1
00:00:13,110 --> 00:00:11,350
good afternoon and welcome to the sts 57

2
00:00:14,950 --> 00:00:13,120
post flight press conference this

3
00:00:16,710 --> 00:00:14,960
afternoon the crew is with us to talk

4
00:00:18,470 --> 00:00:16,720
about the eureka retrieve

5
00:00:20,070 --> 00:00:18,480
and the first flight of the space hab

6
00:00:22,470 --> 00:00:20,080
experiments module

7
00:00:23,349 --> 00:00:22,480
plus other experiments on board the

8
00:00:26,150 --> 00:00:23,359
flight

9
00:00:26,790 --> 00:00:26,160
and to my right is the crew commander

10
00:00:30,870 --> 00:00:26,800
colonel

11
00:00:32,630 --> 00:00:30,880
like to introduce him and turn the

12
00:00:34,310 --> 00:00:32,640
program over to him ron

13
00:00:36,470 --> 00:00:34,320

thanks very much barbara we're delighted

14
00:00:38,470 --> 00:00:36,480
that you all be here with us

15
00:00:40,389 --> 00:00:38,480
so we can share the highlights of the

16
00:00:41,910 --> 00:00:40,399
flight it was a great flight and we're

17
00:00:42,549 --> 00:00:41,920
certainly interested in telling you all

18
00:00:44,630 --> 00:00:42,559
about it

19
00:00:46,950 --> 00:00:44,640
let me introduce the rest of the crew to

20
00:00:47,510 --> 00:00:46,960
my right is brian duffy brian was making

21
00:00:51,110 --> 00:00:47,520
his

22
00:00:53,189 --> 00:00:51,120
second flight on sts-57 he was our pilot

23
00:00:54,229 --> 00:00:53,199
he was the member of the three-man

24
00:00:56,470 --> 00:00:54,239
three-person

25
00:00:58,069 --> 00:00:56,480
orbiter crew along with myself and the

26
00:01:00,389 --> 00:00:58,079
flight engineer

27
00:01:01,110 --> 00:01:00,399
brian also orchestrated the eva for us

28
00:01:05,830 --> 00:01:01,120
he

29
00:01:07,429 --> 00:01:05,840
rendezvous flight plan as well

30
00:01:09,590 --> 00:01:07,439
and he participated in a number of the

31
00:01:12,870 --> 00:01:09,600
space hub experiments

32
00:01:14,550 --> 00:01:12,880
to brian's right is david lowe david was

33
00:01:16,469 --> 00:01:14,560
the payload commander that means that on

34
00:01:18,390 --> 00:01:16,479
this flight he had prime responsibility

35
00:01:20,390 --> 00:01:18,400
for integrating the spacehab module

36
00:01:22,469 --> 00:01:20,400
as being the first flight of spacehab

37
00:01:24,469 --> 00:01:22,479
that took quite a bit of his time

38
00:01:25,830 --> 00:01:24,479

he was also one of our two eva

39
00:01:27,429 --> 00:01:25,840
crewmembers

40
00:01:29,350 --> 00:01:27,439
in addition to that he was the prime

41
00:01:31,270 --> 00:01:29,360
operator for the rms during the eureka

42
00:01:33,270 --> 00:01:31,280
retrieve so as you can see he had a full

43
00:01:36,390 --> 00:01:33,280
plate on this mission as well

44
00:01:36,950 --> 00:01:36,400
to david's right is nancy sherlock nancy

45
00:01:39,109 --> 00:01:36,960
was our

46
00:01:40,710 --> 00:01:39,119
ms2 our flight engineer she was the

47
00:01:42,630 --> 00:01:40,720
third member of the orbiter

48
00:01:44,310 --> 00:01:42,640
team for ascent and entry along with

49
00:01:46,550 --> 00:01:44,320
brian and myself

50
00:01:48,630 --> 00:01:46,560
nancy was the prime rms operator during

51
00:01:49,350 --> 00:01:48,640
the eva so it was a very busy day for

52
00:01:50,630 --> 00:01:49,360
her

53
00:01:52,069 --> 00:01:50,640
and nancy had a great deal of

54
00:01:55,830 --> 00:01:52,079
participation in the spacehead

55
00:01:58,630 --> 00:01:55,840
experiments as well on nancy's right

56
00:02:00,310 --> 00:01:58,640
is jeff weisoff jeff was also making his

57
00:02:03,030 --> 00:02:00,320
first flight along with nancy

58
00:02:04,550 --> 00:02:03,040
uh jeff was the rendezvous mission

59
00:02:06,789 --> 00:02:04,560
specialist for this flight along with

60
00:02:08,630 --> 00:02:06,799
brian and myself he was responsible for

61
00:02:10,150 --> 00:02:08,640
ensuring that the rendezvous profile was

62
00:02:11,190 --> 00:02:10,160
was properly executed

63
00:02:13,589 --> 00:02:11,200

and he had some particular

64
00:02:14,229 --> 00:02:13,599
responsibilities regarding that as we

65
00:02:16,790 --> 00:02:14,239
closed in

66
00:02:18,790 --> 00:02:16,800
to eureka in the final stages jeff was

67
00:02:20,070 --> 00:02:18,800
the second member of the eva team along

68
00:02:21,589 --> 00:02:20,080
with david

69
00:02:23,430 --> 00:02:21,599
jeff had a great deal of interaction

70
00:02:24,229 --> 00:02:23,440
with the space have experiments and he

71
00:02:25,750 --> 00:02:24,239
had a

72
00:02:27,589 --> 00:02:25,760
couple of other experiments that

73
00:02:29,430 --> 00:02:27,599
required his attention as well including

74
00:02:32,309 --> 00:02:29,440
shoot and fair which we'll talk about

75
00:02:33,509 --> 00:02:32,319
a little bit later to jeff's right is

76
00:02:35,110 --> 00:02:33,519
janice boss

77
00:02:38,070 --> 00:02:35,120
janice always gets to get introduced

78
00:02:39,990 --> 00:02:38,080
last but that's by no means least she's

79
00:02:41,670 --> 00:02:40,000
the person who had more than anyone else

80
00:02:43,110 --> 00:02:41,680
to do with the successful

81
00:02:44,710 --> 00:02:43,120
implementation of the space app

82
00:02:46,229 --> 00:02:44,720
experiment procedures on this flight she

83
00:02:47,589 --> 00:02:46,239
really did the lion's share of the work

84
00:02:49,030 --> 00:02:47,599
back in spacehab

85
00:02:51,030 --> 00:02:49,040
in addition to that we integrated her

86
00:02:51,830 --> 00:02:51,040
into the rendezvous profile and janus

87
00:02:54,949 --> 00:02:51,840
was the backup

88
00:02:56,309 --> 00:02:54,959

rms operator during the eva so as you

89
00:02:58,149 --> 00:02:56,319
can see it was a full flight

90
00:02:59,910 --> 00:02:58,159
and and everyone on the crew had a great

91
00:03:00,949 --> 00:02:59,920
deal going on during the the course of

92
00:03:03,030 --> 00:03:00,959
the ten day mission

93
00:03:04,630 --> 00:03:03,040
what we'd like to do with you today is

94
00:03:06,630 --> 00:03:04,640
first show you a film that'll cover the

95
00:03:09,670 --> 00:03:06,640
highlights or some of the highlights

96
00:03:10,390 --> 00:03:09,680
of the sts-57 flight and then after that

97
00:03:13,030 --> 00:03:10,400
we'll

98
00:03:14,470 --> 00:03:13,040
switch medium to uh slides and at the

99
00:03:15,990 --> 00:03:14,480
end of that we'll have about a 20-minute

100
00:03:21,270 --> 00:03:16,000
question answer period

101
00:03:25,509 --> 00:03:23,750
this is our crew patch i'm sure it's

102
00:03:27,350 --> 00:03:25,519
familiar to most of you

103
00:03:29,110 --> 00:03:27,360
here we are the night before launch we

104
00:03:30,789 --> 00:03:29,120
actually had one dry run or dress

105
00:03:32,390 --> 00:03:30,799
rehearsal the day prior to launch the

106
00:03:36,550 --> 00:03:32,400
weather wasn't quite good enough

107
00:03:41,110 --> 00:03:39,830
this is a beautiful sight here we are in

108
00:03:42,710 --> 00:03:41,120
the suit-up room on the morning of

109
00:03:43,830 --> 00:03:42,720
launch here i am adjusting my

110
00:03:49,110 --> 00:03:43,840
microphones

111
00:03:53,670 --> 00:03:51,670
next g david everyone you can see is is

112
00:03:56,949 --> 00:03:53,680
really anxious to go

113
00:03:58,869 --> 00:03:56,959

here's nancy you see a little hello here

114
00:04:04,390 --> 00:03:58,879
to uh to her daughter

115
00:04:08,710 --> 00:04:06,390
as is janice very eager to get on with

116
00:04:12,710 --> 00:04:11,190
once our suits were all checked out and

117
00:04:13,990 --> 00:04:12,720
confirmed that they were all operational

118
00:04:16,469 --> 00:04:14,000
we headed out

119
00:04:17,349 --> 00:04:16,479
to the pad this is always a fun time you

120
00:04:19,349 --> 00:04:17,359
go out you know you're

121
00:04:20,710 --> 00:04:19,359
always going to be greeted by a lot of

122
00:04:22,950 --> 00:04:20,720
folks at the end

123
00:04:24,790 --> 00:04:22,960
at the end of the ramp there people that

124
00:04:27,430 --> 00:04:24,800
you're friends with

125
00:04:29,030 --> 00:04:27,440
a few hours later we get when it's time

126
00:04:30,230 --> 00:04:29,040
to go to work the uh of course the main

127
00:04:31,990 --> 00:04:30,240
engines start

128
00:04:39,270 --> 00:04:32,000
and the the boosters light and the

129
00:04:42,469 --> 00:04:40,870
the roll program for us this time was

130
00:04:44,150 --> 00:04:42,479
nice and smooth we had a cloud that was

131
00:04:49,030 --> 00:04:44,160
nearby you'll see us going uh

132
00:04:52,790 --> 00:04:51,270
went right by the edge of it ron and i

133
00:04:55,590 --> 00:04:52,800
had been sitting there looking

134
00:04:56,150 --> 00:04:55,600
i had it for quite a while it was it had

135
00:04:58,230 --> 00:04:56,160
just

136
00:05:02,629 --> 00:04:58,240
moved left and right over the pad that

137
00:05:05,909 --> 00:05:04,230
shortly after takeoff you can see the

138
00:05:08,070 --> 00:05:05,919

shock wave here on the vehicle

139
00:05:09,430 --> 00:05:08,080
janice and i uh rode on the mid deck and

140
00:05:11,110 --> 00:05:09,440
the two events you really feel other

141
00:05:13,189 --> 00:05:11,120
than other than the initial takeoff is

142
00:05:13,990 --> 00:05:13,199
when the srvs separate after about two

143
00:05:16,390 --> 00:05:14,000
minutes

144
00:05:17,909 --> 00:05:16,400
uh we can feel and hear the sound of

145
00:05:19,270 --> 00:05:17,919
that separation

146
00:05:20,950 --> 00:05:19,280
and then we go for another six and a

147
00:05:24,150 --> 00:05:20,960
half minutes on the main engines

148
00:05:25,670 --> 00:05:24,160
and one of my real great pleasures was

149
00:05:27,510 --> 00:05:25,680
my first sight of the earth when i got

150
00:05:29,510 --> 00:05:27,520
to go up to the flight deck to

151
00:05:30,629 --> 00:05:29,520
participate in the external tank dto

152
00:05:32,790 --> 00:05:30,639
photography

153
00:05:33,990 --> 00:05:32,800
i handed david a camcorder and he took

154
00:05:35,670 --> 00:05:34,000
these great pictures of the tank

155
00:05:43,350 --> 00:05:35,680
floating away and i was using an f4 to

156
00:05:47,110 --> 00:05:44,950
shortly after we arrive on orbit we

157
00:05:49,029 --> 00:05:47,120
begin configuring the orbit

158
00:05:50,950 --> 00:05:49,039
orbiter for orbit operations this is me

159
00:05:52,870 --> 00:05:50,960
opening up the payload bay doors and

160
00:05:55,110 --> 00:05:52,880
brian is taking film footage of the door

161
00:05:58,070 --> 00:05:55,120
opening which we then later downlinked

162
00:05:59,749 --> 00:05:58,080
and for me personally as those doors

163
00:06:01,990 --> 00:05:59,759

open and i got my first glimpse of the

164
00:06:04,469 --> 00:06:02,000
earth from 250 miles was just absolutely

165
00:06:06,230 --> 00:06:04,479
spectacular

166
00:06:07,990 --> 00:06:06,240
this is a view of the eureka satellite

167
00:06:09,510 --> 00:06:08,000
as we're closing in on flight day four

168
00:06:10,950 --> 00:06:09,520
it's actually sped up a little bit but

169
00:06:12,870 --> 00:06:10,960
it gives you an idea of what eureka

170
00:06:14,710 --> 00:06:12,880
looked to us

171
00:06:16,390 --> 00:06:14,720
uh actually it's coming down almost

172
00:06:18,230 --> 00:06:16,400
immediately overhead janice's vantage

173
00:06:19,670 --> 00:06:18,240
point as she was back in the space hub

174
00:06:21,590 --> 00:06:19,680
here we are on the flight deck and you

175
00:06:23,270 --> 00:06:21,600
can see there's a lot of activity going

176
00:06:25,270 --> 00:06:23,280
on in this time frame this is all just

177
00:06:27,029 --> 00:06:25,280
prior to grapple with eureka

178
00:06:28,150 --> 00:06:27,039
as ron mentioned while the other five

179
00:06:29,749 --> 00:06:28,160
members of the crew were up on the

180
00:06:30,950 --> 00:06:29,759
flight deck i was using the space have

181
00:06:32,950 --> 00:06:30,960
overhead window

182
00:06:34,629 --> 00:06:32,960
to look through a night vision system

183
00:06:35,430 --> 00:06:34,639
and the laser ranger you see me taking

184
00:06:37,029 --> 00:06:35,440
out there

185
00:06:38,790 --> 00:06:37,039
to help support the rendezvous with

186
00:06:40,469 --> 00:06:38,800
range and rage rate data

187
00:06:42,390 --> 00:06:40,479
this is the view that i had of eureka as

188
00:06:43,350 --> 00:06:42,400

ron was doing the fly around to get the

189
00:06:45,749 --> 00:06:43,360
grapple fixture

190
00:06:46,870 --> 00:06:45,759
poised for david's activity you can see

191
00:06:48,550 --> 00:06:46,880
david here

192
00:06:49,749 --> 00:06:48,560
looking at the monitors to make sure

193
00:06:51,110 --> 00:06:49,759
everything's ready for him to grab a

194
00:06:51,830 --> 00:06:51,120
hold of the reek and put it back in the

195
00:06:54,950 --> 00:06:51,840
bay

196
00:06:56,550 --> 00:06:54,960
as ron is doing the fly around

197
00:06:57,990 --> 00:06:56,560
and this is the view again out of the

198
00:07:00,469 --> 00:06:58,000
the d camera you can see the

199
00:07:01,990 --> 00:07:00,479
rms coming in in the right hand portion

200
00:07:03,749 --> 00:07:02,000
of your picture there

201
00:07:06,070 --> 00:07:03,759
the payload was very very stable that's

202
00:07:07,670 --> 00:07:06,080
a tribute to both ron's flying

203
00:07:09,350 --> 00:07:07,680
capabilities and and also just how

204
00:07:10,629 --> 00:07:09,360
stable the payload was it was rock solid

205
00:07:12,710 --> 00:07:10,639
there

206
00:07:14,790 --> 00:07:12,720
which is from from an rms point of view

207
00:07:16,150 --> 00:07:14,800
that's a great sight to see

208
00:07:18,070 --> 00:07:16,160
coming in here this is just prior to

209
00:07:19,189 --> 00:07:18,080
grapple in fact i think uh grapple's

210
00:07:21,270 --> 00:07:19,199
about right there

211
00:07:22,469 --> 00:07:21,280
and now it's being uh the end effector

212
00:07:25,110 --> 00:07:22,479
the snares are actually pulling

213
00:07:26,950 --> 00:07:25,120

the payload into the end effector there

214
00:07:29,589 --> 00:07:26,960
this is a

215
00:07:30,790 --> 00:07:29,599
an a camera view right now um this i

216
00:07:31,909 --> 00:07:30,800
don't know how many minutes later it was

217
00:07:35,110 --> 00:07:31,919
we were already over in the

218
00:07:37,029 --> 00:07:35,120
post-capture position um and so

219
00:07:38,550 --> 00:07:37,039
the the payload is pretty stable there

220
00:07:39,749 --> 00:07:38,560
what you can see uh in the background

221
00:07:41,350 --> 00:07:39,759
there we're just coming across the west

222
00:07:43,430 --> 00:07:41,360
coast united states

223
00:07:45,749 --> 00:07:43,440
um you can see the la basin down there

224
00:07:48,869 --> 00:07:45,759
with the with the clouds right there

225
00:07:50,150 --> 00:07:48,879
and coming up into view right now about

226
00:07:51,990 --> 00:07:50,160
middle of the picture is the

227
00:07:53,589 --> 00:07:52,000
the high desert area of california and

228
00:07:55,189 --> 00:07:53,599
edwards air force base is just up beyond

229
00:07:56,469 --> 00:07:55,199
that

230
00:07:59,990 --> 00:07:56,479
you can see the san joaquin valley up

231
00:08:03,270 --> 00:08:01,350
one of the small problems that we had

232
00:08:05,589 --> 00:08:03,280
during the retrieval was that

233
00:08:06,869 --> 00:08:05,599
the antennas on eureka failed to latch

234
00:08:08,710 --> 00:08:06,879
so we took the opportunity to post

235
00:08:09,110 --> 00:08:08,720
grapple to send down some film footage

236
00:08:10,869 --> 00:08:09,120
of that

237
00:08:12,550 --> 00:08:10,879
so the payload operations center over in

238
00:08:14,790 --> 00:08:12,560

germany could take a look at that

239
00:08:16,390 --> 00:08:14,800
and then once everyone was satisfied we

240
00:08:18,790 --> 00:08:16,400
had some good views we began birthing

241
00:08:20,869 --> 00:08:18,800
operations and deactivation of eureka

242
00:08:22,309 --> 00:08:20,879
and this is david operating the robotic

243
00:08:25,350 --> 00:08:22,319
arm manipulating

244
00:08:28,390 --> 00:08:25,360
eureka down into the birth position and

245
00:08:29,270 --> 00:08:28,400
to latch it into the payload bay and we

246
00:08:31,510 --> 00:08:29,280
then began

247
00:08:33,829 --> 00:08:31,520
preparations for the next day's eva

248
00:08:38,230 --> 00:08:33,839
which was to begin with an eba to latch

249
00:08:42,709 --> 00:08:40,230
the birthing sequence itself went very

250
00:08:44,949 --> 00:08:42,719
very smoothly

251
00:08:46,790 --> 00:08:44,959
the next morning as nancy mentioned we

252
00:08:47,670 --> 00:08:46,800
had the plan dva that was flight day

253
00:08:50,550 --> 00:08:47,680
five

254
00:08:52,389 --> 00:08:50,560
and we started out making sure that the

255
00:08:55,190 --> 00:08:52,399
suits were all ready

256
00:08:55,990 --> 00:08:55,200
once we got the the crews into the suits

257
00:08:57,990 --> 00:08:56,000
we actually

258
00:08:59,829 --> 00:08:58,000
brought them into the uh into the mid

259
00:09:00,870 --> 00:08:59,839
deck area from out of the airlock

260
00:09:03,670 --> 00:09:00,880
where they could practice some

261
00:09:05,430 --> 00:09:03,680
translation techniques and also

262
00:09:07,430 --> 00:09:05,440
determine the way in which they wanted

263
00:09:09,190 --> 00:09:07,440

to carry their tools

264
00:09:11,509 --> 00:09:09,200
out for the work that they knew they had

265
00:09:14,310 --> 00:09:11,519
ahead of them

266
00:09:15,829 --> 00:09:14,320
here we see david and jeff you can see

267
00:09:20,230 --> 00:09:15,839
just what tight quarters it is in the

268
00:09:24,070 --> 00:09:22,230
when the four hour pre-breathe was up

269
00:09:24,710 --> 00:09:24,080
david opened the hatch on the tunnel

270
00:09:26,550 --> 00:09:24,720
adapter

271
00:09:28,310 --> 00:09:26,560
and the thermal cover here you can see

272
00:09:32,710 --> 00:09:28,320
him making his initial egress from the

273
00:09:35,590 --> 00:09:34,150
and then there's a shot from inside the

274
00:09:36,070 --> 00:09:35,600
airlock where you can see us positioning

275
00:09:41,110 --> 00:09:36,080
ourselves

276
00:09:46,710 --> 00:09:43,430
this is uh myself positioning to go out

277
00:09:48,150 --> 00:09:46,720
dave's now outside of the hatch

278
00:09:49,350 --> 00:09:48,160
and here i am following him out he's in

279
00:09:56,949 --> 00:09:49,360
the lower left hand corner of the

280
00:10:00,310 --> 00:09:58,870
first task that we had to do was to

281
00:10:01,030 --> 00:10:00,320
basically set up the work site so that

282
00:10:03,670 --> 00:10:01,040
we could go

283
00:10:05,829 --> 00:10:03,680
work on the eureka antennas and jeff

284
00:10:07,430 --> 00:10:05,839
installed a pfr attached device on the

285
00:10:09,030 --> 00:10:07,440
arm and a safety tether and then i came

286
00:10:09,670 --> 00:10:09,040
on over and attached the portable foot

287
00:10:11,750 --> 00:10:09,680
restraint

288
00:10:13,110 --> 00:10:11,760

right there that i was going to step in

289
00:10:17,269 --> 00:10:13,120
and then nancy was going to drive me

290
00:10:20,389 --> 00:10:18,710
all of that is now attached to the end

291
00:10:22,310 --> 00:10:20,399
of the arm to the end effector there and

292
00:10:24,230 --> 00:10:22,320
i'm just about ready to ingress the

293
00:10:25,670 --> 00:10:24,240
portable foot restraint

294
00:10:28,630 --> 00:10:25,680
you can see the arm you're going to see

295
00:10:32,389 --> 00:10:31,269
putting putting some some inputs into

296
00:10:33,829 --> 00:10:32,399
the arm you can see it

297
00:10:35,509 --> 00:10:33,839
it probably moved up to a foot or so and

298
00:10:37,590 --> 00:10:35,519
i think nancy got some some brake slip

299
00:10:46,870 --> 00:10:37,600
messages when both jeff and i ingressed

300
00:10:49,110 --> 00:10:46,880
the portable foot restraint

301
00:10:50,630 --> 00:10:49,120
and then from there nancy uh drove me on

302
00:10:53,829 --> 00:10:50,640
over and positioned me in front of the

303
00:10:55,430 --> 00:10:53,839
eureka the latching into the antennas

304
00:10:57,269 --> 00:10:55,440
uh while eureka was birthed in the

305
00:10:58,389 --> 00:10:57,279
payload bay was one contingency that we

306
00:11:01,030 --> 00:10:58,399
really hadn't trained to

307
00:11:01,910 --> 00:11:01,040
so overnight the rms and eva folks

308
00:11:03,350 --> 00:11:01,920
worked

309
00:11:04,790 --> 00:11:03,360
very hard to send us some good

310
00:11:05,670 --> 00:11:04,800
procedures that they uplinked in the

311
00:11:07,430 --> 00:11:05,680
morning

312
00:11:09,110 --> 00:11:07,440
and that involved manipulating david

313
00:11:10,550 --> 00:11:09,120

over in the middle of the payload bay

314
00:11:12,710 --> 00:11:10,560
and putting him right down between the

315
00:11:14,069 --> 00:11:12,720
shoot payload and the eureka payload to

316
00:11:15,990 --> 00:11:14,079
push on the antenna

317
00:11:17,670 --> 00:11:16,000
we first went to the first antenna which

318
00:11:19,509 --> 00:11:17,680
is the four one here i am

319
00:11:20,710 --> 00:11:19,519
manipulating him back to the aft antenna

320
00:11:22,550 --> 00:11:20,720
and he's going to push

321
00:11:24,710 --> 00:11:22,560
on that antenna while the payload

322
00:11:26,550 --> 00:11:24,720
operations center commanded the latch

323
00:11:28,230 --> 00:11:26,560
jeff was absolutely invaluable to us you

324
00:11:31,030 --> 00:11:28,240
see him over on the side

325
00:11:35,750 --> 00:11:31,040
he was our eyes out in the payload bay

326
00:11:40,630 --> 00:11:38,790
the eureka portion of the eva took just

327
00:11:43,110 --> 00:11:40,640
a little bit less than two hours and

328
00:11:44,150 --> 00:11:43,120
from that point on we pretty much went

329
00:11:46,310 --> 00:11:44,160
into the

330
00:11:47,829 --> 00:11:46,320
what we had planned as far as our dto

331
00:11:49,430 --> 00:11:47,839
was and

332
00:11:50,870 --> 00:11:49,440
that involved three major objectives the

333
00:11:52,629 --> 00:11:50,880
first of which was

334
00:11:54,150 --> 00:11:52,639
what we called mass handling and in this

335
00:11:54,710 --> 00:11:54,160
case i was on the end of the arm and i

336
00:11:57,030 --> 00:11:54,720
was

337
00:11:58,150 --> 00:11:57,040
carrying jeff and we were simulating uh

338
00:12:00,069 --> 00:11:58,160

jeff was just being basically a

339
00:12:02,550 --> 00:12:00,079
500-pound blivet

340
00:12:04,870 --> 00:12:02,560
and i was using jeff to simulate

341
00:12:06,230 --> 00:12:04,880
maneuvering around a large

342
00:12:08,310 --> 00:12:06,240
scientific instrument that we might have

343
00:12:10,069 --> 00:12:08,320
to do on future missions

344
00:12:12,150 --> 00:12:10,079
yeah he was he acted as blithed very

345
00:12:14,949 --> 00:12:12,160
well

346
00:12:15,750 --> 00:12:14,959
um while we were doing this nancy would

347
00:12:17,269 --> 00:12:15,760
um

348
00:12:19,190 --> 00:12:17,279
maneuver me forward and after the

349
00:12:20,470 --> 00:12:19,200
payload bay as well as um up and down

350
00:12:22,150 --> 00:12:20,480
out of the payload bay

351
00:12:25,829 --> 00:12:22,160
and we did this both in vernier and

352
00:12:27,590 --> 00:12:25,839
course rates on the rms and uh

353
00:12:29,910 --> 00:12:27,600
results that i'd like to report are that

354
00:12:30,470 --> 00:12:29,920
uh the the arm is a a very stable

355
00:12:32,230 --> 00:12:30,480
platform

356
00:12:33,990 --> 00:12:32,240
driving around in either vernier or

357
00:12:35,750 --> 00:12:34,000
course rates um was a

358
00:12:37,590 --> 00:12:35,760
fairly simple thing to do as long as you

359
00:12:38,310 --> 00:12:37,600
move slowly as long as the inputs i made

360
00:12:41,350 --> 00:12:38,320
into

361
00:12:43,910 --> 00:12:41,360
the mass were slow inputs it was

362
00:12:44,629 --> 00:12:43,920
very very controllable you can see here

363
00:13:04,310 --> 00:12:44,639

me

364
00:13:05,750 --> 00:13:04,320
switched places on the arm and

365
00:13:07,430 --> 00:13:05,760
i was going to do the third task which

366
00:13:09,750 --> 00:13:07,440
was the high torque task

367
00:13:11,430 --> 00:13:09,760
the idea behind this was uh being held

368
00:13:12,150 --> 00:13:11,440
in the foot restraint on the arm to go

369
00:13:14,150 --> 00:13:12,160
down and

370
00:13:15,670 --> 00:13:14,160
use a torque recorder to torque on some

371
00:13:16,230 --> 00:13:15,680
bolts which is what i'm doing here that

372
00:13:18,550 --> 00:13:16,240
were held

373
00:13:19,829 --> 00:13:18,560
a bulk bolt that was held on the sill

374
00:13:21,750 --> 00:13:19,839
and the idea there was to look at the

375
00:13:21,990 --> 00:13:21,760
reaction forces and how the arm moved as

376
00:13:25,590 --> 00:13:22,000
we

377
00:13:27,590 --> 00:13:25,600
that

378
00:13:29,670 --> 00:13:27,600
turned out to work very easily very much

379
00:13:31,269 --> 00:13:29,680
like our wet f training and uh

380
00:13:36,710 --> 00:13:31,279
seemed to be a very easy operation to do

381
00:13:40,629 --> 00:13:38,389
the other major payload we had on board

382
00:13:42,310 --> 00:13:40,639
was space hab this was the first flight

383
00:13:43,829 --> 00:13:42,320
of space hub it's a commercial module

384
00:13:44,629 --> 00:13:43,839
connected to the crew compartment by a

385
00:13:46,150 --> 00:13:44,639
tunnel

386
00:13:48,069 --> 00:13:46,160
there's a hatch at either end of the

387
00:13:49,590 --> 00:13:48,079
tunnel for asset and entry and you see

388
00:13:50,710 --> 00:13:49,600

david here opening up the hatch on

389
00:13:52,870 --> 00:13:50,720
flight day one

390
00:13:54,470 --> 00:13:52,880
so we can get space have ready for

391
00:13:56,629 --> 00:13:54,480
experiment operations

392
00:13:58,150 --> 00:13:56,639
it flew uphill powered because some of

393
00:13:59,750 --> 00:13:58,160
the experiments required temperature

394
00:14:01,110 --> 00:13:59,760
control and monitoring

395
00:14:03,269 --> 00:14:01,120
but there were a number of systems that

396
00:14:04,629 --> 00:14:03,279
had to be started up on that first day

397
00:14:06,389 --> 00:14:04,639
to get ready for use

398
00:14:07,990 --> 00:14:06,399
you see david here on the forward wall

399
00:14:09,030 --> 00:14:08,000
of space hab where the space hub

400
00:14:11,030 --> 00:14:09,040
subsystems

401
00:14:13,750 --> 00:14:11,040
equipment mostly was getting things

402
00:14:15,189 --> 00:14:13,760
ready to start operations

403
00:14:17,269 --> 00:14:15,199
this is the tunnel going down the tunnel

404
00:14:20,069 --> 00:14:17,279
that was connecting the two

405
00:14:21,590 --> 00:14:20,079
parts of the space hub and the orbiter

406
00:14:23,189 --> 00:14:21,600
this is early on the flight it gives you

407
00:14:25,750 --> 00:14:23,199
a nice view of the aft

408
00:14:27,430 --> 00:14:25,760
wall of space have before we've put out

409
00:14:28,470 --> 00:14:27,440
all our experiment procedures and gotten

410
00:14:30,470 --> 00:14:28,480
a little more clutter than

411
00:14:31,829 --> 00:14:30,480
as you'll see in later views this is

412
00:14:33,670 --> 00:14:31,839
brian checking out some orbiter

413
00:14:35,269 --> 00:14:33,680

equipment that we had stowed back there

414
00:14:37,670 --> 00:14:35,279
that actually is the laser ranger that

415
00:14:39,670 --> 00:14:37,680
we used on the eureka retrieve day

416
00:14:41,189 --> 00:14:39,680
and you can see how the aft wall is

417
00:14:42,389 --> 00:14:41,199
covered with lockers very similar to the

418
00:14:43,990 --> 00:14:42,399
mid deck lockers

419
00:14:45,990 --> 00:14:44,000
space head was envisioned as kind of an

420
00:14:48,470 --> 00:14:46,000
extension of the mid deck to give you

421
00:14:49,750 --> 00:14:48,480
access for lots of experiments doing

422
00:14:52,230 --> 00:14:49,760
early design work

423
00:14:53,750 --> 00:14:52,240
this is the port wall which we found

424
00:14:55,509 --> 00:14:53,760
that to be a very convenient place to

425
00:14:57,509 --> 00:14:55,519
store procedures in the computer disk

426
00:14:58,230 --> 00:14:57,519
you can see me taking some computers out

427
00:15:00,069 --> 00:14:58,240
there

428
00:15:02,790 --> 00:15:00,079
as well as nancy working on an

429
00:15:04,310 --> 00:15:02,800
experiment on the forward wall

430
00:15:05,590 --> 00:15:04,320
with two people back there on the corner

431
00:15:07,670 --> 00:15:05,600
you can see there's plenty of space in

432
00:15:09,430 --> 00:15:07,680
georgia to get around and space hab

433
00:15:11,269 --> 00:15:09,440
was a very nice area to work it was nice

434
00:15:15,350 --> 00:15:11,279
and bright and had a lot of easy access

435
00:15:19,030 --> 00:15:17,910
the starboard wall spacep has the

436
00:15:20,949 --> 00:15:19,040
capability of putting

437
00:15:22,710 --> 00:15:20,959
racks in you see jeff here working at

438
00:15:24,069 --> 00:15:22,720

the rack which had a workbench on it and

439
00:15:25,670 --> 00:15:24,079
some foot restraints it was very handy

440
00:15:26,710 --> 00:15:25,680
for performing experiments and you saw

441
00:15:29,269 --> 00:15:26,720
me working on a

442
00:15:31,030 --> 00:15:29,279
computer we also had some experiments in

443
00:15:32,389 --> 00:15:31,040
the mid deck this is ron working on one

444
00:15:34,389 --> 00:15:32,399
of our protein crystal growth

445
00:15:36,870 --> 00:15:34,399
experiments adjusting the focus for some

446
00:15:38,470 --> 00:15:36,880
photo tv we were taking of it

447
00:15:41,670 --> 00:15:38,480
we flew a lot of computers on this

448
00:15:43,350 --> 00:15:41,680
flight and this is an experiment

449
00:15:45,189 --> 00:15:43,360
tools and diagnostic system which is

450
00:15:46,470 --> 00:15:45,199
basically checking to make sure you can

451
00:15:48,870 --> 00:15:46,480
do some ifm on

452
00:15:50,710 --> 00:15:48,880
on baseline equipment this is a liquid

453
00:15:52,550 --> 00:15:50,720
encapsulated melt zone

454
00:15:54,069 --> 00:15:52,560
and by encapsulating it in a liquid they

455
00:15:58,310 --> 00:15:54,079
were hoping to grow

456
00:16:02,870 --> 00:16:00,870
and this is jeff also operating an

457
00:16:05,030 --> 00:16:02,880
experiment called cgba

458
00:16:06,550 --> 00:16:05,040
which involved mixing the fluids

459
00:16:08,629 --> 00:16:06,560
together and then you'll see him shake

460
00:16:10,389 --> 00:16:08,639
the fluids here in a second and these

461
00:16:11,990 --> 00:16:10,399
were mostly all biological samples that

462
00:16:13,509 --> 00:16:12,000
he was activating

463
00:16:15,910 --> 00:16:13,519

one of the experiments i ran from the

464
00:16:16,949 --> 00:16:15,920
middick was called scg for solution

465
00:16:18,790 --> 00:16:16,959
crystal growth

466
00:16:21,350 --> 00:16:18,800
and we're stirring some solutions here

467
00:16:21,670 --> 00:16:21,360
to as a precursor to another experiment

468
00:16:24,150 --> 00:16:21,680
that

469
00:16:25,269 --> 00:16:24,160
grew some ceramic crystals uh here's

470
00:16:27,509 --> 00:16:25,279
just a quick shot of

471
00:16:29,189 --> 00:16:27,519
one of the things i did one day was to

472
00:16:32,230 --> 00:16:29,199
solder a circuit board

473
00:16:34,710 --> 00:16:32,240
the idea being to look into

474
00:16:35,749 --> 00:16:34,720
how feasible it is to do on orbit repair

475
00:16:38,310 --> 00:16:35,759
of electronic

476
00:16:39,670 --> 00:16:38,320
components another thing we were doing

477
00:16:40,790 --> 00:16:39,680
back in the space hab

478
00:16:42,870 --> 00:16:40,800
was we were actually looking at an

479
00:16:44,550 --> 00:16:42,880
experiment that was

480
00:16:46,150 --> 00:16:44,560
looking at how feasible it is to grow

481
00:16:47,430 --> 00:16:46,160
plants in space which is something that

482
00:16:48,790 --> 00:16:47,440
we figure we'll have to do in the long

483
00:16:49,350 --> 00:16:48,800
term and that's what nancy was doing

484
00:16:50,550 --> 00:16:49,360
here

485
00:16:51,910 --> 00:16:50,560
looks like she got going in one

486
00:16:57,110 --> 00:16:51,920
direction and figured out it was easier

487
00:17:00,389 --> 00:16:58,629
another experiment that we carried

488
00:17:02,069 --> 00:17:00,399

called uh shoot which was super fluid

489
00:17:03,430 --> 00:17:02,079
helium on orbit transfer was operated

490
00:17:05,750 --> 00:17:03,440
from a pgsc

491
00:17:07,590 --> 00:17:05,760
on the flight deck janice and i worked

492
00:17:09,750 --> 00:17:07,600
with that pgsc and brian and

493
00:17:11,750 --> 00:17:09,760
ron coordinated the burns here you can

494
00:17:13,909 --> 00:17:11,760
see the cryogenic doers for the

495
00:17:15,829 --> 00:17:13,919
superfluid helium on the mpass structure

496
00:17:17,829 --> 00:17:15,839
the idea behind this experiment is to

497
00:17:20,710 --> 00:17:17,839
study the transfer of cryogenic fluid

498
00:17:22,390 --> 00:17:20,720
for future servicing of satellites

499
00:17:24,069 --> 00:17:22,400
the other secondary that we carried on

500
00:17:26,630 --> 00:17:24,079
the mid deck called fair

501
00:17:28,630 --> 00:17:26,640
is a fluid transfer experiment between

502
00:17:30,470 --> 00:17:28,640
two tanks to study a future design of

503
00:17:31,669 --> 00:17:30,480
propellant tanks this particular one is

504
00:17:33,270 --> 00:17:31,679
very similar to the design that's

505
00:17:34,710 --> 00:17:33,280
planned to be flown on the cassini probe

506
00:17:40,710 --> 00:17:34,720
that will go to saturn

507
00:17:43,750 --> 00:17:42,310
we had a lot of training pre-flight and

508
00:17:45,110 --> 00:17:43,760
earth observations because of course

509
00:17:47,430 --> 00:17:45,120
looking out the window

510
00:17:49,110 --> 00:17:47,440
is a very interesting view of the earth

511
00:17:50,789 --> 00:17:49,120
you can see me taking some pictures

512
00:17:52,470 --> 00:17:50,799
there with our 70 millimeter

513
00:17:54,070 --> 00:17:52,480

camera which gives you very high detail

514
00:17:56,230 --> 00:17:54,080
for looking at the earth

515
00:17:57,350 --> 00:17:56,240
this is a view of the sinai peninsula

516
00:17:59,350 --> 00:17:57,360
you can see the

517
00:18:01,750 --> 00:17:59,360
gulf of aqaba there leading down into

518
00:18:03,830 --> 00:18:01,760
the red sea

519
00:18:05,909 --> 00:18:03,840
this is further down under the horn of

520
00:18:11,669 --> 00:18:05,919
africa the somalia area

521
00:18:16,470 --> 00:18:15,029
and this is not africa this is the uh

522
00:18:17,190 --> 00:18:16,480
the west coast of australia there you

523
00:18:19,430 --> 00:18:17,200
can see uh

524
00:18:21,190 --> 00:18:19,440
ecsmith bay which the the big bay that

525
00:18:23,110 --> 00:18:21,200
you see along to the right there

526
00:18:27,430 --> 00:18:23,120
and uh sharks bay is just underneath the

527
00:18:31,110 --> 00:18:28,950
and uh one of the other experiments that

528
00:18:33,590 --> 00:18:31,120
we did was called dso 618

529
00:18:34,630 --> 00:18:33,600
writing a cycle ergometer it was one of

530
00:18:36,070 --> 00:18:34,640
the other experiments that we were

531
00:18:37,430 --> 00:18:36,080
trying to

532
00:18:39,430 --> 00:18:37,440
use to increase your orthostatic

533
00:18:41,590 --> 00:18:39,440
tolerance when you come back and land on

534
00:18:43,190 --> 00:18:41,600
earth

535
00:18:44,710 --> 00:18:43,200
we were extremely busy on this flight

536
00:18:45,430 --> 00:18:44,720
and as you can see jeff didn't take time

537
00:18:49,029 --> 00:18:45,440
to eat so

538
00:18:50,470 --> 00:18:49,039

janice felt compelled to feed him

539
00:18:51,990 --> 00:18:50,480
and just like every crew we felt

540
00:18:53,430 --> 00:18:52,000
obligated to play with our food however

541
00:18:55,029 --> 00:18:53,440
in this case we decided to take this

542
00:18:59,510 --> 00:18:55,039
opportunity to bombard jeff

543
00:19:04,310 --> 00:19:01,669
one of the other things that we flew was

544
00:19:05,750 --> 00:19:04,320
a bear for the drug abuse resistance

545
00:19:07,909 --> 00:19:05,760
program a dare bear

546
00:19:09,590 --> 00:19:07,919
and his little t-shirt says dare to keep

547
00:19:13,909 --> 00:19:09,600
kids off drugs and he got pretty good at

548
00:19:16,950 --> 00:19:15,350
as you're getting ready to come home for

549
00:19:18,230 --> 00:19:16,960
entry you check out some of the systems

550
00:19:19,350 --> 00:19:18,240
on board that you haven't been using in

551
00:19:20,950 --> 00:19:19,360
a while

552
00:19:22,630 --> 00:19:20,960
or in the entry configuration making

553
00:19:23,029 --> 00:19:22,640
sure everything's ready this is a

554
00:19:25,590 --> 00:19:23,039
checking

555
00:19:26,950 --> 00:19:25,600
rcs system you can see brian and and ron

556
00:19:28,630 --> 00:19:26,960
moving around of course actually it's

557
00:19:29,350 --> 00:19:28,640
the orbiter moving around as the jets

558
00:19:31,270 --> 00:19:29,360
fire

559
00:19:33,110 --> 00:19:31,280
and you can see how they are enough of

560
00:19:34,789 --> 00:19:33,120
an input that there's a significant

561
00:19:36,310 --> 00:19:34,799
movement on the part of the orbiter with

562
00:19:37,590 --> 00:19:36,320
the wave off days we had we got a little

563
00:19:39,110 --> 00:19:37,600

more chance to look out the windows you

564
00:19:40,630 --> 00:19:39,120
see the terminator here

565
00:19:43,270 --> 00:19:40,640
as everybody had told us first time

566
00:19:44,710 --> 00:19:43,280
flyers sunrises and sunsets are gorgeous

567
00:19:46,390 --> 00:19:44,720
as you heard we had a lot of practice at

568
00:19:47,909 --> 00:19:46,400
deorbit prep and this is one of the

569
00:19:48,630 --> 00:19:47,919
scenes on the flight deck as we prepare

570
00:19:51,029 --> 00:19:48,640
to come in

571
00:19:52,789 --> 00:19:51,039
in the lessons david did a lot of this

572
00:19:54,150 --> 00:19:52,799
camcorder footage and brian did from the

573
00:19:55,830 --> 00:19:54,160
flight deck so you can kind of see

574
00:20:01,430 --> 00:19:55,840
the aft part of the fight deck there and

575
00:20:04,710 --> 00:20:03,510
once we were decided to get serious

576
00:20:07,270 --> 00:20:04,720
about this entry stuff

577
00:20:08,710 --> 00:20:07,280
well we finally did the view of a burn

578
00:20:09,830 --> 00:20:08,720
and we're in the dark for some of the

579
00:20:12,549 --> 00:20:09,840
high mock

580
00:20:14,149 --> 00:20:12,559
times and up in mach 24 range and here

581
00:20:16,630 --> 00:20:14,159
you see the plasma

582
00:20:18,149 --> 00:20:16,640
which surrounds the vehicle during the

583
00:20:19,909 --> 00:20:18,159
entry up there we flew into the daylight

584
00:20:21,909 --> 00:20:19,919
around mach 23 so we didn't get to see

585
00:20:24,549 --> 00:20:21,919
that all the way down

586
00:20:25,510 --> 00:20:24,559
we also we got to florida short of nine

587
00:20:27,430 --> 00:20:25,520
in the morning so we probably didn't

588
00:20:29,029 --> 00:20:27,440

wake everybody up but we think we uh

589
00:20:31,029 --> 00:20:29,039
we announced our arrival with the sonic

590
00:20:32,310 --> 00:20:31,039
booms

591
00:20:34,630 --> 00:20:32,320
here we are with a view of the orbiter

592
00:20:36,630 --> 00:20:34,640
on the final approach we landed at ksc

593
00:20:38,230 --> 00:20:36,640
runway 3-3 it was a great treat for us

594
00:20:39,750 --> 00:20:38,240
to be able to come back to ksc you

595
00:20:44,950 --> 00:20:39,760
always like to bring the orbiter back to

596
00:20:47,990 --> 00:20:46,630
here's a view taken from the sta the

597
00:20:51,430 --> 00:20:48,000
shuttle training aircraft

598
00:20:53,350 --> 00:20:51,440
as we approach the runway the wheels are

599
00:20:56,230 --> 00:20:53,360
now down

600
00:20:57,590 --> 00:20:56,240
just crossing the underrun crossing the

601
00:21:00,390 --> 00:20:57,600
threshold to the runway

602
00:21:04,149 --> 00:21:00,400
now we transition to a view looking down

603
00:21:13,830 --> 00:21:07,190
there's touchdown if you look for them a

604
00:21:17,430 --> 00:21:15,270
there it is that's the drag chute

605
00:21:19,110 --> 00:21:17,440
beginning its deployment sequence

606
00:21:20,950 --> 00:21:19,120
you can see the drag shoot coming out on

607
00:21:22,070 --> 00:21:20,960
the side view there's the shuttle

608
00:21:23,909 --> 00:21:22,080
training aircraft

609
00:21:26,950 --> 00:21:23,919
flying with us in the vertical assembly

610
00:21:29,830 --> 00:21:26,960
building going by in the background

611
00:21:31,590 --> 00:21:29,840
there's nosegear touchdown and now a

612
00:21:32,870 --> 00:21:31,600
picture looking head-on at the orbiter

613
00:21:34,870 --> 00:21:32,880

from the other end of the runway

614
00:21:37,029 --> 00:21:34,880
there's drag shoot jettison you can see

615
00:21:38,710 --> 00:21:37,039
it comes almost straight down

616
00:21:40,549 --> 00:21:38,720
we didn't have much of a crosswind that