activities right now are

26
00:02:32,350 --> 00:02:30,440
proceeding right to the minute our pilot

27
00:02:35,259 --> 00:02:32,360
or our commander Tom Hendricks pilot

28
00:03:05,370 --> 00:02:35,269
Kevin Kregel wishes specialist Don

29
00:03:13,390 --> 00:03:08,470
and here we see the astronauts now

30
00:03:15,580 --> 00:03:13,400
arriving at the 195-foot level the fixed

31
00:03:23,270 --> 00:03:15,590
service structure at pad V walking over

32
00:03:30,080 --> 00:03:26,090
and some of the we'll wait wait out on

33
00:03:32,810 --> 00:03:30,090
the orbiter access arm while other

34
00:03:35,870 --> 00:03:32,820
crewmembers are being assisted with

35
00:03:38,240 --> 00:03:35,880
their helmets and other attire so that

36
00:03:43,670 --> 00:03:38,250
it doesn't get too crowded the white

37
00:04:05,590 --> 00:03:43,680
room is not very large and of course Tom

38
00:04:10,760 --> 00:04:08,870

copy that ass and in the meantime if you

39

00:04:13,720 --> 00:04:10,770

could perform your clothes out for

40

00:04:20,449 --> 00:04:13,730

flight pull your checklist please

41

00:04:23,420 --> 00:04:20,459

yes copy in all systems OTC we're gonna

42

00:04:25,430 --> 00:04:23,430

proceed without the context any

43

00:04:48,830 --> 00:04:25,440

conversation on how all I asked you one

44

00:04:51,939 --> 00:04:48,840

too will be heard by the crew and the

45

00:04:59,570 --> 00:04:51,949

hatch is being closed and sealed

46

00:05:02,150 --> 00:04:59,580

exactly on time all our activities

47

00:05:03,860 --> 00:05:02,160

continue to go smoothly here today we're

48

00:05:06,560 --> 00:05:03,870

not working any technical problems our

49

00:05:09,890 --> 00:05:06,570

weather is holding for us at this time

50

00:05:19,659 --> 00:05:09,900

and we still expect a long time liftoff

51
00:05:24,050 --> 00:05:22,400
and the orbiter access arm can be moved

52
00:05:26,120 --> 00:05:24,060
back into position around the hatch in

53
00:05:36,770 --> 00:05:26,130
about 30 seconds should an emergency

54
00:05:36,780 --> 00:05:51,600
t-minus seven minutes and Counting

55
00:05:57,540 --> 00:05:53,820
next milestone is the start at the

56
00:06:01,350 --> 00:05:57,550
auxiliary power units by pilot Kevin

57
00:06:03,570 --> 00:06:01,360
Kregel it'll flip three switches on the

58
00:06:28,670 --> 00:06:03,580
cockpit to start each of the three ap

59
00:06:33,680 --> 00:06:31,189
three main engines now being given all

60
00:06:52,430 --> 00:06:33,690
of these steering checks to assure that

61
00:07:00,820 --> 00:06:54,770
Karson one of everybody's cleared no one

62
00:07:00,830 --> 00:07:14,820
and the gaseous oxygen fin hood which

63
00:07:14,830 --> 00:07:40,240

been on retraction underway on schedule

64

00:07:44,059 --> 00:07:43,129

mark yeah let's go for autosequence

65

00:07:46,700 --> 00:07:44,069

start

66

00:07:50,930 --> 00:07:46,710

and we've had the handoff to Discovery's

67

00:07:50,940 --> 00:07:54,360

Cory

68

00:08:01,640 --> 00:07:58,719

sound suppression water system activated

69

00:08:07,159 --> 00:08:01,650

13 seconds

70

00:08:12,010 --> 00:08:07,169

ten nine eight seven six five main

71

00:08:14,960 --> 00:08:12,020

engine ignition four three two one and

72

00:08:16,850 --> 00:08:14,970

liftoff of space shuttle Discovery to

73

00:08:21,740 --> 00:08:16,860

complete NASA's constellation of

74

00:08:23,980 --> 00:08:21,750

tracking stations in the sky Houston now

75

00:08:27,740 --> 00:08:23,990

controlling the flight of discovery

76
00:08:29,060 --> 00:08:27,750
Roger roll discovery discovery completes

77
00:08:30,980 --> 00:08:29,070
the roll to place the shuttle and a

78
00:08:38,310 --> 00:08:30,990
heads-down wings level position from

79
00:08:42,329 --> 00:08:40,769
27 seconds into the flying discoveries

80
00:08:44,159 --> 00:08:42,339
three liquid fuel main engines now

81
00:08:45,509 --> 00:08:44,169
throttling back in a three-step fashion

82
00:08:47,300 --> 00:08:45,519
to sixty-seven percent of rated

83
00:08:49,710 --> 00:08:47,310
performance to lessen the stress on the

84
00:08:58,110 --> 00:08:49,720
surfaces is advancing through the sound

85
00:08:59,699 --> 00:08:58,120
barrier fifty seconds into the flight

86
00:09:01,740 --> 00:08:59,709
the main engines now beginning to rev up

87
00:09:03,449 --> 00:09:01,750
once again to 104 percent of rated

88
00:09:05,579 --> 00:09:03,459

performance including the new block one

89

00:09:08,340 --> 00:09:05,589

engine all three main engines performing

90

00:09:16,650 --> 00:09:08,350

normally discovery Houston go at

91

00:09:19,860 --> 00:09:16,660

throttle up discovery now sixty three

92

00:09:21,840 --> 00:09:19,870

thousand feet and altitude eight miles

93

00:09:23,519 --> 00:09:21,850

downrange all systems continue to

94

00:09:37,889 --> 00:09:23,529

function normally in the early stage of

95

00:09:47,430 --> 00:09:40,060

20 seconds left in first stage

96

00:09:52,540 --> 00:09:50,620

discovery approaching the 155 thousand

97

00:10:04,020 --> 00:09:52,550

foot mark and altitude some 26 miles

98

00:10:09,550 --> 00:10:06,430

booster officer confirms solid rocket

99

00:10:13,780 --> 00:10:09,560

booster separation discovery Houston

100

00:10:23,590 --> 00:10:13,790

performance nominal abdominal

101
00:10:28,210 --> 00:10:25,750
you know do you see how that all fits

102
00:10:31,630 --> 00:10:28,220
configured copy that

103
00:10:46,700 --> 00:10:31,640
PLC perform mps helium reconfiguration

104
00:10:53,030 --> 00:10:52,579
using the CPD step 979 increase copying

105
00:11:02,630 --> 00:10:53,040
work

106
00:11:08,000 --> 00:11:06,230
how did you see see the boy giant SS yes

107
00:11:20,190 --> 00:11:08,010
sir I can you step nine six six across

108
00:11:23,980 --> 00:11:22,390
play booster locks tank it's like

109
00:11:27,880 --> 00:11:23,990
pressure and just a heads up if you're

110
00:11:29,740 --> 00:11:27,890
gonna watch on anyone dare you see the

111
00:11:31,360 --> 00:11:29,750
secondary seal pressure will stay low

112
00:11:32,740 --> 00:11:31,370
like that negative because it's a block

113
00:11:37,030 --> 00:11:32,750

one engine it doesn't have a transducer

114

00:11:39,190 --> 00:11:37,040

now location copy feel at the city hold

115

00:11:42,010 --> 00:11:39,200

it 31 downtown clock will hold it - 31

116

00:11:48,010 --> 00:11:42,020

seconds did we like formation around a

117

00:11:51,519 --> 00:11:48,020

multipath contingency SP entity let's go

118

00:11:58,290 --> 00:11:51,529

ahead and keep your s here we go Rizal

119

00:12:03,610 --> 00:11:58,300

15 seconds anyone I copy epi

120

00:12:10,470 --> 00:12:03,620

that's our be either ignition liftoff

121

00:12:14,620 --> 00:12:10,480

confirmed Roger that roll program

122

00:12:20,230 --> 00:12:14,630

Roger roll discovery like I didn't see

123

00:12:26,390 --> 00:12:20,240

the rule copy slide he come go ahead we

124

00:12:51,570 --> 00:12:29,070

negative return discovery Houston

125

00:12:51,580 --> 00:12:54,870

check that out

126

00:12:54,880 --> 00:13:15,190

yeah it's great

127

00:13:15,200 --> 00:13:29,460

you get spec 200 messages coming

128

00:13:44,110 --> 00:13:31,659

beginnings that they raised in 258

129

00:13:44,120 --> 00:15:07,990

Houston discovery that's a deploy

130

00:15:12,730 --> 00:15:10,389

good morning welcome aboard discovery

131

00:15:14,499 --> 00:15:12,740

for a hundred sixteen miles above the

132

00:15:18,309 --> 00:15:14,509

earth just approaching the southern tip

133

00:15:21,160 --> 00:15:18,319

of Baja and we like to share a moment

134

00:15:24,220 --> 00:15:21,170

with you to dedicate the new

135

00:15:27,610 --> 00:15:24,230

consolidated control center after thirty

136

00:15:29,679 --> 00:15:27,620

years of hard work which included over

137

00:15:32,199 --> 00:15:29,689

100 manned space flights from old

138

00:15:34,300 --> 00:15:32,209

control room we're now entering the next

139

00:15:36,730 --> 00:15:34,310

century by opening the new control

140

00:15:40,420 --> 00:15:36,740

center which will lead our manned

141

00:15:42,519 --> 00:15:40,430

spaceflight program into future benefits

142

00:15:44,860 --> 00:15:42,529

aboard International Space Station and

143

00:15:47,019 --> 00:15:44,870

into the next century continuing our

144

00:15:50,170 --> 00:15:47,029

exploration of the solar system for the

145

00:15:51,879 --> 00:15:50,180

benefit of humankind aboard discovery on

146

00:15:54,160 --> 00:15:51,889

this white we have a plaque that

147

00:15:56,559 --> 00:15:54,170

commemorates the opening of the new

148

00:15:58,840 --> 00:15:56,569

control center and it says in

149

00:16:01,960 --> 00:15:58,850

recognition of the first flight flown

150

00:16:04,179 --> 00:16:01,970

from this Mission Control Room this park

151

00:16:06,540 --> 00:16:04,189

was flown on the flight STS 70

152

00:16:09,850 --> 00:16:06,550

on board the space shuttle Discovery

153

00:16:13,660 --> 00:16:09,860

built by the pilot teamwork and powered

154

00:16:15,460 --> 00:16:13,670

by pirate spirit and we dedicated to all

155

00:16:17,769 --> 00:16:15,470

the folks who have worked in the flight

156

00:16:20,079 --> 00:16:17,779

control rooms and who will work in the

157

00:16:23,559 --> 00:16:20,089

new control room and it's all an honor

158

00:16:26,710 --> 00:16:23,569

to carry this plaque for those folks and

159

00:16:29,559 --> 00:16:26,720

we do dedicated to their teamwork and

160

00:16:31,360 --> 00:16:29,569

effort and it's not the rooms that make

161

00:16:34,119 --> 00:16:31,370

the difference it's the people that man

162

00:16:36,819 --> 00:16:34,129

those rooms and we trust our lives and

163

00:16:39,549 --> 00:16:36,829

our nation's manned space program to

164

00:17:59,980 --> 00:16:39,559

those folks and we are proud to be a

165

00:18:04,150 --> 00:18:01,870

that's a farm and this is a picture of

166

00:18:06,730 --> 00:18:04,160

Tom and I doing a Chili's activation and

167

00:18:08,980 --> 00:18:06,740

this is just one part of Hercules to

168

00:18:10,840 --> 00:18:08,990

happen the IBM ThinkPad computer and

169

00:18:15,190 --> 00:18:10,850

you'll see the actual camera coming to

170

00:18:15,760 --> 00:18:15,200

view and just a little bit this camera

171

00:18:17,980 --> 00:18:15,770

on the ground

172

00:18:19,660 --> 00:18:17,990

weighed approximately 70 pounds and it

173

00:18:21,790 --> 00:18:19,670

was quite difficult to train with

174

00:18:24,760 --> 00:18:21,800

particular star alignments to hold this

175

00:18:26,620 --> 00:18:24,770

device over your head and be able to get

176

00:18:29,440 --> 00:18:26,630

an alignment within point zero five

177

00:18:31,000 --> 00:18:29,450

degrees we had some difficulty with the

178

00:18:32,890 --> 00:18:31,010

alignment today and mostly due to the

179

00:18:35,200 --> 00:18:32,900

stabilization of the camera because it

180

00:18:40,450 --> 00:18:35,210

is so large and there's the camera that

181

00:18:42,660 --> 00:18:40,460

I'm holding right now so I be on camera

182

00:18:45,820 --> 00:18:42,670

which is a qualified spectral imaging

183

00:18:47,800 --> 00:18:45,830

intensifier camera and it's got its own

184

00:19:31,060 --> 00:18:47,810

alignment system that's the character on

185

00:21:36,560 --> 00:19:33,410

discovery Don no response it's great to

186

00:21:42,050 --> 00:21:38,870

hey the Windex camera is all installed

187

00:21:44,320 --> 00:21:42,060

in the out window we're ready to forget

188

00:21:46,580 --> 00:21:44,330

our operations here on the flight deck

189

00:21:48,950 --> 00:21:46,590

what we'll be doing here doing this

190

00:21:51,980 --> 00:21:48,960

series of tests is that Tom Hendricks a

191

00:21:53,870 --> 00:21:51,990

commander will be manually inputting

192

00:21:55,970 --> 00:21:53,880

some frustra firings and during night

193

00:21:57,740 --> 00:21:55,980

passes and we'll be looking at the glow

194

00:22:00,800 --> 00:21:57,750

and the emissions from the front

195

00:22:02,930 --> 00:22:00,810

thruster plumes out around the vicinity

196

00:34:06,419 --> 00:22:02,940

of the tail area and the impacts on the

197

00:34:11,950 --> 00:34:09,129

discovery Houston we see you on energy

198

00:34:13,899 --> 00:34:11,960

approaching to hack no update to wins or

199

00:34:27,419 --> 00:34:13,909

weather and you're go for a nominal

200

00:34:32,220 --> 00:34:29,909

commander Tom Henrichs has now assumed

201
00:34:33,930 --> 00:34:32,230
manual control flying the orbiter taking

202
00:34:35,609 --> 00:34:33,940
over from automatic computers as he

203
00:34:37,859 --> 00:34:35,619
begins to negotiate his way around the

204
00:34:39,269 --> 00:34:37,869
so called heading alignment cylinder the

205
00:34:43,049 --> 00:34:39,279
mythical point of reference that

206
00:35:03,320 --> 00:34:43,059
commanders and pilots use to align

207
00:35:08,090 --> 00:35:05,420
Henrik's leveling off the wings as he

208
00:35:10,370 --> 00:35:08,100
begins to negotiate a 237 degree turn

209
00:35:13,130 --> 00:35:10,380
aligning himself with runway 33 the

210
00:35:16,730 --> 00:35:13,140
southeast and northwest approach and an

211
00:35:18,710 --> 00:35:16,740
end to Discovery's 21st mission time to

212
00:35:28,250 --> 00:35:18,720
touch down just three minutes discovery

213
00:35:30,770 --> 00:35:28,260

at an altitude of 31,000 feet the

214

00:35:32,060 --> 00:35:30,780

vortices of the moist air in the early

215

00:35:33,770 --> 00:35:32,070

morning hours at the Kennedy Space

216

00:35:36,080 --> 00:35:33,780

Center's streaming off of Discovery's

217

00:35:57,079 --> 00:35:36,090

wings it's curvy Houston on energy at

218

00:35:57,089 --> 00:36:12,640

discovery Houston on energy at the 90

219

00:36:16,900 --> 00:36:14,950

Henrik's now completing his turn to

220

00:36:19,230 --> 00:36:16,910

align himself with runway 33 at the

221

00:36:23,640 --> 00:36:19,240

Kennedy Space Center time to touch down

222

00:36:26,880 --> 00:36:23,650

scurvy Houston and copy runway insight

223

00:36:28,960 --> 00:36:26,890

about 90 seconds away from touchdown

224

00:36:31,269 --> 00:36:28,970

discovery now at an altitude of about

225

00:36:46,800 --> 00:36:31,279

13,000 feet as it completes its final

226
00:36:52,840 --> 00:36:49,720
discovery speed break comes open as the

227
00:36:54,790 --> 00:36:52,850
orbiter now aligned with runway 3-3 its

228
00:36:56,560 --> 00:36:54,800
final descent seven times steeper than

229
00:36:58,300 --> 00:36:56,570
that of a commercial jetliner on final

230
00:37:15,089 --> 00:36:58,310
approach less than a minute from

231
00:37:20,729 --> 00:37:18,809
a final pre-flare maneuver of

232
00:37:22,979 --> 00:37:20,739
Discovery's nose by Commander Tom

233
00:37:48,810 --> 00:37:22,989
Hendricks pilot Kevin Kregel will drop

234
00:37:55,270 --> 00:37:53,250
Rigell now deploys the drag chute that

235
00:37:57,910 --> 00:37:55,280
was gear touchdown

236
00:37:59,620 --> 00:37:57,920
discovery rolling out on runway 33 at

237
00:38:02,440 --> 00:37:59,630
the Kennedy Space Center to complete a

238
00:38:04,360 --> 00:38:02,450

3.7 million mile mission leaving behind

239

00:38:36,060 --> 00:38:04,370

in orbit NASA's newest tracking and data

240

00:38:42,850 --> 00:38:40,270

we'll stop usin scary houston copy we'll