



1
00:00:28,660 --> 00:00:24,080
from the beginning sts-49 would stand

2
00:00:31,519 --> 00:00:28,670
out as an extraordinary mission as

3
00:00:35,139 --> 00:00:31,529
endeavour rolled onto the tarmac in

4
00:00:38,810 --> 00:00:35,149
Palmdale California on April 25th 1991

5
00:00:43,580 --> 00:00:38,820
it set the stage for America's 47th

6
00:00:46,369 --> 00:00:43,590
space shuttle mission endeavour was a

7
00:00:49,279 --> 00:00:46,379
milestone bringing the shuttle fleet

8
00:00:52,189 --> 00:00:49,289
back to full strength after the loss of

9
00:00:55,189 --> 00:00:52,199
the space shuttle Challenger signifying

10
00:01:00,510 --> 00:00:55,199
a new level of confidence and ambition

11
00:01:05,790 --> 00:01:03,360
but the maiden voyage of Endeavour would

12
00:01:08,940 --> 00:01:05,800
prove to be not only a test of the space

13
00:01:14,970 --> 00:01:08,950

transportation system but a test of the

14

00:01:17,250 --> 00:01:14,980

entire space flight program after more

15

00:01:19,350 --> 00:01:17,260

than a year of intensive training the

16

00:01:23,760 --> 00:01:19,360

crew of Endeavour was ready to face the

17

00:01:26,430 --> 00:01:23,770

complex inaugural voyage ahead Navy

18

00:01:28,740 --> 00:01:26,440

captain Dan brandenstein commanded the

19

00:01:32,390 --> 00:01:28,750

crew of seven while Air Force lieutenant

20

00:01:35,850 --> 00:01:32,400

colonel kevin chilton served as pilot

21

00:01:38,870 --> 00:01:35,860

the piloting skills of both men would be

22

00:01:41,270 --> 00:01:38,880

crucial to the success of the mission

23

00:01:45,810 --> 00:01:41,280

the remaining members of the crew

24

00:01:50,010 --> 00:01:45,820

mission specialists Richard dr.

25

00:01:53,609 --> 00:01:50,020

Kathryn Thornton Coast Guard commander

26

00:01:55,520 --> 00:01:53,619

Bruce Melnick Air Force Lieutenant

27

00:01:59,400 --> 00:01:55,530

Colonel Tom Akers

28

00:02:01,770 --> 00:01:59,410

and navy commander Pierre Thuot shared

29

00:02:03,499 --> 00:02:01,780

in the responsibility of achieving the

30

00:02:07,020 --> 00:02:03,509

mission objectives

31

00:02:10,520 --> 00:02:07,030

the primary objective the retrieval

32

00:02:13,650 --> 00:02:10,530

repair and reboost of the International

33

00:02:18,600 --> 00:02:13,660

Telecommunication satellite or Intel sat

34

00:02:21,120 --> 00:02:18,610

6f3 a wiring error on the unmanned

35

00:02:23,520 --> 00:02:21,130

commercial booster rocket marooned the

36

00:02:28,020 --> 00:02:23,530

satellite in a useless low orbit after

37

00:02:31,580 --> 00:02:28,030

its launch in 1990 Intelsat commissioned

38

00:02:34,260 --> 00:02:31,590

NASA to rescue the stranded satellite

39

00:02:36,900 --> 00:02:34,270
though this was not NASA's first

40

00:02:38,670 --> 00:02:36,910
satellite rescue it would be one of the

41

00:02:42,839 --> 00:02:38,680
most challenging for the space shuttle

42

00:02:45,000 --> 00:02:42,849
program and Deborah and her crew would

43

00:02:48,000 --> 00:02:45,010
engage in the first attachment of a

44

00:02:49,860 --> 00:02:48,010
solid rocket motor in orbit and the

45

00:02:54,270 --> 00:02:49,870
first attempt to perform three

46

00:02:56,550 --> 00:02:54,280
consecutive spacewalks another objective

47

00:03:00,630 --> 00:02:56,560
of the flight would be the Assembly of

48

00:03:04,710 --> 00:03:00,640
station by Evy a methods experiment or a

49

00:03:08,190 --> 00:03:04,720
SEM the mission specialist teams of

50

00:03:11,070 --> 00:03:08,200
Akers Thornton thawed and would

51
00:03:14,200 --> 00:03:11,080
perform every A's or spacewalks

52
00:03:19,600 --> 00:03:14,210
to evaluate equipment and techniques for

53
00:03:21,820 --> 00:03:19,610
construction of space station freedom in

54
00:03:24,820 --> 00:03:21,830
the payload Bay the astronauts would

55
00:03:27,490 --> 00:03:24,830
build a truss structure and evaluate EDA

56
00:03:31,840 --> 00:03:27,500
operations to be used for space station

57
00:03:34,060 --> 00:03:31,850
assembly to achieve these objectives the

58
00:03:36,400 --> 00:03:34,070
crew of Endeavour underwent months of

59
00:03:40,420 --> 00:03:36,410
rigorous training at NASA's Johnson

60
00:03:43,030 --> 00:03:40,430
Space Center in Houston Texas at the

61
00:03:46,210 --> 00:03:43,040
precision air bearing facility a mock-up

62
00:03:48,820 --> 00:03:46,220
of Intel SATs six was used to assess how

63
00:03:51,550 --> 00:03:48,830

the satellite would respond in space and

64

00:03:59,710 --> 00:03:51,560

to demonstrate the capabilities of the

65

00:04:02,050 --> 00:03:59,720

unique capture bar so it would use the

66

00:04:05,380 --> 00:04:02,060

capture bar to catch the satellite and

67

00:04:07,720 --> 00:04:05,390

stop its rotation the bar included a

68

00:04:10,570 --> 00:04:07,730

grapple fixture for the robot arm to

69

00:04:15,189 --> 00:04:10,580

grab the satellite and place it on top

70

00:04:22,030 --> 00:04:20,360

okay Seward and he continued their

71

00:04:26,689 --> 00:04:22,040

training in the weightless environment

72

00:04:28,850 --> 00:04:26,699

training facility this training focused

73

00:04:31,760 --> 00:04:28,860

on the task of attaching the satellite

74

00:04:33,890 --> 00:04:31,770

to the solid rocket motor and preparing

75

00:04:40,060 --> 00:04:33,900

it for its launch from the shuttle cargo

76
00:04:43,820 --> 00:04:40,070
bay it would pay off handsomely in space

77
00:04:46,810 --> 00:04:43,830
the complex dynamics and interactions of

78
00:04:49,310 --> 00:04:46,820
satellite shuttle robot arm and

79
00:04:52,460 --> 00:04:49,320
astronaut were difficult if not

80
00:04:55,070 --> 00:04:52,470
impossible to recreate on the ground and

81
00:05:02,270 --> 00:04:55,080
proved to be the most serious challenge

82
00:05:05,840 --> 00:05:02,280
facing the satellite rescue mission may

83
00:05:09,159 --> 00:05:05,850
7th 1992 a relaxed and confident

84
00:05:11,779 --> 00:05:09,169
endeavour crew heads for the launch pad

85
00:05:14,360 --> 00:05:11,789
weather problems persisted throughout

86
00:05:16,400 --> 00:05:14,370
the day but the rainy skies couldn't

87
00:05:34,190 --> 00:05:16,410
dampen the spirits of the seven-member

88
00:05:38,700 --> 00:05:37,050

booster ignition and liftoff of the

89

00:06:15,020 --> 00:05:38,710

maiden voyage of Endeavour on a

90

00:06:15,030 --> 00:06:29,850

SRB separation confirmed

91

00:06:37,029 --> 00:06:32,800

following a flawless liftoff and ascent

92

00:06:39,400 --> 00:06:37,039

endeavors settled into orbit over the

93

00:06:41,320 --> 00:06:39,410

next two days and ever and the stranded

94

00:06:43,120 --> 00:06:41,330

satellites circled the earth while

95

00:06:44,920 --> 00:06:43,130

performing a series of crucial

96

00:06:48,700 --> 00:06:44,930

manoeuvres as a prelude to the

97

00:06:51,010 --> 00:06:48,710

rendezvous the success of this unique

98

00:06:53,469 --> 00:06:51,020

mission would require an unprecedented

99

00:06:55,870 --> 00:06:53,479

level of coordination between the Intel

100

00:07:01,170 --> 00:06:55,880

Sat control facility in Washington DC

101
00:07:04,450 --> 00:07:01,180
and Mission Control in Houston an

102
00:07:06,430 --> 00:07:04,460
intricate dance ensued as the flight

103
00:07:09,129 --> 00:07:06,440
crew gradually raised endeavours

104
00:07:12,490 --> 00:07:09,139
altitude and Intel Sat controllers

105
00:07:14,830 --> 00:07:12,500
lowered their spacecraft this is a 45

106
00:07:16,390 --> 00:07:14,840
second burn of the twin orbital

107
00:07:18,520 --> 00:07:16,400
maneuvering system engines that produce

108
00:07:20,909 --> 00:07:18,530
about 6,000 pounds of thrust

109
00:07:25,059 --> 00:07:20,919
raising endeavours low ends orbit from

110
00:07:27,010 --> 00:07:25,069
146 to 187 nautical miles getting it

111
00:07:29,770 --> 00:07:27,020
closer to a more circular orbit as it

112
00:07:33,490 --> 00:07:29,780
continues its chase to catch up with the

113
00:07:36,399 --> 00:07:33,500

analyst at space craft as the countdown

114

00:07:38,680 --> 00:07:36,409

to the first spacewalk proceeded crew

115

00:07:50,200 --> 00:07:38,690

members began the checkout of the robot

116

00:07:56,680 --> 00:07:50,210

arm and spacesuits and we can't appear

117

00:07:58,870 --> 00:07:56,690

thanks on Sunday the fourth day in two

118

00:08:01,450 --> 00:07:58,880

endeavours mission food and hebes

119

00:08:05,439 --> 00:08:01,460

stepped into the payload bay to begin

120

00:08:07,839 --> 00:08:05,449

the first rescue attempt while threw it

121

00:08:09,809 --> 00:08:07,849

grappled the satellite from his

122

00:08:13,089 --> 00:08:09,819

unique vantage point in the payload Bay

123

00:08:14,730 --> 00:08:13,099

served as an extra pair of eyes for the

124

00:08:17,499 --> 00:08:14,740

cockpit

125

00:08:26,740 --> 00:08:17,509

Melnik operated the robot arm from

126

00:08:29,320 --> 00:08:26,750

inside the orbiter unfortunately the

127

00:08:48,290 --> 00:08:29,330

cards were stacked against the crew this

128

00:08:53,820 --> 00:08:51,210

the capture attempts caused the four and

129

00:08:56,160 --> 00:08:53,830

a half ton satellite to wobble so much

130

00:08:59,400 --> 00:08:56,170

it became impossible for them it to

131

00:09:02,010 --> 00:08:59,410

attach the capture bar and Deborah was

132

00:09:10,530 --> 00:09:02,020

forced to back away to avoid a collision

133

00:09:14,220 --> 00:09:10,540

with the satellite working best maneuver

134

00:09:16,650 --> 00:09:14,230

for you to back out here so we can stay

135

00:09:27,930 --> 00:09:16,660

stabilized for about six to eight hours

136

00:09:29,460 --> 00:09:27,940

we'll try to come in again tomorrow okay

137

00:09:37,080 --> 00:09:29,470

sounds good we'll have some words for

138

00:09:39,720 --> 00:09:37,090

you shortly after analyzing the downlink

139

00:09:41,820 --> 00:09:39,730

footage from endeavours cameras the crew

140

00:09:44,640 --> 00:09:41,830

held a conference with Mission Control

141

00:09:48,510 --> 00:09:44,650

to discuss conditions contributing to

142

00:09:50,820 --> 00:09:48,520

the unsuccessful attempt prime factors

143

00:09:53,810 --> 00:09:50,830

included the satellites unexpected

144

00:09:56,490 --> 00:09:53,820

sensitivity to touch the unanticipated

145

00:09:59,910 --> 00:09:56,500

movement affecting fluids positioning on

146

00:10:03,810 --> 00:09:59,920

the robot arm and reduced visibility on

147

00:10:06,210 --> 00:10:03,820

the dark side of the earth the next step

148

00:10:09,270 --> 00:10:06,220

was clear a second attempt would be made

149

00:10:11,430 --> 00:10:09,280

on Monday probably the most important

150

00:10:13,410 --> 00:10:11,440

question first were with engineers on

151
00:10:15,330 --> 00:10:13,420
earth struggle throughout the day and

152
00:10:22,020 --> 00:10:15,340
into the night to come up with a better

153
00:10:25,020 --> 00:10:22,030
way of capturing the satellite Monday

154
00:10:28,710 --> 00:10:25,030
May 11th thordan stepped from the

155
00:10:31,140 --> 00:10:28,720
airlock into the payload Bay while

156
00:10:31,980 --> 00:10:31,150
Mission Control had brainstorm for the

157
00:10:33,990 --> 00:10:31,990
second DVA

158
00:10:36,990 --> 00:10:34,000
the crew had come up with a few

159
00:10:39,300 --> 00:10:37,000
suggestions of their own they would

160
00:10:43,080 --> 00:10:39,310
attempt the capture in maximum sunlight

161
00:10:46,050 --> 00:10:43,090
to give through at the best view time

162
00:10:48,300 --> 00:10:46,060
would be allowed for a bump test bumping

163
00:10:48,850 --> 00:10:48,310

the capture bar against the left side of

164

00:10:51,130 --> 00:10:48,860

the cargo

165

00:10:54,430 --> 00:10:51,140

they to familiarize through it with the

166

00:10:56,770 --> 00:10:54,440

dynamics this would also determine how

167

00:11:00,360 --> 00:10:56,780

the bar would respond when striking the

168

00:11:03,790 --> 00:11:00,370

satellite in a weightless environment

169

00:11:06,190 --> 00:11:03,800

perhaps most importantly brandenstein

170

00:11:09,010 --> 00:11:06,200

would have to keep endeavour in position

171

00:11:13,680 --> 00:11:09,020

beneath Intel set for as long as it took

172

00:11:19,810 --> 00:11:17,290

awaiting good sun angles now to begin

173

00:11:22,600 --> 00:11:19,820

maneuvering peer through it on the end

174

00:11:26,530 --> 00:11:22,610

of the robot arm into the tail end of

175

00:11:28,660 --> 00:11:26,540

the satellite yet despite the planning

176

00:11:50,070 --> 00:11:28,670

and coordination between ground and

177

00:12:21,090 --> 00:11:52,330

during the five and a half hour

178

00:12:26,020 --> 00:12:23,740

problems arose when the trigger release

179

00:12:28,840 --> 00:12:26,030

on the grapple bar failed to snap into

180

00:12:44,500 --> 00:12:28,850

place due to the delicate equilibrium of

181

00:12:48,880 --> 00:12:44,510

the orbiting satellite the situation was

182

00:12:51,130 --> 00:12:48,890

becoming increasingly frustrating after

183

00:12:52,870 --> 00:12:51,140

the second attempt through it noted a

184

00:12:54,910 --> 00:12:52,880

wide margin of difference between

185

00:12:57,910 --> 00:12:54,920

performing the capture and NASA's

186

00:13:02,020 --> 00:12:57,920

microgravity simulators and actually

187

00:13:04,960 --> 00:13:02,030

trying it in space because of brandon

188

00:13:07,420 --> 00:13:04,970

Stein's piloting skills and frugal use

189

00:13:10,560 --> 00:13:07,430

of fuel on the second attempt enough

190

00:13:13,360 --> 00:13:10,570

fuel remained for one more rendezvous

191

00:13:15,240 --> 00:13:13,370

and Dan we've been looking at the prop

192

00:13:17,050 --> 00:13:15,250

just want to tell you that your

193

00:13:19,960 --> 00:13:17,060

formation flying there has been

194

00:13:22,540 --> 00:13:19,970

outstanding we've had practically no

195

00:13:25,570 --> 00:13:22,550

four proper uses you don't find job

196

00:13:28,510 --> 00:13:25,580

you're doing a third attempt was

197

00:13:39,220 --> 00:13:28,520

immediately approved but a replanting of

198

00:13:41,890 --> 00:13:39,230

strategy was clearly necessary period no

199

00:13:48,280 --> 00:13:41,900

EBA for tomorrow we're gonna rendezvous

200

00:13:51,610 --> 00:13:48,290

with Intel set on day seven stabilized

201
00:13:54,550 --> 00:13:51,620
he's been human intelligence was

202
00:13:58,590 --> 00:13:54,560
endeavour strongest ally and ingenuity

203
00:14:01,990 --> 00:13:58,600
and adaptability were crucial to success

204
00:14:04,480 --> 00:14:02,000
the hours that followed were a maze of

205
00:14:07,960 --> 00:14:04,490
brainstorming sessions and hands-on

206
00:14:10,630 --> 00:14:07,970
tests for veterans of the space program

207
00:14:14,380 --> 00:14:10,640
the level of activity was reminiscent of

208
00:14:16,780 --> 00:14:14,390
the early days of Gemini and Apollo the

209
00:14:18,730 --> 00:14:16,790
tiger team a group of troubleshooting

210
00:14:25,800 --> 00:14:18,740
specialists discussed the options

211
00:14:31,620 --> 00:14:28,010
where do you want to put all your eggs

212
00:14:35,190 --> 00:14:31,630
among the ideas suggested a revised

213
00:14:39,510 --> 00:14:35,200

two-man space walk to capture and repair

214

00:14:42,269 --> 00:14:39,520

the satellite engineers also discussed

215

00:14:43,769 --> 00:14:42,279

using the orbiters robot arm to maneuver

216

00:14:47,120 --> 00:14:43,779

a crew member to the top of the

217

00:14:49,920 --> 00:14:47,130

satellite and capture it from there

218

00:14:53,070 --> 00:14:49,930

meanwhile the crew came up with a simple

219

00:14:56,220 --> 00:14:53,080

yet revolutionary plan a record-setting

220

00:14:59,280 --> 00:14:56,230

three-man spacewalk of first in the

221

00:15:01,920 --> 00:14:59,290

history of the space program the crew

222

00:15:04,110 --> 00:15:01,930

downlinked a sketch photographed on the

223

00:15:06,780 --> 00:15:04,120

electronic still camera developed by

224

00:15:10,920 --> 00:15:06,790

Johnson Space Center to demonstrate

225

00:15:12,600 --> 00:15:10,930

their plan to Mission Control three

226

00:15:15,000 --> 00:15:12,610

astronauts through it

227

00:15:29,960 --> 00:15:15,010

he band Akers would attempt to capture

228

00:15:36,660 --> 00:15:34,350

safety was a primary concern piloting

229

00:15:38,520 --> 00:15:36,670

had to be exact to ensure there would be

230

00:15:42,210 --> 00:15:38,530

no risk of a collision between the

231

00:15:46,140 --> 00:15:42,220

satellite and the orbiter every possible

232

00:15:48,150 --> 00:15:46,150

danger was assessed so the three crew

233

00:15:50,370 --> 00:15:48,160

members will be putting on their suits

234

00:15:52,020 --> 00:15:50,380

and climbing into the airlock along with

235

00:15:54,329 --> 00:15:52,030

all of their tools and equipment that

236

00:15:56,280 --> 00:15:54,339

will be necessary for tomorrow's

237

00:15:59,370 --> 00:15:56,290

spacewalk attempt to capture the antal

238

00:16:01,380 --> 00:15:59,380

sad spacecraft in addition there was

239

00:16:04,980 --> 00:16:01,390

some concern as to whether the three

240

00:16:07,350 --> 00:16:04,990

astronauts could fit into the airlock so

241

00:16:11,060 --> 00:16:07,360

before the plan was approved it was

242

00:16:14,250 --> 00:16:11,070

tested in the orbiter and on the ground

243

00:16:17,010 --> 00:16:14,260

dozens of Engineers astronauts and other

244

00:16:19,860 --> 00:16:17,020

specialists debated and tested the plan

245

00:16:22,079 --> 00:16:19,870

by using mock-ups of Intel sat in the

246

00:16:26,210 --> 00:16:22,089

under water tank with astronaut story

247

00:16:28,710 --> 00:16:26,220

Musgrave rich Clifford and Jim Voss

248

00:16:35,810 --> 00:16:28,720

similar mock-up demonstrations were

249

00:16:42,030 --> 00:16:40,590

and presented the plan and I think we've

250

00:16:44,520 --> 00:16:42,040

got something that is gonna pull

251
00:16:47,490 --> 00:16:44,530
together here the go-ahead was given

252
00:16:54,620 --> 00:16:47,500
Tuesday night the third and final

253
00:16:59,750 --> 00:16:57,620
good evening friends a high drama is

254
00:17:02,450 --> 00:16:59,760
being played out in space right now a

255
00:17:05,630 --> 00:17:02,460
risky rescue attempt an unprecedented

256
00:17:08,569 --> 00:17:05,640
mission while the astronauts work 225

257
00:17:10,850 --> 00:17:08,579
miles above the earth Americans kept an

258
00:17:16,370 --> 00:17:10,860
ear to their radios and an eye on their

259
00:17:18,410 --> 00:17:16,380
televisions for the latest news the

260
00:17:20,660 --> 00:17:18,420
drama and many were eagerly offering

261
00:17:24,110 --> 00:17:20,670
their own suggestions on how to capture

262
00:17:26,420 --> 00:17:24,120
the stranded satellite velcro fishing

263
00:17:30,760 --> 00:17:26,430

hooks and lassos were some of the

264

00:17:33,080 --> 00:17:30,770

methods suggested Wednesday May 13th

265

00:17:35,120 --> 00:17:33,090

brandenstein and Chilton began

266

00:17:38,270 --> 00:17:35,130

maneuvering the orbiter closer to the

267

00:17:40,550 --> 00:17:38,280

satellite 12 miles behind the satellite

268

00:17:42,860 --> 00:17:40,560

as they approach the most critical burn

269

00:17:46,970 --> 00:17:42,870

of the rendezvous they discovered a

270

00:17:49,910 --> 00:17:46,980

previously unencoded evers computers at

271

00:17:52,400 --> 00:17:49,920

the same time a thunderstorm over a

272

00:17:54,200 --> 00:17:52,410

ground communication site caused the

273

00:17:57,980 --> 00:17:54,210

crew to lose contact with Mission

274

00:18:00,860 --> 00:17:57,990

Control the computer problem on board

275

00:18:02,990 --> 00:18:00,870

endeavour meant brandenstein and Chilton

276

00:18:07,310 --> 00:18:03,000

would not be able to compute the final

277

00:18:09,770 --> 00:18:07,320

critical rendezvous burns ground control

278

00:18:12,190 --> 00:18:09,780

studied the problem with only minutes to

279

00:18:16,190 --> 00:18:12,200

decide to continue the rendezvous or

280

00:18:18,620 --> 00:18:16,200

delay for one orbit another option was

281

00:18:30,560 --> 00:18:18,630

to skip today's attempt and study the

282

00:18:32,960 --> 00:18:30,570

problem for another day or should they

283

00:18:35,300 --> 00:18:32,970

try it without the onboard computer and

284

00:18:37,640 --> 00:18:35,310

attempt a ground controlled approach to

285

00:18:40,040 --> 00:18:37,650

the satellite this type of approach

286

00:18:42,170 --> 00:18:40,050

meant that data normally collected by

287

00:18:45,020 --> 00:18:42,180

the shuttles computer would need to be

288

00:18:48,860 --> 00:18:45,030

calculated on the ground and relayed up

289

00:18:51,110 --> 00:18:48,870

to the crew with only 45 seconds until

290

00:18:54,680 --> 00:18:51,120

the burn and Deborah regained

291

00:18:59,960 --> 00:18:54,690

communications with Houston the decision

292

00:19:02,270 --> 00:18:59,970

was to delay food and acres were

293

00:19:04,730 --> 00:19:02,280

already in the airlock and waited

294

00:19:08,340 --> 00:19:04,740

another hour and a half in their cramped

295

00:19:11,730 --> 00:19:08,350

quarters precious fuel had

296

00:19:13,350 --> 00:19:11,740

used to execute the delay maneuver now

297

00:19:16,799 --> 00:19:13,360

more than ever

298

00:19:21,419 --> 00:19:16,809

brandenstein must fly a perfect final

299

00:19:26,580 --> 00:19:21,429

approach he accomplishes this with fuel

300

00:19:29,880 --> 00:19:26,590

to spare an anxious nation held its

301
00:19:35,630 --> 00:19:29,890
breath as lured he banned acres left the

302
00:19:38,900 --> 00:19:35,640
airlock out in the payload Bay three

303
00:19:42,539 --> 00:19:38,910
spacewalking astronauts are preparing to

304
00:19:47,149 --> 00:19:42,549
install the bottom plane of the assembly

305
00:19:52,320 --> 00:19:49,860
after building a bridge structure across

306
00:19:54,510 --> 00:19:52,330
the payload Bay using struts from the

307
00:19:55,350 --> 00:19:54,520
space station tests and portable foot

308
00:19:57,870 --> 00:19:55,360
restraints

309
00:20:00,600 --> 00:19:57,880
the trio positioned themselves for the

310
00:20:03,930 --> 00:20:00,610
capture on the edge of the payload

311
00:20:07,909 --> 00:20:03,940
Bay and acres on the struts spanning the

312
00:20:10,470 --> 00:20:07,919
payload Bay threw it on the robot arm

313
00:20:13,620 --> 00:20:10,480

adjusted his movements in coordination

314

00:20:16,080 --> 00:20:13,630

with the satellite meanwhile

315

00:20:17,940 --> 00:20:16,090

brandenstein positioned the crew at eye

316

00:20:21,330 --> 00:20:17,950

level with the underside of the

317

00:20:46,380 --> 00:20:21,340

satellite in this attempt every detail

318

00:20:58,529 --> 00:20:46,390

had to be exact really really close to

319

00:21:35,340 --> 00:20:58,539

this and as the saying goes the third

320

00:21:41,560 --> 00:21:39,850

indeed it wasn't over yet but with the

321

00:21:44,470 --> 00:21:41,570

most difficult part of the mission

322

00:21:48,730 --> 00:21:44,480

behind them things could now proceed as

323

00:21:51,399 --> 00:21:48,740

planned after rotating the massive

324

00:21:54,940 --> 00:21:51,409

satellite food and he attached the

325

00:21:56,980 --> 00:21:54,950

capture bar once in place

326
00:22:00,610 --> 00:21:56,990
Melnik maneuvered through it under the

327
00:22:03,100 --> 00:22:00,620
satellite to tighten the bar to do this

328
00:22:05,769 --> 00:22:03,110
Melnik had to move the robot arm with

329
00:22:08,620 --> 00:22:05,779
threw it's still attached extremely close

330
00:22:11,769 --> 00:22:08,630
to the orbiter and truss structure this

331
00:22:17,110 --> 00:22:11,779
unexpected task was not part of the pre

332
00:22:19,389 --> 00:22:17,120
mission training once Melnik used the

333
00:22:22,570 --> 00:22:19,399
robot arm to lower the satellite into

334
00:22:26,169 --> 00:22:22,580
the cargo bay a new booster rocket was

335
00:22:28,990 --> 00:22:26,179
secured when it was all over another

336
00:22:31,180 --> 00:22:29,000
record had been set for the longest

337
00:22:37,269 --> 00:22:31,190
spacewalk in the history of the space

338
00:22:40,299 --> 00:22:37,279

program 8 hours and 29 minutes with the

339

00:22:56,100 --> 00:22:40,309

crew safely inside the airlock again the

340

00:23:00,820 --> 00:22:58,509

however the onboard wiring

341

00:23:02,979 --> 00:23:00,830

configurations on the new orbiter were

342

00:23:06,070 --> 00:23:02,989

different than anticipated by the ground

343

00:23:30,310 --> 00:23:06,080

staff so some minor readjustments were

344

00:23:33,129 --> 00:23:30,320

required by a ground support after two

345

00:23:35,190 --> 00:23:33,139

attempts to deploy ground controllers

346

00:23:37,180 --> 00:23:35,200

sorted out the wiring change

347

00:23:40,239 --> 00:23:37,190

communicated the correct switch

348

00:23:43,119 --> 00:23:40,249

positions to the orbiter and int'l sat

349

00:23:49,479 --> 00:23:43,129

six was on its way to its intended orbit

350

00:23:53,499 --> 00:23:49,489

of 22,300 miles but endeavours work was

351
00:23:55,869 --> 00:23:53,509
yet to be completed mission managers

352
00:23:58,749 --> 00:23:55,879
decided to extend the mission an extra

353
00:24:01,479 --> 00:23:58,759
day allowing for a fourth spacewalk on

354
00:24:05,590 --> 00:24:01,489
Thursday to practice the space station

355
00:24:07,869 --> 00:24:05,600
assembly techniques the crew had

356
00:24:09,330 --> 00:24:07,879
originally planned two days for these

357
00:24:11,919 --> 00:24:09,340
spacewalks

358
00:24:13,930 --> 00:24:11,929
but since the space station test

359
00:24:16,239 --> 00:24:13,940
structure had been partially built for

360
00:24:18,340 --> 00:24:16,249
the satellite rescue attempt they were

361
00:24:25,899 --> 00:24:18,350
able to incorporate most of the

362
00:24:27,460 --> 00:24:25,909
activities of two days into one just so

363
00:24:34,210 --> 00:24:27,470

you know the game plan for the day it's

364

00:24:37,149 --> 00:24:34,220

another day another EBA on Thursday

365

00:24:43,349 --> 00:24:37,159

first attention attention the nation was

366

00:24:46,239 --> 00:24:43,359

again in on the payload a with the Vav

367

00:24:48,299 --> 00:24:46,249

Cathy endeavour set the rule of endeavor

368

00:24:54,909 --> 00:24:48,309

space erection the his most facial

369

00:24:57,070 --> 00:24:54,919

NASA's history the pair spent ratings

370

00:24:58,830 --> 00:24:57,080

that used to be during Space Station

371

00:25:01,800 --> 00:24:58,840

functions bruckman may have

372

00:25:03,470 --> 00:25:01,810

maintenance however however this is

373

00:25:06,720 --> 00:25:03,480

spacewalk was not without its

374

00:25:09,450 --> 00:25:06,730

obligations when the crew members unit

375

00:25:12,750 --> 00:25:09,460

members here a footprint roses body body

376

00:25:15,420 --> 00:25:12,760

position time required to quantitate

377

00:25:20,370 --> 00:25:15,430

space was very close the time required

378

00:25:23,960 --> 00:25:20,380

in water tank but briefly precise pretty

379

00:25:26,670 --> 00:25:23,970

much more difficult and time-consuming

380

00:25:28,620 --> 00:25:26,680

mission planners will use the lessons

381

00:25:30,690 --> 00:25:28,630

learned during the four spacewalks

382

00:25:33,210 --> 00:25:30,700

to increase the efficiency training

383

00:25:35,400 --> 00:25:33,220

frantic and technique be used in the

384

00:25:56,430 --> 00:25:35,410

assembly assembly of Space Station

385

00:26:02,920 --> 00:26:00,490

like endeavour Houston good morning the

386

00:26:05,380 --> 00:26:02,930

sts-49 trainers send Dan and his

387

00:26:06,730 --> 00:26:05,390

spacefaring crew their best for making

388

00:26:09,220 --> 00:26:06,740

the maiden voyage of Endeavour a

389

00:26:10,900 --> 00:26:09,230

spectacular success they wish you well

390

00:26:23,950 --> 00:26:10,910

as you start preparing to come home to

391

00:26:25,530 --> 00:26:23,960

port and ever and it's cruise sailed

392

00:26:28,090 --> 00:26:25,540

into the ninth day of the mission

393

00:26:32,440 --> 00:26:28,100

preparing the orbiter systems for the

394

00:26:35,110 --> 00:26:32,450

trip home the next day it was a day for

395

00:26:37,930 --> 00:26:35,120

reflection as the crew held a news

396

00:26:39,580 --> 00:26:37,940

conference from the orbiter we were

397

00:26:54,160 --> 00:26:39,590

speculating how many people were

398

00:26:57,610 --> 00:26:54,170

involved we knew it was a lot worked and

399

00:27:07,900 --> 00:26:57,620

came up fine to some of our ideas with

400

00:27:10,600 --> 00:27:07,910

theirs and NASA has a great team with

401
00:27:16,950 --> 00:27:10,610
the mission objectives behind them the

402
00:27:19,390 --> 00:27:16,960
crew prepared the orbiter for reentry in

403
00:27:36,639 --> 00:27:19,400
Debra Houston you have a go for the

404
00:27:46,220 --> 00:27:39,289
but before putting this mission in the

405
00:27:48,349 --> 00:27:46,230
books endeavour had one more test after

406
00:27:51,409 --> 00:27:48,359
touchdown at Edwards Air Force Base in

407
00:27:54,440 --> 00:27:51,419
California a drag chute was deployed

408
00:27:56,869 --> 00:27:54,450
from the back of the orbiter Engineers

409
00:27:59,979 --> 00:27:56,879
designed the chute to improve braking

410
00:28:03,169 --> 00:27:59,989
and steering control during landings

411
00:28:05,239 --> 00:28:03,179
long after endeavour has been rolled off

412
00:28:08,359 --> 00:28:05,249
the runway in preparation for another

413
00:28:10,940 --> 00:28:08,369

mission planners and engineers will use

414

00:28:15,919 --> 00:28:10,950

the information and knowledge gained on

415

00:28:19,190 --> 00:28:15,929

this flight to improve future flights in

416

00:28:23,779 --> 00:28:19,200

hindsight most agree the reasons for

417

00:28:26,269 --> 00:28:23,789

mission success were clear despite the

418

00:28:31,940 --> 00:28:26,279

problems often associated with a maiden

419

00:28:33,499 --> 00:28:31,950

voyage endeavour performed flawlessly we

420

00:28:36,349 --> 00:28:33,509

felt pretty good about the mission that

421

00:28:38,239 --> 00:28:36,359

real interesting and challenging and and

422

00:28:40,489 --> 00:28:38,249

we're real happy with the way endeavour

423

00:28:41,989 --> 00:28:40,499

performed it performed like a real champ

424

00:28:45,139 --> 00:28:41,999

which is phenomenal for the first five

425

00:28:48,109 --> 00:28:45,149

new vehicle perhaps the simplest

426

00:28:52,099 --> 00:28:48,119

explanation for this mission success is

427

00:28:54,580 --> 00:28:52,109

the team effort the ability to adapt and

428

00:28:57,440 --> 00:28:54,590

learn in the face of adversity

429

00:29:02,029 --> 00:28:57,450

demonstrated by both the crew and ground

430

00:29:05,509 --> 00:29:02,039

staff proof that people are a vital link