



1
00:00:08,270 --> 00:00:05,330
this is the sts-133 interview with

2
00:00:10,040 --> 00:00:08,280
mission specialists alvin drew tell us

3
00:00:11,690 --> 00:00:10,050
about the place where you grew up your

4
00:00:13,520 --> 00:00:11,700
hometown and what it was like growing up

5
00:00:15,950 --> 00:00:13,530
there and and and how that place

6
00:00:18,139 --> 00:00:15,960
influenced who you've become

7
00:00:19,700 --> 00:00:18,149
grew up first off in the suburbs of

8
00:00:21,920 --> 00:00:19,710
Washington DC in place called Lana

9
00:00:23,720 --> 00:00:21,930
Maryland in Prince George's County and

10
00:00:24,920 --> 00:00:23,730
then when I was about four we actually

11
00:00:26,630 --> 00:00:24,930
moved into the city over in the

12
00:00:28,970 --> 00:00:26,640
northeast side of the place and Township

13
00:00:30,620 --> 00:00:28,980

called Brooklyn probably most famous for

14

00:00:31,909 --> 00:00:30,630

its proximity to Catholic University and

15

00:00:36,380 --> 00:00:31,919

all the Catholic colleges that are

16

00:00:39,170 --> 00:00:36,390

around there it was a working

17

00:00:40,940 --> 00:00:39,180

middle-class neighborhood mix of white

18

00:00:42,590 --> 00:00:40,950

collar and blue collar middle class

19

00:00:44,990 --> 00:00:42,600

african-americans and we're in a place

20

00:00:46,940 --> 00:00:45,000

and they all had a just a strong work

21

00:00:49,069 --> 00:00:46,950

ethic to kind of pull themselves up from

22

00:00:52,069 --> 00:00:49,079

the bootstraps we had just gotten

23

00:00:53,569 --> 00:00:52,079

through the Civil Rights Act 1964 and

24

00:00:56,840 --> 00:00:53,579

the opportunities were open out there

25

00:00:59,360 --> 00:00:56,850

and there was a strong sense of optimism

26

00:01:01,940 --> 00:00:59,370

and ambition out there that they kind of

27

00:01:02,450 --> 00:01:01,950

they brought across we had two doors up

28

00:01:06,200 --> 00:01:02,460

for me

29

00:01:07,280 --> 00:01:06,210

was a man who'd been an undertaker and I

30

00:01:09,620 --> 00:01:07,290

think it recently retired from having

31

00:01:11,690 --> 00:01:09,630

his own funeral home and he had started

32

00:01:13,190 --> 00:01:11,700

off there was a sharecropper in

33

00:01:16,370 --> 00:01:13,200

Mississippi and it worked his way up to

34

00:01:19,399 --> 00:01:16,380

having a good nest egg and he was intent

35

00:01:20,719 --> 00:01:19,409

on beating into me the fact that I could

36

00:01:22,280 --> 00:01:20,729

do anything in the world I wanted to

37

00:01:24,860 --> 00:01:22,290

there was no law there's no no

38

00:01:26,480 --> 00:01:24,870

segregation to hold me back but I need

39

00:01:28,660 --> 00:01:26,490

to have an education this is they nobody

40

00:01:30,680 --> 00:01:28,670

ever take education back from me and

41

00:01:32,480 --> 00:01:30,690

hard work ethic and a good education

42

00:01:35,149 --> 00:01:32,490

would take me anywhere I wanted to go

43

00:01:36,350 --> 00:01:35,159

and that was kind of the mood of the

44

00:01:38,210 --> 00:01:36,360

entire neighborhood around me and

45

00:01:40,460 --> 00:01:38,220

everybody out there was living by that

46

00:01:44,630 --> 00:01:40,470

ethic whether they were expressing it

47

00:01:48,649 --> 00:01:44,640

not that verbally or not did you get it

48

00:01:50,810 --> 00:01:48,659

get a chance to see the the DC Maryland

49

00:01:52,640 --> 00:01:50,820

area from space on your in your previous

50

00:01:54,320 --> 00:01:52,650

spaceflight yeah we got to fly over I

51
00:01:55,940 --> 00:01:54,330
remember having those guys let me know

52
00:01:58,130 --> 00:01:55,950
when we have got this world map program

53
00:02:00,050 --> 00:01:58,140
as this moving you are here dot on it

54
00:02:02,990 --> 00:02:00,060
let me know we were coming up on

55
00:02:04,580 --> 00:02:03,000
Washington DC and and I got about five

56
00:02:07,100 --> 00:02:04,590
minutes notice and I ran up and took a

57
00:02:08,839 --> 00:02:07,110
look out there you can pick out where

58
00:02:10,429 --> 00:02:08,849
the Anacostia River splits off from the

59
00:02:12,199 --> 00:02:10,439
Potomac and that's probably your biggest

60
00:02:13,970 --> 00:02:12,209
indication that you're looking at

61
00:02:15,559 --> 00:02:13,980
Washington DC there's no

62
00:02:17,270 --> 00:02:15,569
nice diamond shape around the city let

63
00:02:19,610 --> 00:02:17,280

you know where it is it's just a just a

64

00:02:21,530 --> 00:02:19,620

grace mere from all the asphalt and

65

00:02:22,610 --> 00:02:21,540

concrete in the middle of downtown that

66

00:02:24,830 --> 00:02:22,620

lets you know that you're looking at a

67

00:02:28,520 --> 00:02:24,840

city at all well what was that moment

68

00:02:30,280 --> 00:02:28,530

like when just just kind of recognizing

69

00:02:33,770 --> 00:02:30,290

and realizing that you know hey I've

70

00:02:36,880 --> 00:02:33,780

I've gotten here and come from there and

71

00:02:39,710 --> 00:02:36,890

I'm here 200 miles up you know and I've

72

00:02:41,869 --> 00:02:39,720

I'm living this accomplishment that I've

73

00:02:43,819 --> 00:02:41,879

set out to do it's probably the same

74

00:02:44,839 --> 00:02:43,829

sensation when you climb a mountain or

75

00:02:46,699 --> 00:02:44,849

you're climbing a cliff face and you

76
00:02:48,440 --> 00:02:46,709
look back and you have the sense of the

77
00:02:50,150 --> 00:02:48,450
distance that you've covered up until

78
00:02:51,589 --> 00:02:50,160
that point you're looking at those three

79
00:02:53,240 --> 00:02:51,599
feet in front and you go there you know

80
00:02:54,680 --> 00:02:53,250
three feet at a time and you look back

81
00:02:56,420 --> 00:02:54,690
and you've covered a few miles when it's

82
00:03:00,410 --> 00:02:56,430
all said and done that same thing that

83
00:03:03,229 --> 00:03:00,420
I've gone from there to here okay every

84
00:03:05,180 --> 00:03:03,239
accomplishment begins with some form of

85
00:03:07,130 --> 00:03:05,190
motivation now you just give give us a

86
00:03:08,660 --> 00:03:07,140
story about somebody motivating you

87
00:03:09,319 --> 00:03:08,670
you've been an astronaut here for about

88
00:03:12,500 --> 00:03:09,329

ten years

89

00:03:15,020 --> 00:03:12,510

what what sets you off on that that

90

00:03:18,349 --> 00:03:15,030

trick and that dead road to pursue this

91

00:03:20,839 --> 00:03:18,359

line at work for me the motivation was

92

00:03:22,729 --> 00:03:20,849

just primal you know it's like no people

93

00:03:25,129 --> 00:03:22,739

get hungry or you get tired you want to

94

00:03:27,920 --> 00:03:25,139

sleep you want to eat from the time I

95

00:03:30,680 --> 00:03:27,930

was four years old I needed to fly

96

00:03:31,699 --> 00:03:30,690

I remember going out to what is now

97

00:03:34,520 --> 00:03:31,709

Baltimore Washington International

98

00:03:36,349 --> 00:03:34,530

Airport to watch my dad go off on a

99

00:03:38,659 --> 00:03:36,359

business trip and just absolutely

100

00:03:40,610 --> 00:03:38,669

obsessed with the planes I saw taking

101
00:03:42,080 --> 00:03:40,620
off in and out of there and knowing then

102
00:03:45,050 --> 00:03:42,090
at four years old that that's what I

103
00:03:48,379 --> 00:03:45,060
wanted to do it was a this was September

104
00:03:51,740 --> 00:03:48,389
of 67 October of 68 a year later I was

105
00:03:53,659 --> 00:03:51,750
in first grade watching the Apollo 7

106
00:03:55,370 --> 00:03:53,669
launch on television our principal no

107
00:03:57,680 --> 00:03:55,380
took out our little black-and-white TV

108
00:04:00,530 --> 00:03:57,690
and we watched that launch and I watched

109
00:04:03,680 --> 00:04:00,540
that and I was torn like no I need to do

110
00:04:06,559 --> 00:04:03,690
this too I went home you know it very

111
00:04:08,210 --> 00:04:06,569
trouble that's my dad notices no what

112
00:04:10,009 --> 00:04:08,220
should I do can I be an astronaut or

113
00:04:11,390 --> 00:04:10,019

should I be a pilot he goes you can do

114

00:04:14,449 --> 00:04:11,400

both those things all these astronauts

115

00:04:15,800 --> 00:04:14,459

have been pilots and that does seal it

116

00:04:17,479 --> 00:04:15,810

for me that was where I was gonna go try

117

00:04:18,439 --> 00:04:17,489

and do I didn't know about the astronaut

118

00:04:20,719 --> 00:04:18,449

part that seemed they weren't too many

119

00:04:22,720 --> 00:04:20,729

weren't too many astronauts there but I

120

00:04:24,640 --> 00:04:22,730

was certainly gonna go fly an airplane

121

00:04:26,440 --> 00:04:24,650

so at 5 or 6 years old ooh that was that

122

00:04:28,630 --> 00:04:26,450

was solidified and scary to think that

123

00:04:31,690 --> 00:04:28,640

some kindergartner made my career choice

124

00:04:36,370 --> 00:04:33,730

recount force if you would the steps

125

00:04:38,590 --> 00:04:36,380

that you've taken in your military

126
00:04:41,530 --> 00:04:38,600
career to get to the NASA astronaut

127
00:04:44,140 --> 00:04:41,540
corps military career started with the

128
00:04:46,510 --> 00:04:44,150
Air Force Academy back in 1980 I went

129
00:04:48,370 --> 00:04:46,520
there because if I wasn't gonna show a

130
00:04:50,590 --> 00:04:48,380
fly spacecraft I wanted to design them

131
00:04:53,110 --> 00:04:50,600
on my heroes at that point was Clarence

132
00:04:54,550 --> 00:04:53,120
Kelly Johnson who was who made the sr-71

133
00:04:56,650 --> 00:04:54,560
and it's several of the planes for

134
00:04:58,210 --> 00:04:56,660
Lockheed and if I couldn't fly plans

135
00:04:59,560 --> 00:04:58,220
which I know what still wanted to do but

136
00:05:00,940 --> 00:04:59,570
didn't think was necessary possible this

137
00:05:01,870 --> 00:05:00,950
was a place to do it when the foremost

138
00:05:04,900 --> 00:05:01,880

aeronautical and astronautical

139

00:05:06,490 --> 00:05:04,910

engineering schools in the country I got

140

00:05:08,170 --> 00:05:06,500

out there and I was being recruited by

141

00:05:11,020 --> 00:05:08,180

the physics department to become a

142

00:05:14,350 --> 00:05:11,030

physics major and one of the instructors

143

00:05:16,270 --> 00:05:14,360

there mapped it out for me and just

144

00:05:17,470 --> 00:05:16,280

trying to give me why she want to be a

145

00:05:20,620 --> 00:05:17,480

physics major he said you get a

146

00:05:22,090 --> 00:05:20,630

technical degree like physics get a good

147

00:05:23,830 --> 00:05:22,100

great grade point average coming out of

148

00:05:25,750 --> 00:05:23,840

the Air Force Academy go to pilot

149

00:05:26,950 --> 00:05:25,760

training become a decent pilot and if

150

00:05:28,450 --> 00:05:26,960

you've got a good grade point average

151
00:05:29,770 --> 00:05:28,460
and you're decent pilot you can go to

152
00:05:32,440 --> 00:05:29,780
test pilot school and become a test

153
00:05:34,150 --> 00:05:32,450
pilot and from there this is who knows

154
00:05:37,690 --> 00:05:34,160
you know all of our current Air Force

155
00:05:39,280 --> 00:05:37,700
astronauts are test pilots and and he

156
00:05:40,930 --> 00:05:39,290
had just but just mapped that out with

157
00:05:41,950 --> 00:05:40,940
flagstones for me and that's about what

158
00:05:44,020 --> 00:05:41,960
I did I came out of the Air Force

159
00:05:46,540 --> 00:05:44,030
Academy with degrees in physics and

160
00:05:48,700 --> 00:05:46,550
aeronautical engineering I went off to

161
00:05:50,040 --> 00:05:48,710
become a pilot flying helicopters first

162
00:05:52,630 --> 00:05:50,050
and combat rescue and Special Operations

163
00:05:54,690 --> 00:05:52,640

eventually I went to jet pilot training

164

00:05:57,130 --> 00:05:54,700

and into the Navy test pilot school

165

00:06:00,160 --> 00:05:57,140

serve most of the 90s as a test pilot

166

00:06:03,190 --> 00:06:00,170

and in coming for the class of 2000 I

167

00:06:04,900 --> 00:06:03,200

applied to become an astronaut tell me

168

00:06:09,730 --> 00:06:04,910

about some of the some of the time you

169

00:06:12,010 --> 00:06:09,740

spent as a combat helicopter pilot they

170

00:06:13,900 --> 00:06:12,020

were exciting I was in at the very

171

00:06:16,390 --> 00:06:13,910

inception of what is now the Air Force

172

00:06:17,410 --> 00:06:16,400

Special Operations Command obviously I

173

00:06:18,550 --> 00:06:17,420

wasn't paying attention I didn't what

174

00:06:20,440 --> 00:06:18,560

was coming till they hauled us out one

175

00:06:22,120 --> 00:06:20,450

day for parades is you're now the Air

176
00:06:24,610 --> 00:06:22,130
Force Special Operations Command yeah

177
00:06:27,850 --> 00:06:24,620
that's good well just a few short months

178
00:06:30,160 --> 00:06:27,860
later we were going into Panama to go

179
00:06:31,990 --> 00:06:30,170
and bring back Manuel Noriega and that

180
00:06:33,970 --> 00:06:32,000
was gonna be my first few combat

181
00:06:35,440 --> 00:06:33,980
missions doing that and things just

182
00:06:37,000 --> 00:06:35,450
never quite calmed

183
00:06:38,770 --> 00:06:37,010
after that we were always somewhere in

184
00:06:40,600 --> 00:06:38,780
the world in the middle of some type of

185
00:06:41,950 --> 00:06:40,610
scrape and special operations because

186
00:06:44,080 --> 00:06:41,960
they're the ones you sent if you're

187
00:06:45,460 --> 00:06:44,090
short of a full war where you're doing

188
00:06:47,620 --> 00:06:45,470

things but even when there was warfare

189

00:06:51,370 --> 00:06:47,630

going on as it wasn't there the first

190

00:06:52,660 --> 00:06:51,380

Gulf War over in Saudi Arabia we were in

191

00:06:54,600 --> 00:06:52,670

the middle of that as well so a year

192

00:06:58,600 --> 00:06:54,610

later I was seeing combat missions over

193

00:07:01,660 --> 00:06:58,610

Saudi Arabia and Kuwait wow that sounds

194

00:07:04,000 --> 00:07:01,670

pretty intense it was it was a good few

195

00:07:06,310 --> 00:07:04,010

years but it wasn't something I'd do for

196

00:07:13,690 --> 00:07:06,320

20 years it was it was a Burnout job

197

00:07:16,300 --> 00:07:13,700

okay do you recall the the time of

198

00:07:17,530 --> 00:07:16,310

getting the call of maybe you want to

199

00:07:18,790 --> 00:07:17,540

come down and be an astronaut do you

200

00:07:20,110 --> 00:07:18,800

have a story about you know what that

201
00:07:21,610 --> 00:07:20,120
was like when you got that call

202
00:07:24,310 --> 00:07:21,620
yeah Rana clean up that was 10 years ago

203
00:07:26,140 --> 00:07:24,320
yesterday I got a call from our our

204
00:07:27,610 --> 00:07:26,150
deputy center director and we just

205
00:07:30,120 --> 00:07:27,620
retired recently as a Kennedy Space

206
00:07:32,260 --> 00:07:30,130
Center director asking if I was

207
00:07:33,940 --> 00:07:32,270
interested in coming out to being an

208
00:07:36,940 --> 00:07:33,950
astronaut and I'm trying to contain

209
00:07:38,380 --> 00:07:36,950
myself and Sam told him I said I'd make

210
00:07:39,760 --> 00:07:38,390
a joke as a joke you come to like a job

211
00:07:41,950 --> 00:07:39,770
like that I'm maybe I'll sign up go

212
00:07:44,050 --> 00:07:41,960
ahead indeed do that well come on here

213
00:07:45,370 --> 00:07:44,060

let me know how it grows on you and then

214

00:07:50,890 --> 00:07:45,380

I hung up the phone close to go to my

215

00:07:52,240 --> 00:07:50,900

office and jumped up and down okay tell

216

00:07:54,670 --> 00:07:52,250

us how you would characterize that the

217

00:07:57,820 --> 00:07:54,680

value of education in your life and and

218

00:08:00,310 --> 00:07:57,830

what it's enabled you to do education

219

00:08:01,480 --> 00:08:00,320

has been in my family's DNA my family

220

00:08:04,270 --> 00:08:01,490

grew up in Washington DC

221

00:08:06,670 --> 00:08:04,280

my parents were met at Dunbar High

222

00:08:09,640 --> 00:08:06,680

School which back in the nineteen late

223

00:08:11,890 --> 00:08:09,650

40s 1950s was one of the first attempts

224

00:08:13,900 --> 00:08:11,900

at a magnet school the schools were

225

00:08:15,820 --> 00:08:13,910

segregated back then and for African

226

00:08:16,990 --> 00:08:15,830

American students who were excelling

227

00:08:20,380 --> 00:08:17,000

that was where they would send these

228

00:08:23,680 --> 00:08:20,390

children there the students it was also

229

00:08:26,470 --> 00:08:23,690

a place for African Americans who had

230

00:08:27,760 --> 00:08:26,480

degrees PhDs who were waiting for their

231

00:08:30,760 --> 00:08:27,770

opportunity to teach in Howard

232

00:08:33,490 --> 00:08:30,770

University to go and make their make

233

00:08:35,410 --> 00:08:33,500

your bones to show their credentials and

234

00:08:39,130 --> 00:08:35,420

so my parents had people who were

235

00:08:41,080 --> 00:08:39,140

aspiring to become college professors

236

00:08:43,060 --> 00:08:41,090

we're teaching them so you'd have a guy

237

00:08:44,310 --> 00:08:43,070

who's with a PhD teaching in freshman

238

00:08:46,080 --> 00:08:44,320

chemistry

239

00:08:47,250 --> 00:08:46,090

and they had some of the best education

240

00:08:48,540 --> 00:08:47,260

they possibly could have and they saw

241

00:08:50,790 --> 00:08:48,550

that as a ticket for them to get out of

242

00:08:53,250 --> 00:08:50,800

poverty within the city and so by the

243

00:08:55,560 --> 00:08:53,260

time I came around we were living a

244

00:08:56,820 --> 00:08:55,570

middle-class existence based on the you

245

00:08:59,090 --> 00:08:56,830

know the tickets they earned from their

246

00:09:01,200 --> 00:08:59,100

education and it was sure that my

247

00:09:03,090 --> 00:09:01,210

sisters my brother and I were all gonna

248

00:09:04,140 --> 00:09:03,100

get education so it was expected that we

249

00:09:05,460 --> 00:09:04,150

were going to go to college it was

250

00:09:07,740 --> 00:09:05,470

expected that we were going to get good

251

00:09:10,230 --> 00:09:07,750

grades or at least give them the best

252

00:09:13,620 --> 00:09:10,240

possible effort we understood that and

253

00:09:15,120 --> 00:09:13,630

my mother was a teacher in school my

254

00:09:16,950 --> 00:09:15,130

father after a career both in government

255

00:09:18,930 --> 00:09:16,960

and in private industry once he retired

256

00:09:20,820 --> 00:09:18,940

went and became a history teacher in

257

00:09:23,190 --> 00:09:20,830

high school they held that whole thing

258

00:09:24,480 --> 00:09:23,200

in very high regard and they sent us the

259

00:09:26,460 --> 00:09:24,490

schools with some of the best teachers

260

00:09:28,500 --> 00:09:26,470

in the city and so I got exposed to some

261

00:09:31,740 --> 00:09:28,510

of the best teachers in this alive had a

262

00:09:34,220 --> 00:09:31,750

good appreciation for what a what good

263

00:09:38,940 --> 00:09:34,230

teaching a good education could do okay

264

00:09:41,130 --> 00:09:38,950

you you've you've flown once before tell

265

00:09:43,170 --> 00:09:41,140

us about what what experiences stand out

266

00:09:46,320 --> 00:09:43,180

most in your mind about about that whole

267

00:09:48,960 --> 00:09:46,330

that whole trip from the launch to to

268

00:09:51,120 --> 00:09:48,970

beam you know up on orbit to the return

269

00:09:53,880 --> 00:09:51,130

what what sticks out in your mind about

270

00:09:57,030 --> 00:09:53,890

few things come to mind first was we had

271

00:09:58,530 --> 00:09:57,040

a few guest stars on our mission there

272

00:10:00,480 --> 00:09:58,540

were astronauts on our crew but there

273

00:10:03,060 --> 00:10:00,490

that obviously would they were their

274

00:10:04,580 --> 00:10:03,070

influence no we'll be on that first and

275

00:10:08,070 --> 00:10:04,590

foremost among them was barb Morgan

276

00:10:10,220 --> 00:10:08,080

Barbara Jo was the first runner-up

277

00:10:13,020 --> 00:10:10,230

Christa McAuliffe for teachers in space

278

00:10:16,050 --> 00:10:13,030

for the flight aboard challenger back in

279

00:10:17,040 --> 00:10:16,060

1986 I think that if anything happened

280

00:10:18,960 --> 00:10:17,050

to Christa should have been on that

281

00:10:20,190 --> 00:10:18,970

flight and it was clear that the program

282

00:10:21,630 --> 00:10:20,200

continued she would have been her

283

00:10:23,640 --> 00:10:21,640

successor it would have been the next

284

00:10:25,380 --> 00:10:23,650

teacher to go up in space as it turned

285

00:10:27,360 --> 00:10:25,390

out ironically she would be the next

286

00:10:30,330 --> 00:10:27,370

teacher to go up on a space shuttle 22

287

00:10:31,950 --> 00:10:30,340

years later and the inspiring part of

288

00:10:33,750 --> 00:10:31,960

that journey obviously had a lot of the

289

00:10:35,040 --> 00:10:33,760

media's attention and it was good to

290

00:10:36,960 --> 00:10:35,050

actually work with Bart when I didn't

291

00:10:39,240 --> 00:10:36,970

see this is media superstar but then

292

00:10:40,950 --> 00:10:39,250

this is very unassuming lady who was

293

00:10:43,020 --> 00:10:40,960

just fun to work with on a crew

294

00:10:45,360 --> 00:10:43,030

despite the historical burden that was

295

00:10:46,980 --> 00:10:45,370

on her shoulders the other one was Dave

296

00:10:49,290 --> 00:10:46,990

Williams one of our Canadian astronauts

297

00:10:50,970 --> 00:10:49,300

who had done very well here at Johnson

298

00:10:52,960 --> 00:10:50,980

Space Center and ran a large part of the

299

00:10:55,120 --> 00:10:52,970

science Directorate here and

300

00:10:59,620 --> 00:10:55,130

and candidate nothing else they they're

301
00:11:01,780 --> 00:10:59,630
very enthusiastic about space travel and

302
00:11:03,610 --> 00:11:01,790
Aeronautics and aerospace and they're

303
00:11:05,410 --> 00:11:03,620
enthusiastic about those among them who

304
00:11:07,720 --> 00:11:05,420
do extremely well and they filled both

305
00:11:09,970 --> 00:11:07,730
those squares and so we had lots of

306
00:11:12,520 --> 00:11:09,980
attention focused on Dave Williams as

307
00:11:14,590 --> 00:11:12,530
well so that was the part running up to

308
00:11:16,270 --> 00:11:14,600
the flight the actual launch was

309
00:11:19,090 --> 00:11:16,280
exciting yeah it was the very first

310
00:11:21,160 --> 00:11:19,100
flight for endeavour after it had been

311
00:11:22,840 --> 00:11:21,170
to an extensive reefer and I've seen

312
00:11:24,670 --> 00:11:22,850
like a brand new spaceship and so we

313
00:11:26,290 --> 00:11:24,680

were just making sure that you got a

314

00:11:29,080 --> 00:11:26,300

good shakedown on its way to orbit and

315

00:11:31,420 --> 00:11:29,090

literally and when I got to orbit the

316

00:11:32,830 --> 00:11:31,430

part that sticks up most of my mind from

317

00:11:33,850 --> 00:11:32,840

that mission was about an hour and a

318

00:11:35,320 --> 00:11:33,860

half into the mission because I had

319

00:11:38,110 --> 00:11:35,330

launched on the mid-deck didn't get to

320

00:11:40,900 --> 00:11:38,120

see the launch I was taping down a

321

00:11:42,010 --> 00:11:40,910

coaxial cable for our internet and it

322

00:11:42,910 --> 00:11:42,020

was the first time I actually gotten up

323

00:11:44,920 --> 00:11:42,920

to a window and of course you're very

324

00:11:46,510 --> 00:11:44,930

busy during that time actually took you

325

00:11:48,940 --> 00:11:46,520

know took a few seconds just to go look

326

00:11:52,180 --> 00:11:48,950

out the window at what was the

327

00:11:54,820 --> 00:11:52,190

Chihuahuan Desert over in Mexico and at

328

00:11:56,980 --> 00:11:54,830

that moment a satellite passed between

329

00:11:58,360 --> 00:11:56,990

me and ears and I don't think very many

330

00:12:00,040 --> 00:11:58,370

astronauts get a chance to see any other

331

00:12:01,300 --> 00:12:00,050

body besides maybe the Hubble or the

332

00:12:03,550 --> 00:12:01,310

space station but just some other random

333

00:12:04,930 --> 00:12:03,560

satellite and that was when I thought

334

00:12:06,820 --> 00:12:04,940

was we're not in Kansas anymore

335

00:12:08,980 --> 00:12:06,830

I'm looking down on top of satellites

336

00:12:11,650 --> 00:12:08,990

passing beneath me it was a it was a

337

00:12:12,940 --> 00:12:11,660

when those moments that no just see the

338

00:12:14,500 --> 00:12:12,950

earth below that the curvature that

339

00:12:16,060 --> 00:12:14,510

brehtaking moment and have it

340

00:12:18,310 --> 00:12:16,070

punctuated by that conjunction between

341

00:12:24,160 --> 00:12:18,320

us and that's that light just stuck with

342

00:12:26,320 --> 00:12:24,170

me okay all veteran crew on sts-133

343

00:12:28,060 --> 00:12:26,330

everybody else has flown before if

344

00:12:29,770 --> 00:12:28,070

you've got three crew members who've

345

00:12:33,160 --> 00:12:29,780

actually spent time up on station as

346

00:12:36,220 --> 00:12:33,170

long-duration crew members how much of a

347

00:12:39,790 --> 00:12:36,230

benefit will that be to having that

348

00:12:41,950 --> 00:12:39,800

experience help in accomplishing this

349

00:12:43,780 --> 00:12:41,960

mission let's go one step beyond that

350

00:12:45,100 --> 00:12:43,790

there's going to be six space station

351
00:12:47,020 --> 00:12:45,110
crew members up there when we docked a

352
00:12:49,240 --> 00:12:47,030
space station so by the time we get

353
00:12:51,010 --> 00:12:49,250
there Steve Lindsey Erik Bowen and I

354
00:12:53,500 --> 00:12:51,020
will be the three members who have had

355
00:12:55,030 --> 00:12:53,510
no experience onboard space station nine

356
00:12:56,800 --> 00:12:55,040
other crew members out there who will

357
00:12:59,560 --> 00:12:56,810
know where everything is we're being

358
00:13:01,000 --> 00:12:59,570
stowed how everything works and so we'll

359
00:13:02,590 --> 00:13:01,010
see them as kind of our you know our

360
00:13:03,700 --> 00:13:02,600
seeing-eye crew members to help us

361
00:13:05,380 --> 00:13:03,710
around

362
00:13:07,300 --> 00:13:05,390
there'd be extremely valuable to have

363
00:13:09,130 --> 00:13:07,310

liking it too you know trying to go up

364

00:13:10,900 --> 00:13:09,140

Mount Everest without a Sherpa these

365

00:13:12,880 --> 00:13:10,910

guys the folks who know where all the

366

00:13:15,220 --> 00:13:12,890

trails are and how to get to places so I

367

00:13:16,660 --> 00:13:15,230

think that it was just a coup that we

368

00:13:18,790 --> 00:13:16,670

decided to start reef lying Space

369

00:13:21,640 --> 00:13:18,800

Station veterans on board space shuttle

370

00:13:22,960 --> 00:13:21,650

missions because it just that there's so

371

00:13:26,410 --> 00:13:22,970

much more efficient on board the space

372

00:13:29,140 --> 00:13:26,420

station when they get there the content

373

00:13:30,640 --> 00:13:29,150

of the mission has changed a lot since

374

00:13:34,480 --> 00:13:30,650

you first started training still

375

00:13:36,690 --> 00:13:34,490

changing as we speak what kind of

376

00:13:38,800 --> 00:13:36,700

challenge has that been for the crew to

377

00:13:40,270 --> 00:13:38,810

to have to deal with that and what kinds

378

00:13:42,850 --> 00:13:40,280

of adjustments have you had to make

379

00:13:45,730 --> 00:13:42,860

because everything is changing almost

380

00:13:47,740 --> 00:13:45,740

constantly it hasn't been that big a

381

00:13:50,260 --> 00:13:47,750

challenge we understood at the beginning

382

00:13:52,840 --> 00:13:50,270

of this that our mission was going to be

383

00:13:54,160 --> 00:13:52,850

influx when we first signed us up this

384

00:13:57,070 --> 00:13:54,170

we were the very last shuttle mission

385

00:13:58,630 --> 00:13:57,080

and we knew that as things did or did

386

00:14:00,520 --> 00:13:58,640

not get done on previous shuttle

387

00:14:02,740 --> 00:14:00,530

missions to ours that things would go on

388

00:14:03,940 --> 00:14:02,750

to an off of our task list because we

389

00:14:05,860 --> 00:14:03,950

were going to be the last chance to get

390

00:14:07,870 --> 00:14:05,870

certain things done you know since then

391

00:14:11,500 --> 00:14:07,880

we've moved in the second-last spot and

392

00:14:12,730 --> 00:14:11,510

we've added two spacewalks and our

393

00:14:15,360 --> 00:14:12,740

attitude was like well when it comes

394

00:14:17,770 --> 00:14:15,370

along we'll we'll we'll go with the flow

395

00:14:19,360 --> 00:14:17,780

the big picture content really hasn't

396

00:14:23,380 --> 00:14:19,370

changed that much the main part of our

397

00:14:26,230 --> 00:14:23,390

mission to bring up Leonardo the

398

00:14:27,700 --> 00:14:26,240

pressurized multi-purpose module and our

399

00:14:29,500 --> 00:14:27,710

Express logistics carrier for the

400

00:14:30,970 --> 00:14:29,510

radiator and stay the same so that

401
00:14:33,010 --> 00:14:30,980
course everything else has been around

402
00:14:35,230 --> 00:14:33,020
the periphery of the mission and really

403
00:14:36,640 --> 00:14:35,240
haven't hasn't rocked our waters too

404
00:14:37,060 --> 00:14:36,650
much even though this is continuous

405
00:14:40,600 --> 00:14:37,070
journey

406
00:14:42,550 --> 00:14:40,610
okay tell me about how you would

407
00:14:43,810 --> 00:14:42,560
characterize the contributions of the

408
00:14:46,870 --> 00:14:43,820
thousands of people who worked behind

409
00:14:48,730 --> 00:14:46,880
the scenes to ensure the success of the

410
00:14:51,700 --> 00:14:48,740
mission and the safety of the crew Thor

411
00:14:53,200 --> 00:14:51,710
for every every mission for me every

412
00:14:55,240 --> 00:14:53,210
time I get to work with the the whole

413
00:14:58,630 --> 00:14:55,250

greater community that that's around

414

00:15:00,700 --> 00:14:58,640

sts-133 and utilization flight 5 on the

415

00:15:03,280 --> 00:15:00,710

space station I'm was a little bit

416

00:15:04,870 --> 00:15:03,290

envious that how do they do these things

417

00:15:07,000 --> 00:15:04,880

and I almost admitted that broke of

418

00:15:08,470 --> 00:15:07,010

Mission Control on these guys are been

419

00:15:09,490 --> 00:15:08,480

working for years to get themselves to

420

00:15:11,360 --> 00:15:09,500

the point where they're in the front

421

00:15:13,700 --> 00:15:11,370

rooms and back rooms and the

422

00:15:16,670 --> 00:15:13,710

you know that the way they converge on

423

00:15:18,560 --> 00:15:16,680

no solutions to problems like you've

424

00:15:19,640 --> 00:15:18,570

seen Apollo 13 no we've seen miniature

425

00:15:22,579 --> 00:15:19,650

versions of that every time we do a

426
00:15:24,530 --> 00:15:22,589
simulation run and to watch those guys

427
00:15:27,170 --> 00:15:24,540
work in such great concert together

428
00:15:30,740 --> 00:15:27,180
every time under some pretty strenuous

429
00:15:33,550 --> 00:15:30,750
conditions impresses me the folks at the

430
00:15:35,780 --> 00:15:33,560
Cape what this orbiter together and the

431
00:15:38,329 --> 00:15:35,790
thousands and thousands of hours of

432
00:15:40,579 --> 00:15:38,339
touch labor to refurbish the shuttle and

433
00:15:41,720 --> 00:15:40,589
turn around for another flight for me

434
00:15:43,579 --> 00:15:41,730
has always been a certain fascination

435
00:15:44,120 --> 00:15:43,589
with people who make something out of

436
00:15:47,600 --> 00:15:44,130
nothing

437
00:15:49,460 --> 00:15:47,610
you know metalsmiths carpenters artisans

438
00:15:50,810 --> 00:15:49,470

and this is what these guys do and you

439

00:15:53,210 --> 00:15:50,820

talk to them and they did they don't

440

00:15:55,850 --> 00:15:53,220

they don't seem to get it so well I'm

441

00:15:57,530 --> 00:15:55,860

just a guy who who puts your reaction

442

00:15:59,600 --> 00:15:57,540

control system tank back in here or

443

00:16:01,880 --> 00:15:59,610

works on your your main engines like

444

00:16:04,070 --> 00:16:01,890

yeah but I can't do that I don't know

445

00:16:06,140 --> 00:16:04,080

how you do that and these guys come in

446

00:16:07,810 --> 00:16:06,150

every day with just just a sense of

447

00:16:10,610 --> 00:16:07,820

dedication and pride in what they do and

448

00:16:12,829 --> 00:16:10,620

it's just we just we're just down at the

449

00:16:14,390 --> 00:16:12,839

Cape for our first review of the orbiter

450

00:16:15,530 --> 00:16:14,400

and looking at the condition it's in and

451

00:16:17,690 --> 00:16:15,540

then the pride these people have in

452

00:16:19,430 --> 00:16:17,700

their work it's really great to see that

453

00:16:21,710 --> 00:16:19,440

it's also the folks in a program office

454

00:16:22,910 --> 00:16:21,720

work budgets and schedules and

455

00:16:25,910 --> 00:16:22,920

everything else to watch that whole

456

00:16:27,920 --> 00:16:25,920

thing going concert it amazes me that it

457

00:16:30,079 --> 00:16:27,930

works at all much less how well it works

458

00:16:31,370 --> 00:16:30,089

and I think is just because that sense

459

00:16:35,350 --> 00:16:31,380

of mission and pride that everybody

460

00:16:39,189 --> 00:16:37,869

if you're a launch schedule holes you're

461

00:16:41,049 --> 00:16:39,199

scheduled to be on board the space

462

00:16:43,269 --> 00:16:41,059

station right around the time of the

463

00:16:45,789 --> 00:16:43,279

10th anniversary of the arrival of

464

00:16:47,949 --> 00:16:45,799

expedition 1 that crew has established

465

00:16:50,019 --> 00:16:47,959

continuous human presence on the space

466

00:16:52,119 --> 00:16:50,029

station discuss if you would the

467

00:16:54,669 --> 00:16:52,129

significance of that milestone that that

468

00:16:56,679 --> 00:16:54,679

that they they accomplished and the

469

00:17:01,960 --> 00:16:56,689

future of space station to space

470

00:17:03,039 --> 00:17:01,970

exploration the milestone what keeps

471

00:17:05,500 --> 00:17:03,049

coming back to my mind when I think

472

00:17:07,000 --> 00:17:05,510

about that was when Neil Armstrong's

473

00:17:09,639 --> 00:17:07,010

work when he stepped on the moon you

474

00:17:11,730 --> 00:17:09,649

know one small step for man one giant

475

00:17:15,039 --> 00:17:11,740

leap for mankind

476

00:17:19,269 --> 00:17:15,049

250 miles into space isn't very far I

477

00:17:22,059 --> 00:17:19,279

mean it's a longer drive to Dallas but

478

00:17:23,500 --> 00:17:22,069

you have to practice in your backyard

479

00:17:26,319 --> 00:17:23,510

which you're going to do on the other

480

00:17:28,000 --> 00:17:26,329

side of the world we learned everything

481

00:17:30,129 --> 00:17:28,010

we were going to do on the moon right

482

00:17:32,230 --> 00:17:30,139

here in low Earth orbit we practiced it

483

00:17:33,940 --> 00:17:32,240

here and then we pushed out if we're

484

00:17:36,759 --> 00:17:33,950

going to go and live places like the

485

00:17:38,289 --> 00:17:36,769

moon Mars and Beyond we need to have

486

00:17:38,950 --> 00:17:38,299

figured out how we're going to live off

487

00:17:41,649 --> 00:17:38,960

this planet

488

00:17:43,259 --> 00:17:41,659

we're not that far away from this John

489

00:17:45,370 --> 00:17:43,269

just young described as a can of beans

490

00:17:48,789 --> 00:17:45,380

and this was the place we're gonna do

491

00:17:51,159 --> 00:17:48,799

that we're gonna have this outpost in

492

00:17:54,100 --> 00:17:51,169

space 250 miles up and we're gonna keep

493

00:17:55,690 --> 00:17:54,110

it continuously inhabited and for as

494

00:17:58,269 --> 00:17:55,700

long as we possibly can and this is

495

00:17:59,649 --> 00:17:58,279

coming up on 10 years and it's a small

496

00:18:02,769 --> 00:17:59,659

step in terms of distance

497

00:18:04,419 --> 00:18:02,779

it's a giant leap and it's been a giant

498

00:18:07,810 --> 00:18:04,429

leap since we first started doing this

499

00:18:10,090 --> 00:18:07,820

this was an XJ pin his face back to the

500

00:18:12,129 --> 00:18:10,100

moon we are working internationally

501
00:18:13,509 --> 00:18:12,139
we're working with people who don't

502
00:18:14,950 --> 00:18:13,519
speak our language as their primary

503
00:18:16,539 --> 00:18:14,960
language they don't even use our same

504
00:18:18,399 --> 00:18:16,549
measurement systems they don't have the

505
00:18:19,629 --> 00:18:18,409
same culture and sometimes the first

506
00:18:21,669 --> 00:18:19,639
time we put these components together

507
00:18:23,019 --> 00:18:21,679
for the first minute is on orbit and

508
00:18:24,820 --> 00:18:23,029
it's working

509
00:18:26,860 --> 00:18:24,830
we've never bought a piece back from

510
00:18:29,259 --> 00:18:26,870
space you know not going to work because

511
00:18:31,090 --> 00:18:29,269
it didn't work because it didn't fit the

512
00:18:33,519 --> 00:18:31,100
right way this has been a major

513
00:18:35,230 --> 00:18:33,529

milestone in and when I look back

514

00:18:37,170 --> 00:18:35,240

because I was here when that first

515

00:18:39,300 --> 00:18:37,180

mission went up

516

00:18:41,160 --> 00:18:39,310

how much we've learned how much smarter

517

00:18:43,770 --> 00:18:41,170

we are now ten years later after

518

00:18:46,530 --> 00:18:43,780

continuously operating and constructing

519

00:18:48,930 --> 00:18:46,540

this this vehicle in space then we were

520

00:18:50,520 --> 00:18:48,940

then I would say that we're a much

521

00:18:52,500 --> 00:18:50,530

better prepared for pushing out into the

522

00:18:54,030 --> 00:18:52,510

solar system and living there for long

523

00:18:58,620 --> 00:18:54,040

periods of time then we could have ever

524

00:19:01,800 --> 00:18:58,630

dreamed of back in 1998 give us if you

525

00:19:07,050 --> 00:19:01,810

would just a nutshell bullet bill in a

526

00:19:08,910 --> 00:19:07,060

list of the key objectives of sts-133 in

527

00:19:12,270 --> 00:19:08,920

a nutshell the big thing is to outfit

528

00:19:15,870 --> 00:19:12,280

and resupply the space station if this

529

00:19:18,090 --> 00:19:15,880

were a home or a structure like on the

530

00:19:20,340 --> 00:19:18,100

ground it happens to be in space the

531

00:19:23,310 --> 00:19:20,350

analogy would be they were putting a new

532

00:19:26,100 --> 00:19:23,320

walk-in closet permanently attached to

533

00:19:28,590 --> 00:19:26,110

the space station this permit is

534

00:19:30,450 --> 00:19:28,600

permanent multi-purpose module and we're

535

00:19:33,300 --> 00:19:30,460

going to put a new either storage

536

00:19:36,510 --> 00:19:33,310

platform or deck out out there outside

537

00:19:38,400 --> 00:19:36,520

the Express logistics carrier carrying a

538

00:19:40,410 --> 00:19:38,410

spare radiator a new air conditioner

539

00:19:41,970 --> 00:19:40,420

superior conditioner for the place

540

00:19:43,650 --> 00:19:41,980

those are the big objectives and

541

00:19:45,150 --> 00:19:43,660

everything else we're doing outside for

542

00:19:49,440 --> 00:19:45,160

these spacewalks

543

00:19:51,290 --> 00:19:49,450

is repair this is two six-and-a-half

544

00:19:54,360 --> 00:19:51,300

hour episodes of this whole station

545

00:19:55,500 --> 00:19:54,370

fixing up things that have gotten old in

546

00:19:58,740 --> 00:19:55,510

the 10 years they've been up there in

547

00:20:00,870 --> 00:19:58,750

space and and that's about those the big

548

00:20:02,640 --> 00:20:00,880

objectives for this mission okay and

549

00:20:05,070 --> 00:20:02,650

tell us if you with some of your key

550

00:20:07,260 --> 00:20:05,080

responsibilities on the mission as

551
00:20:09,060 --> 00:20:07,270
mission specialist 1 as mission

552
00:20:11,340 --> 00:20:09,070
specialist 1 I will be on the flight

553
00:20:13,260 --> 00:20:11,350
deck for a sent a glorified flight

554
00:20:14,460 --> 00:20:13,270
engineer helping out with the rest of

555
00:20:17,100 --> 00:20:14,470
the crew during the eight and a half

556
00:20:20,580 --> 00:20:17,110
minute ride to orbit and the subsequent

557
00:20:22,890 --> 00:20:20,590
hour of noon orbital adjustments after

558
00:20:25,680 --> 00:20:22,900
that next couple days I'll spend with

559
00:20:27,750 --> 00:20:25,690
steve lindsey and eric boe working the

560
00:20:29,430 --> 00:20:27,760
space shuttles robotic arm to do the

561
00:20:30,960 --> 00:20:29,440
inspection of the orbiter to make sure

562
00:20:33,210 --> 00:20:30,970
that we're got a good clean bill of

563
00:20:35,280 --> 00:20:33,220

health and I'll do that again once we've

564

00:20:37,200 --> 00:20:35,290

undock from Space Station and then

565

00:20:39,330 --> 00:20:37,210

finally with along with tim kopra i'll

566

00:20:40,320 --> 00:20:39,340

go out and do the two spacewalks that

567

00:20:44,700 --> 00:20:40,330

are scheduled

568

00:20:48,779 --> 00:20:44,710

okay give us some background or your

569

00:20:50,430 --> 00:20:48,789

best description of the PMM kind of tell

570

00:20:52,139 --> 00:20:50,440

us you know what it looks like and maybe

571

00:20:54,060 --> 00:20:52,149

how it differs from a regular

572

00:20:57,000 --> 00:20:54,070

multi-purpose Logistics Module how it's

573

00:21:00,210 --> 00:20:57,010

been outfitted differently to allow it

574

00:21:04,620 --> 00:21:00,220

to be a permanent part of Space Station

575

00:21:07,159 --> 00:21:04,630

okay so the PMM started off his life as

576
00:21:09,210 --> 00:21:07,169
an mplm multi-purpose Logistics Module

577
00:21:11,909 --> 00:21:09,220
that we're simply going to attach

578
00:21:12,840 --> 00:21:11,919
permanently to the space station people

579
00:21:14,879 --> 00:21:12,850
aren't familiar with the multi-purpose

580
00:21:16,350 --> 00:21:14,889
Logistics Module if you've ever seen

581
00:21:17,669 --> 00:21:16,360
those pods containers that people will

582
00:21:19,769 --> 00:21:17,679
come and drop off in your driveway to

583
00:21:22,740 --> 00:21:19,779
give you extra storage that's what it is

584
00:21:24,330 --> 00:21:22,750
it's a big connects you know for storing

585
00:21:26,730 --> 00:21:24,340
things so we bring up big loads of

586
00:21:28,769 --> 00:21:26,740
transfer and we unload that thing and

587
00:21:30,930 --> 00:21:28,779
then we load it back up for things that

588
00:21:32,159 --> 00:21:30,940

need to come back to earth and we take

589

00:21:34,169 --> 00:21:32,169

those things home well this time we're

590

00:21:35,850 --> 00:21:34,179

not bringing it back home the space

591

00:21:38,129 --> 00:21:35,860

station needs some place to store all of

592

00:21:40,110 --> 00:21:38,139

its stuff just anybody's got a house you

593

00:21:41,460 --> 00:21:40,120

know similar the junk piles up and you

594

00:21:42,810 --> 00:21:41,470

need some place to store it and while we

595

00:21:44,940 --> 00:21:42,820

don't have a closet or a big closet

596

00:21:47,250 --> 00:21:44,950

except above the Japanese experiment

597

00:21:49,139 --> 00:21:47,260

module there's a small one up there we

598

00:21:50,430 --> 00:21:49,149

needed something bigger and that's the

599

00:21:52,590 --> 00:21:50,440

point is we're taking one of these pods

600

00:21:54,210 --> 00:21:52,600

containers and we're permanently

601
00:21:56,000 --> 00:21:54,220
attaching it to the space station and

602
00:21:59,549 --> 00:21:56,010
there's a few things come with that

603
00:22:01,680 --> 00:21:59,559
these mplm we're only going to be in

604
00:22:03,830 --> 00:22:01,690
space for no weeks at a time and you

605
00:22:06,090 --> 00:22:03,840
weren't worried about things like

606
00:22:08,519 --> 00:22:06,100
meteorites or debris hitting it and

607
00:22:10,769 --> 00:22:08,529
knocking holes in it and so in this case

608
00:22:13,320 --> 00:22:10,779
we need to outfit it with micro

609
00:22:14,789 --> 00:22:13,330
meteorite debris shielding much like you

610
00:22:16,320 --> 00:22:14,799
see on the Columbus laboratory which is

611
00:22:20,250 --> 00:22:16,330
about the same dimensions as this as

612
00:22:21,419 --> 00:22:20,260
this pmm that we're going to dock you

613
00:22:22,649 --> 00:22:21,429

know people will be in there so you want

614

00:22:26,009 --> 00:22:22,659

to have things like communications in

615

00:22:28,529 --> 00:22:26,019

there you know the ability to have fire

616

00:22:30,060 --> 00:22:28,539

alarms ring inside and things of that

617

00:22:30,990 --> 00:22:30,070

nature I mean it still it's a closet but

618

00:22:32,909 --> 00:22:31,000

if you're gonna be in there you need to

619

00:22:35,310 --> 00:22:32,919

be able to make it a habitable place and

620

00:22:36,570 --> 00:22:35,320

so they've been doing modifications to

621

00:22:38,039 --> 00:22:36,580

this to make it a more permanent

622

00:22:39,509 --> 00:22:38,049

structure rather than this temporary

623

00:22:43,820 --> 00:22:39,519

addition to the space station that comes

624

00:22:48,260 --> 00:22:46,130

the day after you make it to orbit yeah

625

00:22:51,140 --> 00:22:48,270

you're scheduled to do a limited

626

00:22:53,570 --> 00:22:51,150

inspection of the shuttles exterior on

627

00:22:55,550 --> 00:22:53,580

the tiles tell us about that that

628

00:22:58,730 --> 00:22:55,560

procedure and your involvement in it

629

00:23:00,500 --> 00:22:58,740

okay on the second date flight steve

630

00:23:02,060 --> 00:23:00,510

lindsey eric boe and i will be the three

631

00:23:04,310 --> 00:23:02,070

folks who operate the space shuttles

632

00:23:06,470 --> 00:23:04,320

robotic arm mainly to inspect the

633

00:23:08,450 --> 00:23:06,480

leading edges of both wings and the nose

634

00:23:11,300 --> 00:23:08,460

cap on the shuttle and a few other

635

00:23:13,340 --> 00:23:11,310

places around to see if it suffered any

636

00:23:16,190 --> 00:23:13,350

damage from debris coming off the

637

00:23:18,860 --> 00:23:16,200

external tank during a scent you know

638

00:23:21,410 --> 00:23:18,870

from space shuttle Columbia mishap that

639

00:23:22,700 --> 00:23:21,420

was what caused that mishap was a foam

640

00:23:24,560 --> 00:23:22,710

hitting the leading edge one of those

641

00:23:26,930 --> 00:23:24,570

wings and knocking a hole in it so we'll

642

00:23:28,910 --> 00:23:26,940

take a package of sensors one a long

643

00:23:32,090 --> 00:23:28,920

boom the orbiter boom sensing system and

644

00:23:36,050 --> 00:23:32,100

get up close images some of them 3d

645

00:23:37,610 --> 00:23:36,060

images and scans of all those vital

646

00:23:38,930 --> 00:23:37,620

areas on the outside of the shuttle to

647

00:23:43,330 --> 00:23:38,940

make sure our thermal protection is

648

00:23:47,990 --> 00:23:43,340

still in place okay and walk us through

649

00:23:51,110 --> 00:23:48,000

rendezvous and docking day and being

650

00:23:52,940 --> 00:23:51,120

sure to touch on the part post docking

651
00:23:55,400 --> 00:23:52,950
where you actually have to start getting

652
00:23:58,610 --> 00:23:55,410
the logistics carrier out of the payload

653
00:24:00,560 --> 00:23:58,620
Bay attaching the third day in space

654
00:24:01,160 --> 00:24:00,570
start off with us chasing down the space

655
00:24:03,170 --> 00:24:01,170
station

656
00:24:05,150 --> 00:24:03,180
I think it's several miles away and

657
00:24:07,580 --> 00:24:05,160
we'll do is we'll get ourselves to a

658
00:24:09,740 --> 00:24:07,590
point about 600 feet below the space

659
00:24:11,060 --> 00:24:09,750
station and we'll do a quick flip

660
00:24:12,320 --> 00:24:11,070
beneath there so they can take some of

661
00:24:13,580 --> 00:24:12,330
their high-powered optics and take

662
00:24:15,260 --> 00:24:13,590
pictures of the rest of the shuttle that

663
00:24:17,270 --> 00:24:15,270

we couldn't expect with the robot on and

664

00:24:19,010 --> 00:24:17,280

then we'll continue to fly out about

665

00:24:21,290 --> 00:24:19,020

another 400 feet in front of the space

666

00:24:23,090 --> 00:24:21,300

station from there we'll align our

667

00:24:24,770 --> 00:24:23,100

docking port with the space stations

668

00:24:27,890 --> 00:24:24,780

docking port on its front and back up

669

00:24:29,960 --> 00:24:27,900

onto it in a slow waltz with the space

670

00:24:32,930 --> 00:24:29,970

station to do that once that's we've got

671

00:24:34,550 --> 00:24:32,940

a good docking and I did a good airtight

672

00:24:37,130 --> 00:24:34,560

seal between us and the space station

673

00:24:39,530 --> 00:24:37,140

will I think even before we open up the

674

00:24:41,300 --> 00:24:39,540

hatches and meet the crew we've got the

675

00:24:43,280 --> 00:24:41,310

Express logistics carrier which needs to

676
00:24:48,390 --> 00:24:43,290
be ready to come out of the payload Bay

677
00:24:51,240 --> 00:24:48,400
right away and so that's gonna be a

678
00:24:53,160 --> 00:24:51,250
a choreographed sequence of events

679
00:24:54,450 --> 00:24:53,170
between our robot arm and the space

680
00:24:58,080 --> 00:24:54,460
stations robotic arm

681
00:24:59,790 --> 00:24:58,090
the Mystics carrier sits so far forward

682
00:25:02,040 --> 00:24:59,800
in the shuttles payload Bay that when

683
00:25:03,990 --> 00:25:02,050
it's docked the front labs on the space

684
00:25:05,670 --> 00:25:04,000
station blocked the arms ability to grab

685
00:25:08,070 --> 00:25:05,680
it so we cannot grab that logistics

686
00:25:10,590 --> 00:25:08,080
carrier with our own robot arm and so

687
00:25:12,330 --> 00:25:10,600
what will happen is the space stations

688
00:25:13,170 --> 00:25:12,340

robotic arm will be mounted forward on

689

00:25:15,480 --> 00:25:13,180

the space station

690

00:25:17,670 --> 00:25:15,490

I believe it's either the note2 of the

691

00:25:21,180 --> 00:25:17,680

lab will reach into our payload Bay and

692

00:25:22,710 --> 00:25:21,190

grab that logistics carrier out once

693

00:25:24,600 --> 00:25:22,720

it's there it can't get to where it

694

00:25:26,670 --> 00:25:24,610

needs to put that logistics carrier up

695

00:25:29,010 --> 00:25:26,680

on the space station truss so it needs

696

00:25:31,350 --> 00:25:29,020

to reposition itself so once that's out

697

00:25:32,910 --> 00:25:31,360

it will go to position to hand off to us

698

00:25:35,070 --> 00:25:32,920

we'll take our space station our space

699

00:25:37,530 --> 00:25:35,080

shuttle robot arm and grapple that

700

00:25:39,630 --> 00:25:37,540

logistics carrier and the space station

701
00:25:41,130 --> 00:25:39,640
arm with our two crew members leave

702
00:25:42,300 --> 00:25:41,140
nicole stott and team copra and it will

703
00:25:44,960 --> 00:25:42,310
now have gone through the hatch hasn't

704
00:25:47,460 --> 00:25:44,970
gotten aboard the space station we'll

705
00:25:49,700 --> 00:25:47,470
reposition that arm off of the front of

706
00:25:52,170 --> 00:25:49,710
the space station up went to the mobile

707
00:25:54,120 --> 00:25:52,180
servicing system which is best a big

708
00:25:55,800 --> 00:25:54,130
rail car the front face of the truss is

709
00:25:57,360 --> 00:25:55,810
a set of railroad tracks and this thing

710
00:25:59,490 --> 00:25:57,370
can trundle up and down these tracks to

711
00:26:02,670 --> 00:25:59,500
different work sites they'll get it on

712
00:26:04,200 --> 00:26:02,680
that mobile servicing station move out

713
00:26:08,040 --> 00:26:04,210

to where they need to where they can put

714

00:26:09,870 --> 00:26:08,050

the reach both the pallet this Express

715

00:26:12,510 --> 00:26:09,880

logistics carrier and its installation

716

00:26:15,630 --> 00:26:12,520

site on board the truss we will move

717

00:26:17,160 --> 00:26:15,640

with the shuttle arm this carrier to a

718

00:26:18,630 --> 00:26:17,170

point out where the space station arm

719

00:26:20,790 --> 00:26:18,640

can get it and that's called a hand back

720

00:26:22,860 --> 00:26:20,800

we'll hand it back to them they'll grab

721

00:26:24,000 --> 00:26:22,870

it move it on top of the space station

722

00:26:26,670 --> 00:26:24,010

trust well the bottom of the space

723

00:26:29,310 --> 00:26:26,680

station trusts and and get it all

724

00:26:30,660 --> 00:26:29,320

plugged in and then we go pick up with

725

00:26:31,680 --> 00:26:30,670

the rest of our day no meeting and

726

00:26:34,200 --> 00:26:31,690

greeting with the space station crew

727

00:26:36,960 --> 00:26:34,210

okay

728

00:26:38,010 --> 00:26:36,970

you and Tim copra are scheduled to do

729

00:26:41,250 --> 00:26:38,020

two spacewalks

730

00:26:42,810 --> 00:26:41,260

on the mission as you mentioned the

731

00:26:45,060 --> 00:26:42,820

first one will also be your first

732

00:26:48,300 --> 00:26:45,070

spacewalk of your career tell us about

733

00:26:48,780 --> 00:26:48,310

the anticipation level from that excited

734

00:26:50,250 --> 00:26:48,790

about it

735

00:26:51,330 --> 00:26:50,260

and also know just a little bit of

736

00:26:53,190 --> 00:26:51,340

apprehension because just something that

737

00:26:54,090 --> 00:26:53,200

you want to get exactly right and

738

00:26:56,310 --> 00:26:54,100

spacewalks

739

00:26:58,950 --> 00:26:56,320

as you know weather in the pool or in

740

00:27:00,780 --> 00:26:58,960

space are challenging both mentally

741

00:27:02,730 --> 00:27:00,790

physically and emotionally

742

00:27:03,960 --> 00:27:02,740

they do work you to some of your limits

743

00:27:05,700 --> 00:27:03,970

and so I'm looking forward to that

744

00:27:07,950 --> 00:27:05,710

challenge but also want to make sure I'd

745

00:27:11,250 --> 00:27:07,960

know I meet you each objective and those

746

00:27:13,580 --> 00:27:11,260

spacewalks and so I'm looking forward to

747

00:27:18,980 --> 00:27:16,669

there are two Eevee aids on this mission

748

00:27:20,590 --> 00:27:18,990

you and Tim copra will will go outside

749

00:27:23,600 --> 00:27:20,600

and do some things I kind of give us a

750

00:27:26,659 --> 00:27:23,610

big-picture overview of what the

751

00:27:39,590 --> 00:27:26,669

purposes of the EVs are okay for our

752

00:27:43,159 --> 00:27:39,600

mission sts-133 revs:842rpm component

753

00:27:44,840 --> 00:27:43,169

some segments the robotic operators go

754

00:27:46,490 --> 00:27:44,850

out and position it in place using an

755

00:27:48,139 --> 00:27:46,500

arm like a big crane and the

756

00:27:50,029 --> 00:27:48,149

spacewalkers caught there and bolted

757

00:27:52,010 --> 00:27:50,039

down and like anything like you can put

758

00:27:53,389 --> 00:27:52,020

on your house you know you want plumbing

759

00:27:54,889 --> 00:27:53,399

you know you want electricity and

760

00:27:56,899 --> 00:27:54,899

increasingly in this century you want

761

00:27:58,430 --> 00:27:56,909

data a connection so these guys will go

762

00:27:59,899 --> 00:27:58,440

out and put those plumbing lines those

763

00:28:01,490 --> 00:27:59,909

electrical lines and the data lines up

764

00:28:04,789 --> 00:28:01,500

to that particular new piece of the

765

00:28:07,519 --> 00:28:04,799

space station for ours we've got the PMM

766

00:28:09,260 --> 00:28:07,529

the permanent multi-purpose module which

767

00:28:10,700 --> 00:28:09,270

is like a closet no closet don't require

768

00:28:12,919 --> 00:28:10,710

a lot of plumbing don't require a lot of

769

00:28:15,320 --> 00:28:12,929

no data don't require a lot of

770

00:28:16,060 --> 00:28:15,330

electricity so we were just gonna bolt

771

00:28:18,710 --> 00:28:16,070

this thing on

772

00:28:22,279 --> 00:28:18,720

however somewhere along the line in our

773

00:28:23,810 --> 00:28:22,289

training flow we had a nitrogen tank on

774

00:28:26,419 --> 00:28:23,820

what a space station had a glitch it

775

00:28:27,799 --> 00:28:26,429

wasn't providing nitrogen and this

776

00:28:28,970 --> 00:28:27,809

opened the door for us to have two

777

00:28:30,980 --> 00:28:28,980

spacewalks on the mission they were

778

00:28:33,250 --> 00:28:30,990

looking to have us go out and either

779

00:28:36,529 --> 00:28:33,260

repair or replace this nitrogen tank

780

00:28:38,539 --> 00:28:36,539

that tank because of some really smart

781

00:28:41,090 --> 00:28:38,549

troubleshooting when the ground got

782

00:28:43,130 --> 00:28:41,100

fixed the task itself would have been

783

00:28:44,659 --> 00:28:43,140

more than enough for one spacewalk but

784

00:28:47,029 --> 00:28:44,669

not quite enough for two

785

00:28:49,370 --> 00:28:47,039

and so the space station program put out

786

00:28:51,110 --> 00:28:49,380

a casting call for any other tasks that

787

00:28:52,399 --> 00:28:51,120

could be added on to fill up the time on

788

00:28:54,769 --> 00:28:52,409

the second spacewalk since we're out the

789

00:28:56,570 --> 00:28:54,779

door I found there was a long list of

790

00:28:59,060 --> 00:28:56,580

tasks more than two spacewalks worth

791

00:29:01,580 --> 00:28:59,070

that were out there so even though the

792

00:29:03,560 --> 00:29:01,590

tank problem itself had gone away these

793

00:29:05,299 --> 00:29:03,570

this long list of tasks none of which

794

00:29:07,250 --> 00:29:05,309

would have been important enough when

795

00:29:09,500 --> 00:29:07,260

it's owed to a merited spacewalk the

796

00:29:10,639 --> 00:29:09,510

conglomerate of them all kind of went

797

00:29:12,560 --> 00:29:10,649

over the threshold where it was worth

798

00:29:13,850 --> 00:29:12,570

having two spacewalks to catch up the

799

00:29:16,909 --> 00:29:13,860

space station without using space

800

00:29:18,350 --> 00:29:16,919

station assets without taxing the space

801
00:29:19,820 --> 00:29:18,360
station crew members extra time they

802
00:29:21,680 --> 00:29:19,830
have their own scheduled spacewalks but

803
00:29:22,970 --> 00:29:21,690
we're up there we've got the assets

804
00:29:26,029 --> 00:29:22,980
we've got the people let's go ahead and

805
00:29:27,440 --> 00:29:26,039
go out and do these service repairs on

806
00:29:29,090 --> 00:29:27,450
the space station so it much

807
00:29:30,860 --> 00:29:29,100
resembles what we would call a stage

808
00:29:32,810 --> 00:29:30,870
space walk something where the shuttle

809
00:29:34,399 --> 00:29:32,820
wouldn't be there where you're servicing

810
00:29:35,659 --> 00:29:34,409
or repairing or outfitting of the space

811
00:29:38,840 --> 00:29:35,669
station and those are the two spacewalks

812
00:29:41,539 --> 00:29:38,850
that we're gonna do a bunch of I call

813
00:29:44,120 --> 00:29:41,549

them dogs and cats but no elephants okay

814

00:29:47,360 --> 00:29:44,130

then go ahead and if you would give us

815

00:29:49,490 --> 00:29:47,370

an overview of the tasks you're gonna do

816

00:29:50,960 --> 00:29:49,500

on the first spacewalk eta one okay our

817

00:29:53,629 --> 00:29:50,970

first spacewalk that we're going to do

818

00:29:56,149 --> 00:29:53,639

it starts off and then the bulk of that

819

00:29:57,919 --> 00:29:56,159

is going to be cleaning up from the last

820

00:30:04,060 --> 00:29:57,929

spacewalk that our space station crew

821

00:30:09,799 --> 00:30:07,850

ammonia pump for our cooling system fail

822

00:30:11,720 --> 00:30:09,809

aboard the space station and we need to

823

00:30:14,750 --> 00:30:11,730

go and replace it that task is very long

824

00:30:16,279 --> 00:30:14,760

and involved and they got the new pump

825

00:30:17,509 --> 00:30:16,289

in place they got the space station in a

826

00:30:19,700 --> 00:30:17,519

configuration where it could sustain

827

00:30:23,240 --> 00:30:19,710

itself but the old pump needed to be put

828

00:30:24,710 --> 00:30:23,250

away and a lot of the tools and things

829

00:30:26,990 --> 00:30:24,720

that were out there had to be put away

830

00:30:28,639 --> 00:30:27,000

too and next opportunity to do that was

831

00:30:31,639 --> 00:30:28,649

going to be during our spacewalks so we

832

00:30:35,240 --> 00:30:31,649

will start right off with going out to

833

00:30:36,980 --> 00:30:35,250

pick up that failed pump and putting it

834

00:30:38,690 --> 00:30:36,990

back in the storage location for the

835

00:30:40,850 --> 00:30:38,700

replacement pump it's got a big tent

836

00:30:43,310 --> 00:30:40,860

that it goes into and we'll put it in

837

00:30:46,460 --> 00:30:43,320

there and bolt it down

838

00:30:48,710 --> 00:30:46,470

once that's done Tim Coker will go off

839

00:30:50,450 --> 00:30:48,720

and and and we'll split up and do

840

00:30:51,830 --> 00:30:50,460

different separate tasks I think our

841

00:30:55,370 --> 00:30:51,840

next thing we're going to go do from

842

00:30:57,470 --> 00:30:55,380

there is bring in a portable foot

843

00:30:59,600 --> 00:30:57,480

restraint I think at least portable foot

844

00:31:00,980 --> 00:30:59,610

restraints the ski bindings to hold us

845

00:31:03,289 --> 00:31:00,990

to the space station there's times when

846

00:31:05,149 --> 00:31:03,299

we have to go put a lot of torque or

847

00:31:07,460 --> 00:31:05,159

force on the space station to turn a

848

00:31:09,379 --> 00:31:07,470

wheel turn a bolt and we need something

849

00:31:11,690 --> 00:31:09,389

to take that reaction otherwise we'll

850

00:31:13,220 --> 00:31:11,700

just simply go the opposite way where we

851
00:31:16,129 --> 00:31:13,230
don't have any weight in space

852
00:31:17,480 --> 00:31:16,139
we've got probably a dozen of these foot

853
00:31:19,070 --> 00:31:17,490
restraints in different spots around the

854
00:31:21,139 --> 00:31:19,080
space station and we can unplug them and

855
00:31:22,879 --> 00:31:21,149
take from the places but they need to be

856
00:31:24,409 --> 00:31:22,889
updated there's some new equipment and

857
00:31:26,210 --> 00:31:24,419
configurations need to be done so this

858
00:31:28,580 --> 00:31:26,220
one is one of the remaining ones that

859
00:31:31,129 --> 00:31:28,590
needs to be brought inside so we'll grab

860
00:31:32,779 --> 00:31:31,139
that one and bring it inside but first

861
00:31:34,970 --> 00:31:32,789
we need to take a another foot or screen

862
00:31:36,230 --> 00:31:34,980
out there to that spot and plug it in

863
00:31:38,299 --> 00:31:36,240

there's this huge tool stanchions

864

00:31:39,590 --> 00:31:38,309

attached to it and it's it not something

865

00:31:41,180 --> 00:31:39,600

want to lug around so we'll just simply

866

00:31:43,070 --> 00:31:41,190

move the short distance to the one

867

00:31:44,300 --> 00:31:43,080

already fixed and we'll bring the one

868

00:31:47,810 --> 00:31:44,310

that needs updating back into the

869

00:31:52,100 --> 00:31:47,820

airlock for repair once we're done with

870

00:31:55,280 --> 00:31:52,110

that we've got a light and camera

871

00:31:56,660 --> 00:31:55,290

assembly out on the starboard truss and

872

00:31:59,060 --> 00:31:56,670

gives us great views of the earth great

873

00:32:00,710 --> 00:31:59,070

views of the stack from out there in the

874

00:32:04,400 --> 00:32:00,720

truss and great views of the solar

875

00:32:06,110 --> 00:32:04,410

arrays however with this new ELC four

876

00:32:08,450 --> 00:32:06,120

platform that we're taking out to the

877

00:32:10,130 --> 00:32:08,460

space station a lot of that views

878

00:32:12,050 --> 00:32:10,140

outboard are going to be blocked and a

879

00:32:13,850 --> 00:32:12,060

lot of the cameras not just its views

880

00:32:15,470 --> 00:32:13,860

are blocked by this new platform in

881

00:32:17,120 --> 00:32:15,480

order to recover some of that field of

882

00:32:19,580 --> 00:32:17,130

view we're going to take this whole post

883

00:32:21,410 --> 00:32:19,590

incant it inboard about 30 degrees and

884

00:32:22,580 --> 00:32:21,420

give you some more views that you have

885

00:32:25,280 --> 00:32:22,590

more views the earth more views the

886

00:32:28,460 --> 00:32:25,290

space station so we when you take out a

887

00:32:30,290 --> 00:32:28,470

wedge a big shim and put it between that

888

00:32:32,240 --> 00:32:30,300

light stanchion and the trust itself to

889

00:32:36,100 --> 00:32:32,250

hold this thing inboard about 30 degrees

890

00:32:38,180 --> 00:32:36,110

and Tim and I will do that task together

891

00:32:40,190 --> 00:32:38,190

well next thing we're going to do is set

892

00:32:43,010 --> 00:32:40,200

up so we can take this mobile service

893

00:32:45,950 --> 00:32:43,020

mobile based system that arm that sits

894

00:32:50,570 --> 00:32:45,960

on a basement a rail car let it go out

895

00:32:53,240 --> 00:32:50,580

past the end of the starboard truss 1s1

896

00:32:55,040 --> 00:32:53,250

trust it's a able to go out into the

897

00:32:58,280 --> 00:32:55,050

rotating components of the space station

898

00:32:59,720 --> 00:32:58,290

on an s3 and outboard provide there's a

899

00:33:02,030 --> 00:32:59,730

linkage and that rail system that lets

900

00:33:04,270 --> 00:33:02,040

it go across so what we're going to do

901
00:33:07,430 --> 00:33:04,280
is put up it's basically a mini bridge

902
00:33:10,010 --> 00:33:07,440
and they're called rail stubs that allow

903
00:33:12,590 --> 00:33:10,020
this the wheels for that rail car to

904
00:33:15,050 --> 00:33:12,600
move from the s-1 trust out board onto

905
00:33:16,490 --> 00:33:15,060
the s3 truss and we'll go ahead and

906
00:33:18,710 --> 00:33:16,500
clamp those two down they'll be just to

907
00:33:20,960 --> 00:33:18,720
will put up there we've also got some

908
00:33:22,400 --> 00:33:20,970
stops out there to physically keep this

909
00:33:24,410 --> 00:33:22,410
thing from rolling off the edge of s1

910
00:33:26,690 --> 00:33:24,420
before they had these stubs out there

911
00:33:28,370 --> 00:33:26,700
and so and they're just alone hinges we

912
00:33:30,260 --> 00:33:28,380
simply roll those stops down out of the

913
00:33:31,580 --> 00:33:30,270

way and allow that rail car to go

914

00:33:33,320 --> 00:33:31,590

inboard and outboard from there and

915

00:33:34,400 --> 00:33:33,330

that's gonna be the big part of our task

916

00:33:38,960 --> 00:33:34,410

right there

917

00:33:41,000 --> 00:33:38,970

let's see and finally we have a payload

918

00:33:43,160 --> 00:33:41,010

from the Japanese Space Agency it's

919

00:33:45,350 --> 00:33:43,170

called message in a bottle we're simply

920

00:33:48,020 --> 00:33:45,360

going to open this bottle up and get a

921

00:33:49,790 --> 00:33:48,030

sample of the vacuum of space it's a big

922

00:33:52,910 --> 00:33:49,800

thermos bottle and we open it up and

923

00:33:54,710 --> 00:33:52,920

allow it to equalize with the vacuum of

924

00:33:55,119 --> 00:33:54,720

space out there and then we seal it back

925

00:33:57,049 --> 00:33:55,129

up

926
00:33:58,970 --> 00:33:57,059
oddly enough being out there in space

927
00:34:00,350 --> 00:33:58,980
you've got a better vacuum there that

928
00:34:01,639 --> 00:34:00,360
can you get here on earth with any kind

929
00:34:03,499 --> 00:34:01,649
of pumps so you really have a more

930
00:34:05,419 --> 00:34:03,509
perfect vacuum we'll get some

931
00:34:06,769 --> 00:34:05,429
photographs for the Japanese Space

932
00:34:10,240 --> 00:34:06,779
Agency and we'll bring that in and that

933
00:34:12,859 --> 00:34:10,250
would wrap up our first spacewalk and

934
00:34:15,169 --> 00:34:12,869
for the second evie a what's the current

935
00:34:18,589 --> 00:34:15,179
plan for that one okay for the second

936
00:34:21,669 --> 00:34:18,599
day spacewalk I'll start off on my part

937
00:34:24,409 --> 00:34:21,679
to go out to that failed pump module and

938
00:34:25,579 --> 00:34:24,419

there is some residual ammonia sitting

939

00:34:27,260 --> 00:34:25,589

in that tank this isn't the kind of

940

00:34:28,430 --> 00:34:27,270

bottle of ammonia you have under sitting

941

00:34:30,440 --> 00:34:28,440

on your sink in the kitchen or your

942

00:34:32,809 --> 00:34:30,450

bathroom this 100 percent ammonia it's

943

00:34:34,220 --> 00:34:32,819

pretty noxious stuff and we don't really

944

00:34:37,909 --> 00:34:34,230

want to carry that back down to earth

945

00:34:40,099 --> 00:34:37,919

with us so what we can do is vent that

946

00:34:42,649 --> 00:34:40,109

out into space where it's harmless and

947

00:34:45,799 --> 00:34:42,659

we can bring back an empty tank empty

948

00:34:47,629 --> 00:34:45,809

pump module so what I'll do is take a

949

00:34:49,039 --> 00:34:47,639

vent line that I've already set up on

950

00:34:51,319 --> 00:34:49,049

the first day spacewalk when you bring

951
00:34:54,700 --> 00:34:51,329
back this fill pump module I'll connect

952
00:34:57,559 --> 00:34:54,710
that vent line to the module itself and

953
00:34:59,390 --> 00:34:57,569
close the bail to let it vent itself out

954
00:35:00,230 --> 00:34:59,400
into space and it takes about maybe 90

955
00:35:01,609 --> 00:35:00,240
seconds two minutes

956
00:35:04,849 --> 00:35:01,619
for other than mowing an event itself

957
00:35:07,309 --> 00:35:04,859
overboard once that's done I'll close up

958
00:35:09,559 --> 00:35:07,319
and cap that failed module close up the

959
00:35:11,180 --> 00:35:09,569
tent flap behind it and let it sit until

960
00:35:14,359 --> 00:35:11,190
a future mission brings it back to earth

961
00:35:16,339 --> 00:35:14,369
and then what I'll do is take that vent

962
00:35:17,210 --> 00:35:16,349
those vent tools and those bags that

963
00:35:19,700 --> 00:35:17,220

were leftover from that original

964

00:35:22,420 --> 00:35:19,710

spacewalk put them back in the original

965

00:35:25,220 --> 00:35:22,430

bags and put them back on top of the

966

00:35:27,260 --> 00:35:25,230

airlock where those bags stay for any

967

00:35:29,089 --> 00:35:27,270

for any future doesn't have to change

968

00:35:32,780 --> 00:35:29,099

under the pump module or the spacewalk

969

00:35:35,329 --> 00:35:32,790

for repair once I'm done with that I'll

970

00:35:37,010 --> 00:35:35,339

head out on to what was our normal

971

00:35:39,890 --> 00:35:37,020

profile for them they're doing the

972

00:35:42,740 --> 00:35:39,900

repairs on a space station we have the

973

00:35:44,990 --> 00:35:42,750

that platform that ELC for platform that

974

00:35:49,010 --> 00:35:45,000

we're putting out on the s3 truss

975

00:35:50,359 --> 00:35:49,020

segment there's a computer control box I

976

00:35:52,010 --> 00:35:50,369

can't think what platform needing

977

00:35:54,260 --> 00:35:52,020

computer control but this one does and

978

00:35:57,710 --> 00:35:54,270

it has a thermal blanket on it to keep

979

00:35:59,690 --> 00:35:57,720

it from getting overly warm and well it

980

00:36:01,010 --> 00:35:59,700

needed that for the launch part but for

981

00:36:03,440 --> 00:36:01,020

sitting in space it doesn't need that

982

00:36:05,059 --> 00:36:03,450

blanket so I'll go out and grab that

983

00:36:06,900 --> 00:36:05,069

blanket and roll it up and put it in a

984

00:36:08,700 --> 00:36:06,910

bag

985

00:36:10,530 --> 00:36:08,710

and if you've ever seen Charlie Brown

986

00:36:11,490 --> 00:36:10,540

and Linus is a blanket that's the part

987

00:36:14,820 --> 00:36:11,500

that worries like me this blanket

988

00:36:17,700 --> 00:36:14,830

suddenly turns ugly and attacks me

989

00:36:19,410 --> 00:36:17,710

we had some bags I call them Jefferson

990

00:36:21,660 --> 00:36:19,420

stowage bags they're just their laundry

991

00:36:23,070 --> 00:36:21,670

bags it's a glorified name for a laundry

992

00:36:25,980 --> 00:36:23,080

bag they're sitting out on one of our

993

00:36:27,540 --> 00:36:25,990

cedar carts one of those hand portable

994

00:36:30,360 --> 00:36:27,550

rail carts and they some of the mobile

995

00:36:32,190 --> 00:36:30,370

base system and we'll grab those three

996

00:36:34,620 --> 00:36:32,200

bags and put them in the same bag as

997

00:36:36,050 --> 00:36:34,630

that blanket and it was untie them they

998

00:36:39,000 --> 00:36:36,060

were taken out for the pump module

999

00:36:41,670 --> 00:36:39,010

repair task by Doug Wheelock and Tracy

1000

00:36:42,990 --> 00:36:41,680

Caldwell Dyson earlier and I'll go and

1001
00:36:44,760 --> 00:36:43,000
clean those up and bring them back in

1002
00:36:48,330 --> 00:36:44,770
for this one so we can stage him for the

1003
00:36:52,230 --> 00:36:48,340
next task for time we go outside once

1004
00:36:54,720 --> 00:36:52,240
that's done I'll go over to the port

1005
00:36:57,240 --> 00:36:54,730
side of the other truss segment there is

1006
00:36:58,830 --> 00:36:57,250
a working light that we can put inside

1007
00:37:00,000 --> 00:36:58,840
for people who do work inside the trust

1008
00:37:02,190 --> 00:37:00,010
because it's obviously dark even when

1009
00:37:04,830 --> 00:37:02,200
the Sun's up it's called a seat of light

1010
00:37:06,750 --> 00:37:04,840
and I will take that light out there and

1011
00:37:08,310 --> 00:37:06,760
install that one and get it plugged in

1012
00:37:10,910 --> 00:37:08,320
and and then they can do a quick power

1013
00:37:13,830 --> 00:37:10,920

check while I'm out there I'll be on s3

1014

00:37:15,900 --> 00:37:13,840

I'll come in board from that task and go

1015

00:37:18,030 --> 00:37:15,910

up to the very roof of that truss

1016

00:37:21,950 --> 00:37:18,040

segment on s1 where s1 meets the

1017

00:37:23,880 --> 00:37:21,960

rotating components from s3 there is a

1018

00:37:26,520 --> 00:37:23,890

one of the boxes out there has a

1019

00:37:28,680 --> 00:37:26,530

connector to it no big data connector

1020

00:37:30,330 --> 00:37:28,690

and the bail itself needs to be shielded

1021

00:37:32,610 --> 00:37:30,340

from sunlight so it doesn't get too hot

1022

00:37:34,650 --> 00:37:32,620

or too cold some of that shielding that

1023

00:37:35,910 --> 00:37:34,660

blanket has peeled away and the

1024

00:37:37,770 --> 00:37:35,920

program's concerned that it's getting

1025

00:37:40,320 --> 00:37:37,780

sunlight is getting put dude getting too

1026

00:37:43,890 --> 00:37:40,330

hot I'll simply take that blanket put it

1027

00:37:47,400 --> 00:37:43,900

back over top of the connector and use a

1028

00:37:49,290 --> 00:37:47,410

wire tie it's a coat hanger realize all

1029

00:37:51,630 --> 00:37:49,300

it is and wrap it around that to hold it

1030

00:37:53,280 --> 00:37:51,640

down so it doesn't peel back again take

1031

00:37:55,200 --> 00:37:53,290

a quick picture of it so people can see

1032

00:37:57,900 --> 00:37:55,210

it's in a proper configuration and then

1033

00:38:00,330 --> 00:37:57,910

I'll head down to the underside of that

1034

00:38:03,690 --> 00:38:00,340

same trust on the Earth's side of it and

1035

00:38:05,340 --> 00:38:03,700

where we've got these basically

1036

00:38:07,320 --> 00:38:05,350

receivers for

1037

00:38:09,330 --> 00:38:07,330

these grapple bars that go on the

1038

00:38:11,820 --> 00:38:09,340

radiators the Raiders themselves nearly

1039

00:38:13,920 --> 00:38:11,830

they fold out like accordions and I mean

1040

00:38:16,470 --> 00:38:13,930

if they're folded up in order to move in

1041

00:38:18,570 --> 00:38:16,480

and install them for a placement they've

1042

00:38:20,160 --> 00:38:18,580

got this big like it's like a double y

1043

00:38:22,890 --> 00:38:20,170

shaped

1044

00:38:24,960 --> 00:38:22,900

that allows you to grapple it itself

1045

00:38:26,520 --> 00:38:24,970

ties to the radiators and it has a

1046

00:38:28,470 --> 00:38:26,530

grapple fixture on it so the robot arm

1047

00:38:30,030 --> 00:38:28,480

can grapple to it well when you've got

1048

00:38:32,700 --> 00:38:30,040

the radiator deployed you need some

1049

00:38:34,320 --> 00:38:32,710

place to park that grapple beam and so

1050

00:38:37,260 --> 00:38:34,330

we've got these stowage receptacles for

1051

00:38:38,550 --> 00:38:37,270

it and on a previous spacewalk they went

1052

00:38:40,020 --> 00:38:38,560

out there and tried to bolt them down

1053

00:38:42,360 --> 00:38:40,030

and the bolts just wouldn't sit quite so

1054

00:38:44,280 --> 00:38:42,370

they're wobbly my job is to go out there

1055

00:38:45,810 --> 00:38:44,290

and take a look at it do some

1056

00:38:47,220 --> 00:38:45,820

troubleshooting to see if we can figure

1057

00:38:48,930 --> 00:38:47,230

out why these things aren't cinched down

1058

00:38:51,240 --> 00:38:48,940

as tightly as they'd like them cinched

1059

00:38:53,820 --> 00:38:51,250

and if I can fix it so that they are

1060

00:38:55,560 --> 00:38:53,830

cinched down where they need to be I'll

1061

00:38:57,510 --> 00:38:55,570

look at both those beams and when I'm

1062

00:38:59,940 --> 00:38:57,520

done with that task I'll head over to

1063

00:39:02,280 --> 00:38:59,950

note 3 the newest module in space

1064

00:39:05,910 --> 00:39:02,290

station where we have a row of

1065

00:39:07,440 --> 00:39:05,920

connectors on the very port most side of

1066

00:39:09,600 --> 00:39:07,450

it and out port side of that knot of

1067

00:39:11,070 --> 00:39:09,610

that module there's a blanket over top

1068

00:39:13,200 --> 00:39:11,080

of it and we'd like to remove that

1069

00:39:16,080 --> 00:39:13,210

blanket so we can have access to all the

1070

00:39:19,500 --> 00:39:16,090

power and data connections out there for

1071

00:39:21,720 --> 00:39:19,510

future missions and so what's up just a

1072

00:39:23,550 --> 00:39:21,730

strip of cloth maybe about three or four

1073

00:39:26,520 --> 00:39:23,560

feet long I'll roll that up and put it

1074

00:39:28,590 --> 00:39:26,530

into the bag and make off with that I

1075

00:39:31,950 --> 00:39:28,600

think once that's done I'll head back to

1076

00:39:35,940 --> 00:39:31,960

the airlock and drop that bag off pick

1077

00:39:38,790 --> 00:39:35,950

up a lens cover to put on to one of our

1078

00:39:40,200 --> 00:39:38,800

cameras the glass itself we'd like

1079

00:39:41,880 --> 00:39:40,210

something that we can replace so if it

1080

00:39:44,040 --> 00:39:41,890

gets pitted or scratched you don't have

1081

00:39:46,440 --> 00:39:44,050

to bring a whole camera home this one

1082

00:39:49,020 --> 00:39:46,450

sets up on top that mobile base system

1083

00:39:51,510 --> 00:39:49,030

up on the very front face of the space

1084

00:39:54,210 --> 00:39:51,520

station it's called a poet and don't ask

1085

00:39:56,310 --> 00:39:54,220

me what the POA stands for but it's a

1086

00:39:58,020 --> 00:39:56,320

it's a fixed receptacle that you can you

1087

00:39:59,600 --> 00:39:58,030

can bring module sit it'll grapple to

1088

00:40:02,730 --> 00:39:59,610

them the same way that the robot arm

1089

00:40:04,170 --> 00:40:02,740

grapples to an object and that's where

1090

00:40:06,930 --> 00:40:04,180

we had that failed pump module that's

1091

00:40:08,670 --> 00:40:06,940

been it sits there until we do our space

1092

00:40:11,100 --> 00:40:08,680

Walker and move it I'm gonna go out on

1093

00:40:13,110 --> 00:40:11,110

the camera on that one and simply put a

1094

00:40:14,850 --> 00:40:13,120

protective lens cover over top of it and

1095

00:40:16,290 --> 00:40:14,860

then head back down to the to the

1096

00:40:19,120 --> 00:40:16,300

airlock with Tim and that should wrap up

1097

00:40:21,559 --> 00:40:19,130

our second spacewalk

1098

00:40:23,720 --> 00:40:21,569

after your work on station is complete

1099

00:40:27,680 --> 00:40:23,730

you will undock and prepare for the trip

1100

00:40:31,519 --> 00:40:27,690

back to earth it might be one of the

1101
00:40:33,950 --> 00:40:31,529
last opportunities for anybody to see a

1102
00:40:36,430 --> 00:40:33,960
Space Station from the vantage point of

1103
00:40:39,400 --> 00:40:36,440
inside of a shuttle while backing away

1104
00:40:41,630 --> 00:40:39,410
as you sit here today trying to imagine

1105
00:40:43,549 --> 00:40:41,640
that moment what what goes through your

1106
00:40:47,180 --> 00:40:43,559
head about about the profoundness of

1107
00:40:48,529 --> 00:40:47,190
that a little bit sad and also a little

1108
00:40:50,480 --> 00:40:48,539
bit happy that no the space show has

1109
00:40:52,160 --> 00:40:50,490
done such good things to be able to be

1110
00:40:54,710 --> 00:40:52,170
one of those lucky people to get to see

1111
00:40:56,779 --> 00:40:54,720
that from the shuttle uppermost in my

1112
00:40:58,579 --> 00:40:56,789
mind I know when I'm there doing it

1113
00:40:59,809 --> 00:40:58,589

because the same thing last time I

1114

00:41:02,299 --> 00:40:59,819

backed away from the space station was

1115

00:41:03,799 --> 00:41:02,309

get the pictures yeah you want to have

1116

00:41:05,690 --> 00:41:03,809

some just some really good shots to

1117

00:41:07,279 --> 00:41:05,700

bring back to everybody of that it's the

1118

00:41:10,009 --> 00:41:07,289

only chance you get to see certain parts

1119

00:41:11,690 --> 00:41:10,019

of the space station is the camera shots

1120

00:41:14,140 --> 00:41:11,700

we take while we're undocking and flying

1121

00:41:15,980 --> 00:41:14,150

away it's also some of the big you know

1122

00:41:16,999 --> 00:41:15,990

photographic moments you know the things

1123

00:41:18,349 --> 00:41:17,009

that people really want to see they're

1124

00:41:20,029 --> 00:41:18,359

really gorgeous shots you get to the

1125

00:41:21,589 --> 00:41:20,039

space station and it's nice to be able

1126
00:41:24,170 --> 00:41:21,599
to share those views with people on the

1127
00:41:26,690 --> 00:41:24,180
ground so I'm gonna have a camera handy

1128
00:41:28,940 --> 00:41:26,700
and all my battery of lenses out there

1129
00:41:30,740 --> 00:41:28,950
and trying and get getting good shots to

1130
00:41:32,660 --> 00:41:30,750
the space station has been walking over

1131
00:41:35,299 --> 00:41:32,670
getting away so it's not just me trying

1132
00:41:36,680 --> 00:41:35,309
to describe how beautiful wasn't up all

1133
00:41:41,329 --> 00:41:36,690
the way people will see it with their

1134
00:41:42,769 --> 00:41:41,339
own two eyes this mission is scheduled

1135
00:41:45,829 --> 00:41:42,779
to be one of the last space shuttle

1136
00:41:47,180 --> 00:41:45,839
missions what does it mean to you two to

1137
00:41:52,370 --> 00:41:47,190
the had a part in the space shuttle

1138
00:41:53,690 --> 00:41:52,380

program no I didn't appreciate how lucky

1139

00:41:55,490 --> 00:41:53,700

it was me in the space shuttle program

1140

00:41:57,140 --> 00:41:55,500

when I first got here I just happy to be

1141

00:41:58,519 --> 00:41:57,150

an astronaut being in the space program

1142

00:42:02,390 --> 00:41:58,529

and the shuttle was a way to get into

1143

00:42:04,940 --> 00:42:02,400

space in our space program we've been in

1144

00:42:08,990 --> 00:42:04,950

space now for what since the late 50s

1145

00:42:11,870 --> 00:42:09,000

early 60s we've only had one program

1146

00:42:13,670 --> 00:42:11,880

with a hypersonic reentry vehicle that

1147

00:42:16,009 --> 00:42:13,680

landed like an airplane and had the

1148

00:42:19,249 --> 00:42:16,019

capability no other spacecraft I know of

1149

00:42:20,299 --> 00:42:19,259

have robot arms on the spacecraft out

1150

00:42:21,470 --> 00:42:20,309

there you know come back in the

1151
00:42:23,420 --> 00:42:21,480
atmosphere and land like an airplane

1152
00:42:26,539 --> 00:42:23,430
take off like a rocket and do the things

1153
00:42:27,950 --> 00:42:26,549
that the Space Shuttle does I don't know

1154
00:42:30,140 --> 00:42:27,960
we're gonna get there for a very long

1155
00:42:31,730 --> 00:42:30,150
time it was a it was a pretty bold

1156
00:42:32,090 --> 00:42:31,740
audacious thing we did back in the

1157
00:42:34,730 --> 00:42:32,100
sixties

1158
00:42:36,260 --> 00:42:34,740
70s to build such a spacecraft and to

1159
00:42:38,360 --> 00:42:36,270
have been one of the people who got to

1160
00:42:43,430 --> 00:42:38,370
be a crew member on board something with

1161
00:42:45,830 --> 00:42:43,440
that type of capability it's just it's a

1162
00:42:47,300 --> 00:42:45,840
privilege I just assumed that once the

1163
00:42:49,700 --> 00:42:47,310

shuttle was done flying that we would

1164

00:42:51,290 --> 00:42:49,710

have something bigger and more capable

1165

00:42:52,430 --> 00:42:51,300

that would take us further you know and

1166

00:42:54,470 --> 00:42:52,440

the shuttles that might go to the moon

1167

00:42:56,120 --> 00:42:54,480

or something like that but we've gone

1168

00:42:58,010 --> 00:42:56,130

the other way we're going to capsules

1169

00:42:59,210 --> 00:42:58,020

and of course they don't know you need

1170

00:43:01,100 --> 00:42:59,220

something that's big and complex for

1171

00:43:03,830 --> 00:43:01,110

what we have envisioned for NASA out in

1172

00:43:05,570 --> 00:43:03,840

the future and I understand that but but

1173

00:43:06,710 --> 00:43:05,580

virtually I understand that it's know

1174

00:43:08,410 --> 00:43:06,720

that we're not gonna have something that

1175

00:43:13,190 --> 00:43:08,420

that's as cool as the shuttle wasn't no

1176

00:43:14,990 --> 00:43:13,200

it's more practical okay this is also

1177

00:43:17,810 --> 00:43:15,000

scheduled to be the the last flight of

1178

00:43:19,760 --> 00:43:17,820

space shuttle discovery it's the most

1179

00:43:24,130 --> 00:43:19,770

accomplished shuttle in the shuttle

1180

00:43:29,290 --> 00:43:24,140

fleet if you had to compile a list of

1181

00:43:34,130 --> 00:43:31,610

activities events it's been involved in

1182

00:43:36,050 --> 00:43:34,140

what which which one's come to mind that

1183

00:43:38,240 --> 00:43:36,060

you would say would definitely have to

1184

00:43:40,010 --> 00:43:38,250

be on that list well I understand them

1185

00:43:42,560 --> 00:43:40,020

I had the perspective of a test pilot

1186

00:43:44,450 --> 00:43:42,570

and the holy grail of your test pilot is

1187

00:43:45,890 --> 00:43:44,460

to fly the first mission of anything you

1188

00:43:47,360 --> 00:43:45,900

know anytime you brand-new airplane

1189

00:43:49,040 --> 00:43:47,370

comes out you want to go fly that first

1190

00:43:50,330 --> 00:43:49,050

flight or if you take some new

1191

00:43:52,600 --> 00:43:50,340

configuration you want to be the one to

1192

00:43:55,100 --> 00:43:52,610

take it up for the first time to go see

1193

00:43:57,560 --> 00:43:55,110

will it work or discover something new

1194

00:44:00,170 --> 00:43:57,570

that nobody's seen before and so given

1195

00:44:01,460 --> 00:44:00,180

that in Discovery's past and understand

1196

00:44:04,430 --> 00:44:01,470

that Columbia was the first shuttle to

1197

00:44:06,860 --> 00:44:04,440

actually fly but discovery was the very

1198

00:44:08,840 --> 00:44:06,870

first shuttle to fly after we lost

1199

00:44:10,940 --> 00:44:08,850

Challenger after we completely

1200

00:44:12,830 --> 00:44:10,950

reconfigured the solid rocket motors and

1201

00:44:15,530 --> 00:44:12,840

the configuration of the space shuttle

1202

00:44:18,020 --> 00:44:15,540

the first one to go out there and tiptoe

1203

00:44:21,080 --> 00:44:18,030

back out there was where the crew aboard

1204

00:44:23,960 --> 00:44:21,090

discovery likewise after we lost

1205

00:44:26,870 --> 00:44:23,970

Columbia and several years ago the first

1206

00:44:29,720 --> 00:44:26,880

shell that fly back in space again was

1207

00:44:31,460 --> 00:44:29,730

discovery and we learned a lot from that

1208

00:44:32,660 --> 00:44:31,470

also we ground ourselves again because

1209

00:44:35,060 --> 00:44:32,670

we discovered a lot of things that were

1210

00:44:37,010 --> 00:44:35,070

still problems with that with what we

1211

00:44:37,820 --> 00:44:37,020

were trying to fix and so we had a

1212

00:44:40,040 --> 00:44:37,830

second

1213

00:44:44,060 --> 00:44:40,050

no first flight and again a year later

1214

00:44:45,320 --> 00:44:44,070

on sts-121 was again discovery it was

1215

00:44:47,190 --> 00:44:45,330

the one that was at

1216

00:44:49,590 --> 00:44:47,200

assuming the risks you know then

1217

00:44:51,510 --> 00:44:49,600

exploring the unknown with these crews

1218

00:44:54,150 --> 00:44:51,520

aboard and I would say for me at least

1219

00:44:56,460 --> 00:44:54,160

those are the most significant

1220

00:44:58,410 --> 00:44:56,470

accomplishments aboard discovery was

1221

00:44:59,700 --> 00:44:58,420

because each time this thing flew it was

1222

00:45:01,440 --> 00:44:59,710

a brand new shuttle and it looks it

1223

00:45:03,410 --> 00:45:01,450

looks externally like the old shuttles

1224

00:45:05,070 --> 00:45:03,420

we had before but we had done extensive

1225

00:45:06,720 --> 00:45:05,080

remodeling and refitting and

1226

00:45:08,280 --> 00:45:06,730

reconfiguring and every time you do that

1227

00:45:09,780 --> 00:45:08,290

there's an opportunity for things to go

1228

00:45:11,820 --> 00:45:09,790

wrong you have untested and unproven

1229

00:45:13,770 --> 00:45:11,830

systems and you got to go shake those

1230

00:45:17,600 --> 00:45:13,780

out so those are probably some of the

1231

00:45:19,650 --> 00:45:17,610

most dangerous missions that we flew

1232

00:45:21,210 --> 00:45:19,660

clearly some of the most ambitious and

1233

00:45:22,860 --> 00:45:21,220

daring ones and each one of those times

1234

00:45:27,390 --> 00:45:22,870

it was discovering was the one that was

1235

00:45:30,810 --> 00:45:27,400

making that voyage how would you

1236

00:45:33,870 --> 00:45:30,820

characterize what space shuttle has

1237

00:45:39,600 --> 00:45:33,880

meant to the advancement of human space

1238

00:45:41,640 --> 00:45:39,610

exploration space show was in the most

1239

00:45:44,010 --> 00:45:41,650

ambitious most complex vehicle that

1240

00:45:46,110 --> 00:45:44,020

we've ever built the Soviet Union tried

1241

00:45:48,180 --> 00:45:46,120

hard to make their own version of a

1242

00:45:50,880 --> 00:45:48,190

space shuttle never got a single person

1243

00:45:53,160 --> 00:45:50,890

in space aboard that shuttle itself they

1244

00:45:54,630 --> 00:45:53,170

flew it unmanned for one orbit around

1245

00:45:57,540 --> 00:45:54,640

the earth and landed it and then they

1246

00:45:58,950 --> 00:45:57,550

were done it tells you how difficult it

1247

00:46:01,650 --> 00:45:58,960

was to have pulled it off in the first

1248

00:46:04,020 --> 00:46:01,660

place by the time we're done here we'll

1249

00:46:07,770 --> 00:46:04,030

have had 134 missions aboard this

1250

00:46:09,360 --> 00:46:07,780

particular model we'll have built the

1251
00:46:13,020 --> 00:46:09,370
largest most complex structure that's

1252
00:46:14,180 --> 00:46:13,030
ever been put up in orbit ever we'll put

1253
00:46:17,010 --> 00:46:14,190
up the Hubble telescope

1254
00:46:18,300 --> 00:46:17,020
we'll have done just things that we

1255
00:46:19,740 --> 00:46:18,310
never would have thought were capable of

1256
00:46:22,620 --> 00:46:19,750
shuttles capable of doing even when we

1257
00:46:24,540 --> 00:46:22,630
designed it back in the 1970s it's it

1258
00:46:26,970 --> 00:46:24,550
set the bar it set the expectations of

1259
00:46:29,250 --> 00:46:26,980
what we can do in space we first put the

1260
00:46:31,290 --> 00:46:29,260
shuttle up or a design this thing we

1261
00:46:32,880 --> 00:46:31,300
just gone to the moon know about it you

1262
00:46:34,470 --> 00:46:32,890
know we had a few know a few capsules go

1263
00:46:36,150 --> 00:46:34,480

off in space and splash back down we had

1264

00:46:38,940 --> 00:46:36,160

a few communication satellites up in

1265

00:46:40,230 --> 00:46:38,950

orbit but routine access to space or

1266

00:46:42,390 --> 00:46:40,240

something for science fiction writers

1267

00:46:43,800 --> 00:46:42,400

and now it's not you have a whole

1268

00:46:45,510 --> 00:46:43,810

generation of people I know if you were

1269

00:46:47,640 --> 00:46:45,520

born back when we first started doing

1270

00:46:49,170 --> 00:46:47,650

the show you'd have your own kids and so

1271

00:46:51,180 --> 00:46:49,180

you and your children with both would

1272

00:46:53,610 --> 00:46:51,190

have grown up with the expectation of

1273

00:46:55,320 --> 00:46:53,620

course we routinely go into space and we