1
00:00:08,710 --> 00:00:05,990
this is the sts-133 interview with

2
00:00:11,030 --> 00:00:08,720
mission specialist tim copra uh tim tell

3
00:00:13,830 --> 00:00:11,040
us about the place uh or places that you

4
00:00:16,470 --> 00:00:13,840
that you grew up and and um what about

5
00:00:17,670 --> 00:00:16,480
those places influenced influence who

6
00:00:19,590 --> 00:00:17,680
you've become

7
00:00:21,510 --> 00:00:19,600
i grew up in austin texas which i think

8
00:00:23,750 --> 00:00:21,520
is a great town it's still a great town

9
00:00:25,429 --> 00:00:23,760
i'm a big fan of texas and particularly

10
00:00:27,349 --> 00:00:25,439
austin texas

11
00:00:29,750 --> 00:00:27,359
austin was sort of an eclectic town it

12
00:00:32,950 --> 00:00:29,760
was a college town very vibrant very

13
00:00:34,630 --> 00:00:32,960

lively and very youthful and i think

14
00:00:37,270 --> 00:00:34,640
that one thing that i really got out of

15
00:00:39,830 --> 00:00:37,280
living in austin texas was

16
00:00:41,830 --> 00:00:39,840
the feeling that anything is possible

17
00:00:43,830 --> 00:00:41,840
there's lots of freedom to move around

18
00:00:45,910 --> 00:00:43,840
the town is a very safe place to grow up

19
00:00:47,510 --> 00:00:45,920
and to live and i think that's one of

20
00:00:49,029 --> 00:00:47,520
the things that influenced me and in

21
00:00:50,869 --> 00:00:49,039
addition to that i had some very

22
00:00:52,709 --> 00:00:50,879
influential teachers that taught me a

23
00:00:53,670 --> 00:00:52,719
lot about leadership and about myself

24
00:00:56,389 --> 00:00:53,680
and i think

25
00:00:58,869 --> 00:00:56,399
they definitely put me on the right path

26
00:01:01,510 --> 00:00:58,879
did you get a chance to see austin the

27
00:01:04,070 --> 00:01:01,520
austin area from space at any point i

28
00:01:05,910 --> 00:01:04,080
did in fact one of my goals was to take

29
00:01:07,910 --> 00:01:05,920
lots of pictures of texas and

30
00:01:09,990 --> 00:01:07,920
particularly austin and the surrounding

31
00:01:12,630 --> 00:01:10,000
lakes we spent lots of summers on lake

32
00:01:14,070 --> 00:01:12,640
travis just north of austin and

33
00:01:16,469 --> 00:01:14,080
you would think with a big state like

34
00:01:18,230 --> 00:01:16,479
texas that it'd be very simple to take

35
00:01:20,070 --> 00:01:18,240
lots of photographs but when you're

36
00:01:22,230 --> 00:01:20,080
moving at five miles a second you have

37
00:01:24,149 --> 00:01:22,240
to be very good and really on target and

38
00:01:26,630 --> 00:01:24,159

so we'd fly over

39
00:01:28,870 --> 00:01:26,640
this whole chain of lakes in central and

40
00:01:31,109 --> 00:01:28,880
north central texas and uh it was

41
00:01:33,350 --> 00:01:31,119
difficult to even identify which lake

42
00:01:35,510 --> 00:01:33,360
was which and so it took several passes

43
00:01:38,830 --> 00:01:35,520
but eventually i got some really great

44
00:01:41,510 --> 00:01:38,840
shots of lake travis and and austin

45
00:01:43,910 --> 00:01:41,520
okay every accomplishment begins with

46
00:01:46,630 --> 00:01:43,920
with some form of motivation you've been

47
00:01:48,230 --> 00:01:46,640
an astronaut for about 10 years

48
00:01:49,429 --> 00:01:48,240
and you've been with nasa longer than

49
00:01:51,510 --> 00:01:49,439
that

50
00:01:53,990 --> 00:01:51,520
tell us about what motivated you to

51
00:01:56,709 --> 00:01:54,000
pursue this line of work you mentioned

52
00:01:57,910 --> 00:01:56,719
teachers were there other motivations

53
00:02:01,670 --> 00:01:57,920
you know uh

54
00:02:03,990 --> 00:02:01,680
i'm 47 years old i was born in 1963

55
00:02:06,149 --> 00:02:04,000
and when i was a little kid we were

56
00:02:08,949 --> 00:02:06,159
landing men on the moon and

57
00:02:11,750 --> 00:02:08,959
i think every kid my age wanted to be an

58
00:02:13,589 --> 00:02:11,760
astronaut a fireman a policeman you know

59
00:02:15,910 --> 00:02:13,599
little boys that's what you gravitated

60
00:02:17,350 --> 00:02:15,920
to when i was growing up and i remember

61
00:02:19,670 --> 00:02:17,360
being completely enthralled with the

62
00:02:22,229 --> 00:02:19,680
space program at a very young age and i

63
00:02:24,550 --> 00:02:22,239

know that had a very uh distinct impact

64
00:02:26,949 --> 00:02:24,560
on me my brother if it was at all

65
00:02:28,710 --> 00:02:26,959
possible was uh more interested in space

66
00:02:30,949 --> 00:02:28,720
than i was and i remember staying up

67
00:02:33,430 --> 00:02:30,959
late watching the moon landings with my

68
00:02:36,550 --> 00:02:33,440
brother and uh you know if

69
00:02:38,790 --> 00:02:36,560
for me it was just a huge big

70
00:02:40,070 --> 00:02:38,800
goal which you know at the time when

71
00:02:42,550 --> 00:02:40,080
you're a kid you know everything is

72
00:02:45,190 --> 00:02:42,560
achievable and then over time perhaps

73
00:02:47,190 --> 00:02:45,200
you you kind of lose grasp of those

74
00:02:49,430 --> 00:02:47,200
unachievable goals but

75
00:02:51,350 --> 00:02:49,440
over time it became clear to me uh when

76
00:02:52,710 --> 00:02:51,360
i was at west point that it was

77
00:02:54,390 --> 00:02:52,720
something that was possible because

78
00:02:56,630 --> 00:02:54,400
there were several people who had

79
00:02:58,550 --> 00:02:56,640
graduated from west point and uh even

80
00:03:01,350 --> 00:02:58,560
some of my instructors eventually became

81
00:03:03,670 --> 00:03:01,360
astronauts and uh that it went from this

82
00:03:05,509 --> 00:03:03,680
unrealistic childhood goal to something

83
00:03:07,509 --> 00:03:05,519
that was clearly tangible and possible

84
00:03:09,270 --> 00:03:07,519
if you work really hard

85
00:03:10,710 --> 00:03:09,280
look looking back on watching those moon

86
00:03:12,390 --> 00:03:10,720
landings

87
00:03:14,309 --> 00:03:12,400
do you did you

88
00:03:16,070 --> 00:03:14,319

have a sense of what

89
00:03:17,670 --> 00:03:16,080
what the implications were actually what

90
00:03:19,750 --> 00:03:17,680
was going on at that point was it just a

91
00:03:21,509 --> 00:03:19,760
cool factor as a kid

92
00:03:24,550 --> 00:03:21,519
well i think you know the implication in

93
00:03:26,309 --> 00:03:24,560
terms of uh of the the achievement and

94
00:03:28,710 --> 00:03:26,319
and how um

95
00:03:30,789 --> 00:03:28,720
how big this event was for the nation in

96
00:03:34,869 --> 00:03:30,799
the world i think even as a you know a

97
00:03:36,869 --> 00:03:34,879
very uh young person i had a grasp of

98
00:03:40,149 --> 00:03:36,879
that it was a big deal

99
00:03:42,390 --> 00:03:40,159
uh you could see uh especially on uh

100
00:03:45,190 --> 00:03:42,400
the the first moon landing how there was

101
00:03:46,710 --> 00:03:45,200
the the ticker tape across uh

102
00:03:49,030 --> 00:03:46,720
you know different places throughout the

103
00:03:51,430 --> 00:03:49,040
world talking about the first man to

104
00:03:53,509 --> 00:03:51,440
step foot on the moon and so it was very

105
00:03:55,270 --> 00:03:53,519
clear even to to

106
00:03:56,710 --> 00:03:55,280
all of us young people that this was a

107
00:03:58,949 --> 00:03:56,720
huge event

108
00:04:00,550 --> 00:03:58,959
definitely a cool factor

109
00:04:04,390 --> 00:04:00,560
but but more than that it was a

110
00:04:06,390 --> 00:04:04,400
tremendous achievement for mankind okay

111
00:04:08,470 --> 00:04:06,400
uh recount for us the steps you took in

112
00:04:10,390 --> 00:04:08,480
your military career uh to get to nasa

113
00:04:11,910 --> 00:04:10,400

and then subsequently to that uh on to

114
00:04:13,190 --> 00:04:11,920
the astronaut corps

115
00:04:15,190 --> 00:04:13,200
sure you know

116
00:04:17,670 --> 00:04:15,200
i've had a lot of fun

117
00:04:19,830 --> 00:04:17,680
working in the army it started out as a

118
00:04:21,110 --> 00:04:19,840
west point cadet and i went straight

119
00:04:23,189 --> 00:04:21,120
from high school

120
00:04:25,590 --> 00:04:23,199
to the united states military academy at

121
00:04:27,030 --> 00:04:25,600
west point and i spent four years there

122
00:04:29,670 --> 00:04:27,040
and then i was commissioned as a second

123
00:04:31,670 --> 00:04:29,680
lieutenant and after flight school i was

124
00:04:34,230 --> 00:04:31,680
stationed at fort campbell kentucky and

125
00:04:35,990 --> 00:04:34,240
i was an aeroscout pilot and platoon

126
00:04:38,310 --> 00:04:36,000
leader so i had some of the introductory

127
00:04:39,189 --> 00:04:38,320
leadership jobs that that young officers

128
00:04:41,030 --> 00:04:39,199
have

129
00:04:44,550 --> 00:04:41,040
and after serving there i went to

130
00:04:47,350 --> 00:04:44,560
germany i served as a company commander

131
00:04:49,590 --> 00:04:47,360
for an apache company also spent time in

132
00:04:52,230 --> 00:04:49,600
desert shield and desert storm so i had

133
00:04:53,749 --> 00:04:52,240
a lot of very traditional army jobs from

134
00:04:56,390 --> 00:04:53,759
the standpoint of leadership

135
00:04:57,189 --> 00:04:56,400
opportunities and learning how staffs

136
00:04:58,390 --> 00:04:57,199
work

137
00:04:59,990 --> 00:04:58,400
from there

138
00:05:02,070 --> 00:05:00,000

my my career was a little bit different

139
00:05:04,469 --> 00:05:02,080
than an average army career and that i

140
00:05:05,830 --> 00:05:04,479
went to a more technical side i went to

141
00:05:06,629 --> 00:05:05,840
graduate school

142
00:05:09,029 --> 00:05:06,639
at

143
00:05:11,830 --> 00:05:09,039
georgia tech for aerospace engineering

144
00:05:14,070 --> 00:05:11,840
and then i went to the u.s navy test

145
00:05:16,629 --> 00:05:14,080
pilot school and learned how to fly

146
00:05:18,790 --> 00:05:16,639
aircraft that had been

147
00:05:20,950 --> 00:05:18,800
modified or adjusted or brand new

148
00:05:22,790 --> 00:05:20,960
aircraft and what the implications were

149
00:05:25,029 --> 00:05:22,800
so that was an opportunity to understand

150
00:05:27,029 --> 00:05:25,039
that tie between the operational world

151
00:05:28,710 --> 00:05:27,039
which i had served in in the military

152
00:05:30,629 --> 00:05:28,720
and the technical world which i was

153
00:05:33,110 --> 00:05:30,639
becoming introduced to through my

154
00:05:35,029 --> 00:05:33,120
graduate studies and test pilot school

155
00:05:37,029 --> 00:05:35,039
so after that i spent time at fort

156
00:05:38,790 --> 00:05:37,039
rucker alabama as an experimental test

157
00:05:40,629 --> 00:05:38,800
pilot and after serving there for a

158
00:05:42,629 --> 00:05:40,639
couple years and working on the comanche

159
00:05:44,870 --> 00:05:42,639
helicopter project

160
00:05:47,110 --> 00:05:44,880
i came here to johnson space center and

161
00:05:49,350 --> 00:05:47,120
i worked with space station hardware for

162
00:05:51,590 --> 00:05:49,360
about two years and learned what it was

163
00:05:53,590 --> 00:05:51,600

like to to work in the nasa environment

164
00:05:56,070 --> 00:05:53,600
and what the space

165
00:05:57,749 --> 00:05:56,080
side of the world was like and then uh i

166
00:05:59,270 --> 00:05:57,759
was selected in 2000 to become an

167
00:06:00,629 --> 00:05:59,280
astronaut

168
00:06:03,189 --> 00:06:00,639
how much time

169
00:06:05,350 --> 00:06:03,199
when did you first apply to to become an

170
00:06:07,909 --> 00:06:05,360
astronaut and how much time was there in

171
00:06:09,430 --> 00:06:07,919
between the application and when you got

172
00:06:11,189 --> 00:06:09,440
the call to say hey do you want to want

173
00:06:13,350 --> 00:06:11,199
to be an astronaut

174
00:06:15,230 --> 00:06:13,360
well i'd applied once before i think

175
00:06:18,150 --> 00:06:15,240
around

176
00:06:19,110 --> 00:06:18,160
1993 or so and

177
00:06:21,909 --> 00:06:19,120
you know i really didn't have the

178
00:06:23,029 --> 00:06:21,919
experience base in order to be selected

179
00:06:24,469 --> 00:06:23,039
so for me

180
00:06:26,390 --> 00:06:24,479
you know it's sort of a shot in the dark

181
00:06:29,110 --> 00:06:26,400
but i knew that i wanted to do it and uh

182
00:06:30,390 --> 00:06:29,120
the first step is uh is applying because

183
00:06:31,909 --> 00:06:30,400
if you don't apply you're surely not

184
00:06:34,230 --> 00:06:31,919
going to be selected

185
00:06:37,670 --> 00:06:34,240
uh for the the time in during which i

186
00:06:41,670 --> 00:06:37,680
was selected i think i applied uh in 19

187
00:06:44,629 --> 00:06:41,680
late 1998 1999 and then our class was

188
00:06:46,870 --> 00:06:44,639

announced in july of 2000 so

189
00:06:48,950 --> 00:06:46,880
there were many months between putting

190
00:06:50,710 --> 00:06:48,960
the packet in and then getting an

191
00:06:52,390 --> 00:06:50,720
interview which meant

192
00:06:54,629 --> 00:06:52,400
you're on a short list

193
00:06:57,990 --> 00:06:54,639
and then being announced so i think my

194
00:06:59,670 --> 00:06:58,000
interview was in september of 1999 which

195
00:07:00,950 --> 00:06:59,680
was several months after my application

196
00:07:03,589 --> 00:07:00,960
was turned in

197
00:07:05,830 --> 00:07:03,599
and then our class was announced in 2000

198
00:07:08,550 --> 00:07:05,840
so it was a long period of time a lot of

199
00:07:11,189 --> 00:07:08,560
waiting and i'm sure that uh all of my

200
00:07:13,749 --> 00:07:11,199
classmates were very anxious to find out

201
00:07:14,830 --> 00:07:13,759
do you recall where you were when when

202
00:07:17,270 --> 00:07:14,840
you got

203
00:07:18,870 --> 00:07:17,280
absolutely tell us that

204
00:07:19,749 --> 00:07:18,880
so um

205
00:07:21,430 --> 00:07:19,759
you know

206
00:07:24,150 --> 00:07:21,440
you're really anticipating the call

207
00:07:26,629 --> 00:07:24,160
because uh the call is one hey you've

208
00:07:28,790 --> 00:07:26,639
been selected or you know thank you very

209
00:07:32,309 --> 00:07:28,800
much for applying but we've chosen

210
00:07:34,950 --> 00:07:32,319
someone else on this go around so and on

211
00:07:37,189 --> 00:07:34,960
my case i was working at johnson space

212
00:07:39,029 --> 00:07:37,199
center as an engineer and i was at

213
00:07:41,430 --> 00:07:39,039

huntsville at marshall space flight

214
00:07:43,670 --> 00:07:41,440
center working with some of the space

215
00:07:45,270 --> 00:07:43,680
station hardware we were inspecting the

216
00:07:46,790 --> 00:07:45,280
hardware and performing tests on the

217
00:07:49,270 --> 00:07:46,800
hardware to make sure that all the

218
00:07:52,309 --> 00:07:49,280
spacewalk interfaces were good for the

219
00:07:55,029 --> 00:07:52,319
spacewalkers and so i was uh in the

220
00:07:55,990 --> 00:07:55,039
office there at uh at marshall and i got

221
00:07:58,710 --> 00:07:56,000
a call

222
00:08:01,270 --> 00:07:58,720
from bill parsons and uh he said uh do

223
00:08:03,110 --> 00:08:01,280
you know why i'm calling i said um

224
00:08:04,869 --> 00:08:03,120
i might sir he said well i just want to

225
00:08:07,430 --> 00:08:04,879
let you know that you've been selected

226
00:08:09,589 --> 00:08:07,440
in the class of 2000. so it's an

227
00:08:11,350 --> 00:08:09,599
exciting time either i was in trouble

228
00:08:13,110 --> 00:08:11,360
because of something i'd done on my job

229
00:08:14,469 --> 00:08:13,120
or it was a really

230
00:08:17,510 --> 00:08:14,479
good news phone call and it turned out

231
00:08:19,909 --> 00:08:18,309
we

232
00:08:20,950 --> 00:08:19,919
go back to education here you mentioned

233
00:08:23,510 --> 00:08:20,960
it before

234
00:08:25,029 --> 00:08:23,520
tell us how you would characterize what

235
00:08:26,950 --> 00:08:25,039
education

236
00:08:30,469 --> 00:08:26,960
means to

237
00:08:32,709 --> 00:08:30,479
to the advancement of anyone's life

238
00:08:34,870 --> 00:08:32,719

you know

239
00:08:36,070 --> 00:08:34,880
education is absolutely key

240
00:08:37,509 --> 00:08:36,080
and

241
00:08:39,829 --> 00:08:37,519
one thing that i think is particularly

242
00:08:41,110 --> 00:08:39,839
difficult for young people to understand

243
00:08:42,870 --> 00:08:41,120
and and i say that because it was

244
00:08:44,870 --> 00:08:42,880
difficult for me to understand at the

245
00:08:47,750 --> 00:08:44,880
time is that every educational

246
00:08:50,470 --> 00:08:47,760
opportunity builds on itself and and is

247
00:08:51,829 --> 00:08:50,480
useful in some way and uh and sometimes

248
00:08:54,230 --> 00:08:51,839
it's not so tangible i mean if you're

249
00:08:56,630 --> 00:08:54,240
learning a specific skill

250
00:08:58,470 --> 00:08:56,640
how to repair a car for example then you

251
00:09:00,790 --> 00:08:58,480
can directly apply

252
00:09:02,790 --> 00:09:00,800
that skill to repairing the next car but

253
00:09:04,470 --> 00:09:02,800
if you're studying calculus i mean how

254
00:09:07,110 --> 00:09:04,480
do you apply calculus to your everyday

255
00:09:09,670 --> 00:09:07,120
life and and i tell

256
00:09:10,470 --> 00:09:09,680
our kids the same thing that is that

257
00:09:12,470 --> 00:09:10,480
that

258
00:09:14,310 --> 00:09:12,480
a lot of what you do in school teaches

259
00:09:16,870 --> 00:09:14,320
you how to think and it teaches you how

260
00:09:18,710 --> 00:09:16,880
to solve problems and sometimes it's not

261
00:09:21,509 --> 00:09:18,720
a direct application of that piece of

262
00:09:23,670 --> 00:09:21,519
your educational experience that you use

263
00:09:26,150 --> 00:09:23,680

but what it does is it teaches

264
00:09:27,190 --> 00:09:26,160
you how to solve those problems and and

265
00:09:30,150 --> 00:09:27,200
uh

266
00:09:33,350 --> 00:09:30,160
and in very intangible ways it allows

267
00:09:34,550 --> 00:09:33,360
you to um broaden what you do in your

268
00:09:35,829 --> 00:09:34,560
life and

269
00:09:37,590 --> 00:09:35,839
i like liken

270
00:09:38,870 --> 00:09:37,600
every course that i've taken and

271
00:09:40,790 --> 00:09:38,880
especially those that are much more

272
00:09:42,550 --> 00:09:40,800
intangible as

273
00:09:45,190 --> 00:09:42,560
a tool in my kit bag

274
00:09:47,750 --> 00:09:45,200
and at some point whether i can even

275
00:09:51,430 --> 00:09:47,760
recognize it or not it's information or

276
00:09:52,949 --> 00:09:51,440
its skill or maybe even a small

277
00:09:54,790 --> 00:09:52,959
piece of wisdom that i've gained through

278
00:09:57,829 --> 00:09:54,800
that educational experience and life

279
00:10:00,230 --> 00:09:57,839
experience that i can apply to a

280
00:10:02,150 --> 00:10:00,240
completely different situation so

281
00:10:05,190 --> 00:10:02,160
education is key and none of it is

282
00:10:09,190 --> 00:10:07,590
in 2009 you spent some time on board the

283
00:10:11,750 --> 00:10:09,200
international space station as a flight

284
00:10:13,509 --> 00:10:11,760
engineer on expedition 20. uh what was

285
00:10:14,949 --> 00:10:13,519
it like living and working on the

286
00:10:15,990 --> 00:10:14,959
station and what are you most looking

287
00:10:18,710 --> 00:10:16,000
forward to

288
00:10:20,630 --> 00:10:18,720

on your return trip to iss you know it's

289
00:10:22,389 --> 00:10:20,640
almost indescribable what it's like to

290
00:10:23,430 --> 00:10:22,399
live and work on the international space

291
00:10:24,630 --> 00:10:23,440
station

292
00:10:26,150 --> 00:10:24,640
um

293
00:10:28,310 --> 00:10:26,160
to in some respects it's sort of a

294
00:10:30,389 --> 00:10:28,320
surreal experience

295
00:10:32,710 --> 00:10:30,399
because

296
00:10:35,190 --> 00:10:32,720
on the one hand it's completely like

297
00:10:37,509 --> 00:10:35,200
you've uh you've been trained to do

298
00:10:39,350 --> 00:10:37,519
uh you're executing experiments you've

299
00:10:41,509 --> 00:10:39,360
been trained on you're maintaining the

300
00:10:43,829 --> 00:10:41,519
vehicle uh to make sure it's in good

301
00:10:46,069 --> 00:10:43,839
operational order and sometimes things

302
00:10:48,230 --> 00:10:46,079
break and we're trained how to fix it

303
00:10:50,550 --> 00:10:48,240
you exercise because you need to make

304
00:10:52,550 --> 00:10:50,560
sure that you protect your body for bone

305
00:10:53,829 --> 00:10:52,560
loss and make sure you maintain your

306
00:10:56,069 --> 00:10:53,839
muscle mass and those are all things

307
00:10:58,310 --> 00:10:56,079
that we've been trained to do and so

308
00:11:01,030 --> 00:10:58,320
it's in that respect it's identical to

309
00:11:02,870 --> 00:11:01,040
the ground on the other hand

310
00:11:04,710 --> 00:11:02,880
you're floating and you look out the

311
00:11:06,150 --> 00:11:04,720
window and you see the planet below you

312
00:11:08,310 --> 00:11:06,160
and you can look out and you see the

313
00:11:11,269 --> 00:11:08,320

blackness of space and it is black and

314
00:11:13,190 --> 00:11:11,279
you recognize it it's a it's a vacuum

315
00:11:14,389 --> 00:11:13,200
out there and it's an abyss

316
00:11:15,990 --> 00:11:14,399
so

317
00:11:18,389 --> 00:11:16,000
you combine these two experiences one

318
00:11:20,790 --> 00:11:18,399
that's very very familiar and one that

319
00:11:22,790 --> 00:11:20,800
is completely unfamiliar and and once

320
00:11:24,790 --> 00:11:22,800
you fully recognize that that you're in

321
00:11:26,630 --> 00:11:24,800
this spaceship going around the planet

322
00:11:28,150 --> 00:11:26,640
every 90 minutes

323
00:11:31,269 --> 00:11:28,160
and bring that all together with your

324
00:11:33,350 --> 00:11:31,279
your experience it's just a tremendous

325
00:11:35,590 --> 00:11:33,360
um life opportunity and i'm very

326
00:11:37,509 --> 00:11:35,600
thankful for it for this next trip i

327
00:11:39,030 --> 00:11:37,519
think that uh that one of the things i'm

328
00:11:40,710 --> 00:11:39,040
looking forward to the most is seeing

329
00:11:43,750 --> 00:11:40,720
the cupola

330
00:11:45,190 --> 00:11:43,760
when uh the sts-130 mission came back

331
00:11:46,790 --> 00:11:45,200
and i was talking with one of the crew

332
00:11:48,870 --> 00:11:46,800
members and i said well you know the

333
00:11:50,310 --> 00:11:48,880
cupola must be you know similar to

334
00:11:52,710 --> 00:11:50,320
looking out the shuttle windows because

335
00:11:54,550 --> 00:11:52,720
the shuttle windows are very large and a

336
00:11:56,629 --> 00:11:54,560
very large field of view and one thing i

337
00:11:57,750 --> 00:11:56,639
noticed as a difference between the

338
00:11:59,670 --> 00:11:57,760

windows

339
00:12:02,310 --> 00:11:59,680
and the service module for example and

340
00:12:03,269 --> 00:12:02,320
the subtle windows is that when when you

341
00:12:04,629 --> 00:12:03,279
can see

342
00:12:06,629 --> 00:12:04,639
a broader

343
00:12:09,030 --> 00:12:06,639
picture i think your mind integrates

344
00:12:11,590 --> 00:12:09,040
that and it gives it more of a 3d effect

345
00:12:13,590 --> 00:12:11,600
and so i likened

346
00:12:16,150 --> 00:12:13,600
these uh these new cupola windows with

347
00:12:18,310 --> 00:12:16,160
the shuttle windows and this sts-130

348
00:12:20,150 --> 00:12:18,320
crew member says no it's nothing like

349
00:12:22,470 --> 00:12:20,160
that it's completely different it almost

350
00:12:24,550 --> 00:12:22,480
feels as if you're outside so i'm really

351
00:12:26,069 --> 00:12:24,560
looking forward to seeing that observing

352
00:12:27,990 --> 00:12:26,079
the planet and

353
00:12:29,670 --> 00:12:28,000
space and also

354
00:12:31,030 --> 00:12:29,680
looking at these new modules that we've

355
00:12:33,670 --> 00:12:31,040
added because it's even bigger than the

356
00:12:36,550 --> 00:12:33,680
last time we were there we have node 3

357
00:12:39,110 --> 00:12:36,560
and we have a new russian module as well

358
00:12:41,430 --> 00:12:39,120
so all that and uh and seeing how the

359
00:12:43,030 --> 00:12:41,440
crew for the international space station

360
00:12:44,310 --> 00:12:43,040
is doing and chatting with them about

361
00:12:46,790 --> 00:12:44,320
their experience those are the things

362
00:12:48,310 --> 00:12:46,800
i'm looking forward to okay

363
00:12:49,750 --> 00:12:48,320

you've had the experience of living

364
00:12:50,870 --> 00:12:49,760
working on the space station but you've

365
00:12:52,310 --> 00:12:50,880
also

366
00:12:54,150 --> 00:12:52,320
spent some time flying on the shuttle

367
00:12:56,230 --> 00:12:54,160
too compare and contrast those

368
00:12:57,430 --> 00:12:56,240
experiences they're obviously different

369
00:12:59,509 --> 00:12:57,440
experiences

370
00:13:01,990 --> 00:12:59,519
what do you remember most about your

371
00:13:03,269 --> 00:13:02,000
your shuttle flight

372
00:13:05,670 --> 00:13:03,279
they are different experiences but

373
00:13:08,870 --> 00:13:05,680
they're also very similar you know

374
00:13:11,190 --> 00:13:08,880
the pace is actually very quick for both

375
00:13:13,350 --> 00:13:11,200
a shuttle mission and a station mission

376
00:13:15,350 --> 00:13:13,360
the primary difference i guess is that

377
00:13:17,030 --> 00:13:15,360
the shuttle mission is much more

378
00:13:18,629 --> 00:13:17,040
choreographed because there are very

379
00:13:20,230 --> 00:13:18,639
specific

380
00:13:22,550 --> 00:13:20,240
tasks that have to get accomplished in a

381
00:13:25,750 --> 00:13:22,560
very uh finite amount of time

382
00:13:26,949 --> 00:13:25,760
so for example on sts-127

383
00:13:29,990 --> 00:13:26,959
in the course of the mission we have

384
00:13:32,150 --> 00:13:30,000
five spacewalks and lots of robotics on

385
00:13:34,550 --> 00:13:32,160
board between the ssr mess which is the

386
00:13:37,190 --> 00:13:34,560
space station arm the the shuttle arm

387
00:13:39,509 --> 00:13:37,200
and the japanese robotic arm so lots of

388
00:13:41,430 --> 00:13:39,519

choreographing and uh

389
00:13:43,430 --> 00:13:41,440
and and lots of uh

390
00:13:45,350 --> 00:13:43,440
very synchronized events

391
00:13:47,269 --> 00:13:45,360
and that's sort of the typical space

392
00:13:49,030 --> 00:13:47,279
shuttle mission it's all synchronized

393
00:13:51,269 --> 00:13:49,040
and closely planned out

394
00:13:53,509 --> 00:13:51,279
whereas on the station mission although

395
00:13:56,150 --> 00:13:53,519
the days are very very full and we're

396
00:13:58,389 --> 00:13:56,160
very active all the time you do get into

397
00:14:00,550 --> 00:13:58,399
more of a routine of life

398
00:14:03,590 --> 00:14:00,560
you sleep you get up you get ready for

399
00:14:05,590 --> 00:14:03,600
the day you look at your schedule you

400
00:14:08,710 --> 00:14:05,600
complete experiments you maintain the

401
00:14:10,870 --> 00:14:08,720
vehicle you exercise you chat with your

402
00:14:12,710 --> 00:14:10,880
your crew mates you have dinner together

403
00:14:14,069 --> 00:14:12,720
and so you sort of get into a routine

404
00:14:15,670 --> 00:14:14,079
and look for those

405
00:14:18,310 --> 00:14:15,680
short periods of time that you have off

406
00:14:20,629 --> 00:14:18,320
in order to take pictures or even call

407
00:14:23,269 --> 00:14:20,639
home on the internet protocol telephone

408
00:14:25,670 --> 00:14:23,279
and email so some of those niceties i

409
00:14:27,990 --> 00:14:25,680
think are are one addition you have with

410
00:14:29,670 --> 00:14:28,000
a space station mission although it's

411
00:14:31,750 --> 00:14:29,680
very very busy you do have just a little

412
00:14:35,350 --> 00:14:31,760
bit more time to do those kinds of

413
00:14:39,910 --> 00:14:37,269

prior to your first space flight you

414
00:14:43,030 --> 00:14:39,920
served some time doing a long duration

415
00:14:45,030 --> 00:14:43,040
underwater nemo mission

416
00:14:47,030 --> 00:14:45,040
how did spending that time underwater

417
00:14:48,389 --> 00:14:47,040
prepare you for for your time on space

418
00:14:50,629 --> 00:14:48,399
station

419
00:14:52,389 --> 00:14:50,639
it was actually a great uh environment

420
00:14:54,710 --> 00:14:52,399
in which to prepare for a spatial

421
00:14:57,590 --> 00:14:54,720
atlanta space station mission uh just

422
00:14:58,949 --> 00:14:57,600
like those missions it was a small crew

423
00:15:01,590 --> 00:14:58,959
a crew of six

424
00:15:02,949 --> 00:15:01,600
we were in a very confined environment

425
00:15:05,030 --> 00:15:02,959
we had

426
00:15:07,670 --> 00:15:05,040
lots of objectives to accomplish every

427
00:15:09,509 --> 00:15:07,680
day we did simulated spacewalks outside

428
00:15:11,030 --> 00:15:09,519
of aquarius

429
00:15:13,189 --> 00:15:11,040
and walking around on the bottom of the

430
00:15:14,949 --> 00:15:13,199
ocean so

431
00:15:16,949 --> 00:15:14,959
just the interpersonal

432
00:15:20,069 --> 00:15:16,959
aspect of it and working with a small

433
00:15:22,470 --> 00:15:20,079
team and also working with a remote

434
00:15:25,430 --> 00:15:22,480
mission control all those aspects were

435
00:15:26,790 --> 00:15:25,440
very very similar to space flight

436
00:15:29,509 --> 00:15:26,800
and i think it's a very valuable

437
00:15:32,790 --> 00:15:29,519
experience too you know one one aside on

438
00:15:33,990 --> 00:15:32,800

that nemo mission it it was also similar

439
00:15:36,069 --> 00:15:34,000
to

440
00:15:38,150 --> 00:15:36,079
space station and space shuttle missions

441
00:15:39,990 --> 00:15:38,160
where you learn that

442
00:15:42,550 --> 00:15:40,000
that humans adapt very quickly to their

443
00:15:44,310 --> 00:15:42,560
environment and when i was on nemo one

444
00:15:45,829 --> 00:15:44,320
of the times we did the simulated space

445
00:15:46,949 --> 00:15:45,839
walk on the bottom of the ocean we're

446
00:15:49,910 --> 00:15:46,959
wearing a

447
00:15:53,350 --> 00:15:49,920
super light 17 dive helmet which gave us

448
00:15:55,670 --> 00:15:53,360
oxygen and our communications and we had

449
00:15:57,670 --> 00:15:55,680
weights in our our boots and we had a

450
00:15:59,990 --> 00:15:57,680
suit on so that we could walk around on

451
00:16:01,990 --> 00:16:00,000
the bottom of the ocean and uh we had

452
00:16:04,470 --> 00:16:02,000
been out for maybe a couple of hours and

453
00:16:06,470 --> 00:16:04,480
then i realized that it felt perfectly

454
00:16:08,069 --> 00:16:06,480
normal now that's strange when you're

455
00:16:10,629 --> 00:16:08,079
walking around 90 feet on the bottom of

456
00:16:12,710 --> 00:16:10,639
the ocean wearing this suit and it feels

457
00:16:14,629 --> 00:16:12,720
normal that's a demonstration that

458
00:16:17,990 --> 00:16:14,639
humans can adapt to their environment

459
00:16:22,230 --> 00:16:19,749
there are thousands of people that work

460
00:16:25,269 --> 00:16:22,240
behind the scenes to ensure this the

461
00:16:28,629 --> 00:16:25,279
success and safety of the crew and and

462
00:16:30,629 --> 00:16:28,639
every mission uh tell us about

463
00:16:33,509 --> 00:16:30,639

how you would characterize those those

464
00:16:35,030 --> 00:16:33,519
people's contributions to every mission

465
00:16:37,030 --> 00:16:35,040
you know one thing that was very clear

466
00:16:38,470 --> 00:16:37,040
on my last mission and especially on the

467
00:16:41,910 --> 00:16:38,480
station mission when you have a chance

468
00:16:44,629 --> 00:16:41,920
to reflect on what's going on

469
00:16:45,829 --> 00:16:44,639
the space business is a team sport

470
00:16:48,389 --> 00:16:45,839
and

471
00:16:50,550 --> 00:16:48,399
although our job has lots of visibility

472
00:16:52,629 --> 00:16:50,560
really i think the heavy lifting is done

473
00:16:55,430 --> 00:16:52,639
on the ground

474
00:16:57,829 --> 00:16:55,440
by the time all the the products are put

475
00:16:59,030 --> 00:16:57,839
together which means the procedures and

476
00:17:00,150 --> 00:16:59,040
the training

477
00:17:04,789 --> 00:17:00,160
and

478
00:17:07,350 --> 00:17:04,799
complete our job becomes relatively

479
00:17:09,590 --> 00:17:07,360
simple in comparison to the the day in

480
00:17:12,390 --> 00:17:09,600
day out preparation for the mission

481
00:17:15,270 --> 00:17:12,400
and so uh i think all of us feel pretty

482
00:17:17,829 --> 00:17:15,280
humbled to be part of any space shuttle

483
00:17:19,750 --> 00:17:17,839
or space station mission because there's

484
00:17:21,829 --> 00:17:19,760
so much work that is done to make this

485
00:17:24,789 --> 00:17:21,839
happen and uh all of us are very very

486
00:17:27,829 --> 00:17:24,799
thankful for their hard work

487
00:17:29,270 --> 00:17:27,839
uh if the timeline holds and you launch

488
00:17:30,470 --> 00:17:29,280

when you're supposed to now you're

489
00:17:32,070 --> 00:17:30,480
scheduled to be

490
00:17:34,070 --> 00:17:32,080
on station right around the 10th

491
00:17:35,669 --> 00:17:34,080
anniversary of the arrival of expedition

492
00:17:37,830 --> 00:17:35,679
1. um

493
00:17:40,150 --> 00:17:37,840
that crew established continuous human

494
00:17:42,470 --> 00:17:40,160
presence on iss

495
00:17:45,830 --> 00:17:42,480
discuss the significance of that

496
00:17:47,590 --> 00:17:45,840
milestone that they made and

497
00:17:48,870 --> 00:17:47,600
the station's importance to the future

498
00:17:50,870 --> 00:17:48,880
of space flight

499
00:17:52,230 --> 00:17:50,880
absolutely you know

500
00:17:54,390 --> 00:17:52,240
we're very thankful for those early

501
00:17:55,510 --> 00:17:54,400
crews because it's not just the mission

502
00:17:57,510 --> 00:17:55,520
that they

503
00:17:59,590 --> 00:17:57,520
they were the pathfinders for

504
00:18:01,830 --> 00:17:59,600
it was the training as well

505
00:18:04,470 --> 00:18:01,840
the training is very arduous and there's

506
00:18:06,070 --> 00:18:04,480
lots of sacrifices that the the crew

507
00:18:08,150 --> 00:18:06,080
members make in order to get there in

508
00:18:09,990 --> 00:18:08,160
terms of time away from family

509
00:18:11,350 --> 00:18:10,000
and uh and the arduous training they

510
00:18:13,750 --> 00:18:11,360
must go through in order to get ready

511
00:18:15,029 --> 00:18:13,760
for the mission and and uh they were the

512
00:18:17,350 --> 00:18:15,039
trailblazers

513
00:18:19,430 --> 00:18:17,360

and every mission after that has made it

514
00:18:21,350 --> 00:18:19,440
uh that much better and it goes along

515
00:18:23,909 --> 00:18:21,360
with the ground teams getting those

516
00:18:26,150 --> 00:18:23,919
crews ready for flight so they made a

517
00:18:28,710 --> 00:18:26,160
lot of those preparations in terms of

518
00:18:31,430 --> 00:18:28,720
getting crews ready the other part of

519
00:18:34,470 --> 00:18:31,440
that though is that we've watched the

520
00:18:36,710 --> 00:18:34,480
space station grow from one module to a

521
00:18:39,510 --> 00:18:36,720
couple modules on which they live to now

522
00:18:42,630 --> 00:18:39,520
this full-blown flying city in space

523
00:18:45,190 --> 00:18:42,640
which fully supports six crew members

524
00:18:47,029 --> 00:18:45,200
uh it's a testament to the dedication of

525
00:18:48,390 --> 00:18:47,039
the ground teams have done this the

526
00:18:49,909 --> 00:18:48,400
people that have built the hardware and

527
00:18:51,669 --> 00:18:49,919
tested the hardware to make sure that

528
00:18:53,110 --> 00:18:51,679
all works all the people that have

529
00:18:55,750 --> 00:18:53,120
trained the crews and the crews

530
00:18:58,470 --> 00:18:55,760
themselves to make this very very

531
00:19:00,070 --> 00:18:58,480
complex operation happen so we're very

532
00:19:02,710 --> 00:19:00,080
thankful for those early crews in

533
00:19:05,110 --> 00:19:02,720
particular to their contribution to make

534
00:19:06,950 --> 00:19:05,120
sure that we can continue this and uh

535
00:19:08,789 --> 00:19:06,960
this is a stepping stone i mean we have

536
00:19:12,310 --> 00:19:08,799
this space station going around our

537
00:19:14,789 --> 00:19:12,320
planet but this is the first step in

538
00:19:17,510 --> 00:19:14,799

a very long term aspect of human

539
00:19:19,750 --> 00:19:17,520
exploration so someday we hope to go on

540
00:19:22,470 --> 00:19:19,760
beyond low earth orbit go to the moon go

541
00:19:26,070 --> 00:19:22,480
to mars and and continue this path but

542
00:19:28,950 --> 00:19:26,080
it's started with those that first crew

543
00:19:29,990 --> 00:19:28,960
on the international space station okay

544
00:19:32,310 --> 00:19:30,000
and we've touched on some of the

545
00:19:33,990 --> 00:19:32,320
background of what the mission is all

546
00:19:35,350 --> 00:19:34,000
about but just for the record again uh

547
00:19:37,830 --> 00:19:35,360
tell us what the key objectives of the

548
00:19:39,350 --> 00:19:37,840
mission are and we'll get into talking

549
00:19:40,630 --> 00:19:39,360
about the specifics of the modules and

550
00:19:41,830 --> 00:19:40,640
stuff a little bit later on but okay

551
00:19:43,350 --> 00:19:41,840
just the key objectives of what the

552
00:19:45,669 --> 00:19:43,360
mission is sure

553
00:19:48,150 --> 00:19:45,679
um we have uh

554
00:19:50,230 --> 00:19:48,160
a few key objectives on this mission we

555
00:19:51,430 --> 00:19:50,240
have two very large payloads in our

556
00:19:54,310 --> 00:19:51,440
payload bay

557
00:19:57,590 --> 00:19:54,320
we have an elc-4 which is an express

558
00:19:59,270 --> 00:19:57,600
logistics carrier and on this carrier is

559
00:20:00,950 --> 00:19:59,280
a radiator that could be used in the

560
00:20:02,470 --> 00:20:00,960
future if one were to fail we had to

561
00:20:03,830 --> 00:20:02,480
replace it so that gets installed on

562
00:20:06,470 --> 00:20:03,840
space station

563
00:20:08,390 --> 00:20:06,480

we have a pmm which is a permanent

564
00:20:10,470 --> 00:20:08,400
multi-purpose module

565
00:20:12,630 --> 00:20:10,480
and that is taken out of the payload bay

566
00:20:16,470 --> 00:20:12,640
and installed on the bottom side or the

567
00:20:18,310 --> 00:20:16,480
nader portion of the node one module

568
00:20:20,710 --> 00:20:18,320
and then we have two spacewalks and the

569
00:20:23,830 --> 00:20:20,720
objective of those space walks is really

570
00:20:25,750 --> 00:20:23,840
to get lots of tasks completed so that

571
00:20:27,669 --> 00:20:25,760
once the shuttle retires we're in the

572
00:20:29,510 --> 00:20:27,679
best possible situation

573
00:20:31,590 --> 00:20:29,520
for maintaining the international space

574
00:20:33,669 --> 00:20:31,600
station

575
00:20:35,590 --> 00:20:33,679
and tell us what your

576
00:20:37,190 --> 00:20:35,600
main responsibilities are in the

577
00:20:39,430 --> 00:20:37,200
capacity of

578
00:20:44,310 --> 00:20:39,440
mission specialists too

579
00:20:46,870 --> 00:20:44,320
i'm essentially a flight engineer

580
00:20:48,390 --> 00:20:46,880
for the commander and pilot on the

581
00:20:50,230 --> 00:20:48,400
flight deck so

582
00:20:52,230 --> 00:20:50,240
the pilot is sitting to my right the

583
00:20:55,190 --> 00:20:52,240
commander is sitting to my left and i'm

584
00:20:57,270 --> 00:20:55,200
in between and on a nominal flight

585
00:20:58,870 --> 00:20:57,280
things are relatively routine and we're

586
00:21:01,669 --> 00:20:58,880
prepared for that because we have

587
00:21:04,870 --> 00:21:01,679
procedures we execute those procedures

588
00:21:07,430 --> 00:21:04,880

and then we have a safe ascent and

589
00:21:08,310 --> 00:21:07,440
rendezvous with space station and a very

590
00:21:09,990 --> 00:21:08,320
safe

591
00:21:11,909 --> 00:21:10,000
entry and landing

592
00:21:13,510 --> 00:21:11,919
back at kennedy space center

593
00:21:15,590 --> 00:21:13,520
one of the primary things we do for

594
00:21:17,510 --> 00:21:15,600
training is to prepare for those off

595
00:21:19,190 --> 00:21:17,520
nominal situations where things don't

596
00:21:20,870 --> 00:21:19,200
work like they're supposed to

597
00:21:22,549 --> 00:21:20,880
the space shuttle is a very robust

598
00:21:24,549 --> 00:21:22,559
vehicle there's lots of redundancy on

599
00:21:27,190 --> 00:21:24,559
board so that when things fail

600
00:21:29,830 --> 00:21:27,200
we have opportunities to to make it

601
00:21:32,950 --> 00:21:29,840
right but that also requires lots of

602
00:21:34,870 --> 00:21:32,960
coordination on the flight deck and uh

603
00:21:37,029 --> 00:21:34,880
al drew will be sitting next to me as

604
00:21:38,630 --> 00:21:37,039
the mission specialist one on the way up

605
00:21:41,909 --> 00:21:38,640
and then nicole stott

606
00:21:44,070 --> 00:21:41,919
um on the the entry coming home and as a

607
00:21:45,350 --> 00:21:44,080
team of four on the on the flight deck

608
00:21:47,350 --> 00:21:45,360
we try to make sure that we get

609
00:21:50,149 --> 00:21:47,360
everything done so that it's a safe

610
00:21:52,470 --> 00:21:50,159
flight going up and coming down

611
00:21:55,270 --> 00:21:52,480
then once we get to space station we

612
00:21:58,310 --> 00:21:55,280
rendezvous space station on flight day

613
00:22:01,590 --> 00:21:58,320

three and right away nicole stott and i

614
00:22:04,230 --> 00:22:01,600
go to the cupola and our job is to uh

615
00:22:06,630 --> 00:22:04,240
pull out the elc-4

616
00:22:08,149 --> 00:22:06,640
we hand it off to the space shuttle arm

617
00:22:10,549 --> 00:22:08,159
and then we pick that back up and then

618
00:22:12,710 --> 00:22:10,559
nicole will install that on the

619
00:22:14,549 --> 00:22:12,720
truck one of the trusses on the space

620
00:22:17,590 --> 00:22:14,559
station so that's one of the very first

621
00:22:21,350 --> 00:22:18,950
give us some more background if you

622
00:22:23,750 --> 00:22:21,360
would on the permanent permanent

623
00:22:24,710 --> 00:22:23,760
multi-purpose module the pmm

624
00:22:27,510 --> 00:22:24,720
and

625
00:22:30,390 --> 00:22:27,520
how it how it's been configured

626
00:22:32,870 --> 00:22:30,400
differently from a regular um

627
00:22:35,510 --> 00:22:32,880
mpl a multi-purpose logistics module

628
00:22:37,110 --> 00:22:35,520
what what is it going to be used for and

629
00:22:40,710 --> 00:22:37,120
how it's how has it been configured to

630
00:22:43,750 --> 00:22:40,720
make it useful for that purpose sure

631
00:22:46,310 --> 00:22:43,760
the pmm the the permanent

632
00:22:49,750 --> 00:22:46,320
the multi-purpose module started out as

633
00:22:51,990 --> 00:22:49,760
an mplm a multi-purpose logistics module

634
00:22:54,149 --> 00:22:52,000
which was built

635
00:22:56,789 --> 00:22:54,159
by the italians and we've used that on

636
00:22:58,470 --> 00:22:56,799
many many missions to bring up payloads

637
00:23:01,029 --> 00:22:58,480
uh typically it's docked to space

638
00:23:02,630 --> 00:23:01,039

station the space shuttle crew unloads

639
00:23:05,029 --> 00:23:02,640
all the equipment on board

640
00:23:07,270 --> 00:23:05,039
stores it onto space station and then

641
00:23:09,110 --> 00:23:07,280
that's placed back in the payload bay of

642
00:23:11,190 --> 00:23:09,120
the shuttle and taken back home and is

643
00:23:13,430 --> 00:23:11,200
prepared for a future flight what we've

644
00:23:15,350 --> 00:23:13,440
done with the pmm is we've made it so

645
00:23:18,390 --> 00:23:15,360
that it's a little bit more robust and

646
00:23:20,549 --> 00:23:18,400
safer for being exposed to space for a

647
00:23:22,630 --> 00:23:20,559
long period of time so they've improved

648
00:23:25,909 --> 00:23:22,640
the shielding and some of the components

649
00:23:28,549 --> 00:23:25,919
inside so that it's a it's a very useful

650
00:23:30,870 --> 00:23:28,559
storage location on space station once

651
00:23:33,190 --> 00:23:30,880
it's stocked so it'll come full of

652
00:23:35,270 --> 00:23:33,200
equipment but even so one of the things

653
00:23:37,590 --> 00:23:35,280
that we found with the space station is

654
00:23:39,590 --> 00:23:37,600
that it's very very important to have

655
00:23:41,590 --> 00:23:39,600
closets you need to have a place to

656
00:23:43,110 --> 00:23:41,600
store all your equipment

657
00:23:45,830 --> 00:23:43,120
especially now because with the

658
00:23:47,909 --> 00:23:45,840
retirement of shuttle we're now relying

659
00:23:50,149 --> 00:23:47,919
on other vehicles to bring equipment on

660
00:23:52,470 --> 00:23:50,159
board and so we're trying to get things

661
00:23:57,909 --> 00:23:52,480
maximized so that

662
00:24:01,750 --> 00:23:59,590
on the same day that you are scheduled

663
00:24:03,430 --> 00:24:01,760

to dock to the station uh

664
00:24:05,190 --> 00:24:03,440
you're scheduled to also take out the

665
00:24:07,510 --> 00:24:05,200
logistics carrier from the payload bay

666
00:24:09,590 --> 00:24:07,520
and attach it to to station kind of give

667
00:24:12,470 --> 00:24:09,600
us a blow-by-blow account of how that's

668
00:24:14,549 --> 00:24:12,480
going to happen and tell us where elc 4

669
00:24:17,669 --> 00:24:14,559
will will be temporarily uh

670
00:24:19,669 --> 00:24:17,679
docked to sure it's a pretty busy day we

671
00:24:21,669 --> 00:24:19,679
rendezvous with space station and as

672
00:24:24,710 --> 00:24:21,679
soon as the hatch opens up we all go

673
00:24:26,070 --> 00:24:24,720
into space station they give us a safety

674
00:24:28,630 --> 00:24:26,080
briefing for where the equipment is

675
00:24:30,310 --> 00:24:28,640
located and things that we need to know

676
00:24:32,789 --> 00:24:30,320
but then right after that nicole and i

677
00:24:34,470 --> 00:24:32,799
go to the cupola and get ready to remove

678
00:24:35,350 --> 00:24:34,480
the logistics carrier from the payload

679
00:24:37,830 --> 00:24:35,360
bay

680
00:24:39,830 --> 00:24:37,840
the folks on the flight deck will

681
00:24:42,390 --> 00:24:39,840
open up some hardware that keeps it

682
00:24:44,070 --> 00:24:42,400
restrained in the payload bay and then

683
00:24:46,710 --> 00:24:44,080
we've already attached it

684
00:24:49,350 --> 00:24:46,720
with the space station arm it's removed

685
00:24:50,789 --> 00:24:49,360
out and then it gets passed off to the

686
00:24:52,870 --> 00:24:50,799
space shuttle arm

687
00:24:54,630 --> 00:24:52,880
then we reconfigure the space station

688
00:24:57,750 --> 00:24:54,640

arm we take it back

689
00:24:58,789 --> 00:24:57,760
and then nicole will fly it and dock it

690
00:25:01,190 --> 00:24:58,799
on to

691
00:25:03,350 --> 00:25:01,200
a common attach system on board space

692
00:25:05,110 --> 00:25:03,360
station that's located on the starboard

693
00:25:07,029 --> 00:25:05,120
side which is the right hand side as

694
00:25:09,669 --> 00:25:07,039
you're facing forward

695
00:25:12,830 --> 00:25:09,679
inboard of the solar arrays on the

696
00:25:16,149 --> 00:25:12,840
bottom or nader portion of the truss

697
00:25:18,630 --> 00:25:16,159
okay uh and also if you would do the

698
00:25:21,190 --> 00:25:18,640
same for the process of getting the the

699
00:25:23,510 --> 00:25:21,200
pmm out of the payload and attaching it

700
00:25:25,269 --> 00:25:23,520
so the pmm is probably a little bit uh

701
00:25:29,990 --> 00:25:25,279
cleaner process because we don't need to

702
00:25:31,990 --> 00:25:30,000
do a swap with the space shuttle arm so

703
00:25:35,510 --> 00:25:32,000
we come in with the space station arm we

704
00:25:37,669 --> 00:25:35,520
attach it on to the the pmm

705
00:25:39,269 --> 00:25:37,679
we pull it out and we do an automatic

706
00:25:41,830 --> 00:25:39,279
maneuver after that manual flying that

707
00:25:43,909 --> 00:25:41,840
gets it ready for installation on the

708
00:25:46,390 --> 00:25:43,919
node 1 module on the bottom or nader

709
00:25:49,350 --> 00:25:46,400
portion of the module and then the last

710
00:25:52,710 --> 00:25:49,360
part we we fly it in and it gets to a

711
00:25:54,549 --> 00:25:52,720
certain point where it hits some levers

712
00:25:57,669 --> 00:25:54,559
that tell us that it's within reach to

713
00:26:00,149 --> 00:25:57,679

go ahead and attach it with

714
00:26:02,549 --> 00:26:00,159
some hardware that allows it to

715
00:26:04,870 --> 00:26:02,559
birth up and 16 bolts can be driven that

716
00:26:07,190 --> 00:26:04,880
make it a permanent part of the space

717
00:26:09,710 --> 00:26:07,200
station

718
00:26:12,710 --> 00:26:09,720
you and al drew have two space walks on

719
00:26:15,110 --> 00:26:12,720
sts-133 uh tell us about what what's

720
00:26:17,350 --> 00:26:15,120
going to happen on eva one

721
00:26:19,750 --> 00:26:17,360
well really excited to be able to have

722
00:26:21,190 --> 00:26:19,760
some evas on this flight and uh we've

723
00:26:22,870 --> 00:26:21,200
been working really hard with both the

724
00:26:24,470 --> 00:26:22,880
ground team and

725
00:26:27,110 --> 00:26:24,480
our crew that's going to be working a

726
00:26:29,830 --> 00:26:27,120
robotic arm during the same time so our

727
00:26:31,830 --> 00:26:29,840
first dva is one in which al and i are

728
00:26:33,750 --> 00:26:31,840
going to work together quite a bit we

729
00:26:35,909 --> 00:26:33,760
have a robotic arm operation in which

730
00:26:37,669 --> 00:26:35,919
we're going to remove the pump module

731
00:26:39,269 --> 00:26:37,679
that's stowed on the front face of the

732
00:26:42,710 --> 00:26:39,279
space station and we're going to put it

733
00:26:44,549 --> 00:26:42,720
back where it was initially stowed

734
00:26:47,750 --> 00:26:44,559
the one that they used to replace the

735
00:26:49,430 --> 00:26:47,760
broken one on space station and so

736
00:26:52,549 --> 00:26:49,440
we'll go ahead and remove that from the

737
00:26:54,710 --> 00:26:52,559
front face install that on a platform on

738
00:26:56,549 --> 00:26:54,720

space station and uh

739
00:26:58,470 --> 00:26:56,559
mike barrett is going to be flying me

740
00:27:00,230 --> 00:26:58,480
while i'm on the end of the arm and al's

741
00:27:03,269 --> 00:27:00,240
going to be there to help guide this

742
00:27:05,269 --> 00:27:03,279
large box about an 800 pound box into

743
00:27:07,510 --> 00:27:05,279
rails so that we can install it bolt it

744
00:27:09,750 --> 00:27:07,520
down and get it hooked up correctly so

745
00:27:11,909 --> 00:27:09,760
that's the first big task al is going to

746
00:27:13,830 --> 00:27:11,919
be using some special tools

747
00:27:16,789 --> 00:27:13,840
to vent this pump module because inside

748
00:27:18,230 --> 00:27:16,799
the pump module is some ammonia and if

749
00:27:20,389 --> 00:27:18,240
on a future mission they need to bring

750
00:27:22,389 --> 00:27:20,399
this pump module home for safety

751
00:27:23,590 --> 00:27:22,399
purposes they've bent all the ammonia

752
00:27:26,149 --> 00:27:23,600
from that and so al is going to be

753
00:27:28,230 --> 00:27:26,159
working hard on getting that done

754
00:27:30,470 --> 00:27:28,240
we also have a couple other tasks that

755
00:27:33,350 --> 00:27:30,480
al and i will do together we're going to

756
00:27:35,990 --> 00:27:33,360
install a wedge on a camera stanchion

757
00:27:38,070 --> 00:27:36,000
this long extension that has a camera on

758
00:27:40,070 --> 00:27:38,080
the end so that in the future when they

759
00:27:41,990 --> 00:27:40,080
bring up visiting vehicles this camera

760
00:27:43,590 --> 00:27:42,000
stanchion will be out of the way

761
00:27:46,870 --> 00:27:43,600
and after we complete that we're going

762
00:27:48,710 --> 00:27:46,880
to install this extension on the rails

763
00:27:50,549 --> 00:27:48,720

on which the mobile transporter moves

764
00:27:52,549 --> 00:27:50,559
and that allows this huge mobile

765
00:27:54,630 --> 00:27:52,559
transport that goes up and down the

766
00:27:56,549 --> 00:27:54,640
front face of the space station to get a

767
00:27:58,950 --> 00:27:56,559
little bit farther out so if they have

768
00:28:01,190 --> 00:27:58,960
to replace some of the units on the far

769
00:28:03,750 --> 00:28:01,200
side of space station they can move that

770
00:28:05,590 --> 00:28:03,760
mobile transporter all the way down

771
00:28:07,669 --> 00:28:05,600
and a few other small tasks that we'll

772
00:28:09,110 --> 00:28:07,679
do and uh bottom line is we're just

773
00:28:11,350 --> 00:28:09,120
trying to put space station the best

774
00:28:14,070 --> 00:28:11,360
configuration prior to the retirement of

775
00:28:16,630 --> 00:28:14,080
the space shuttle okay

776
00:28:17,430 --> 00:28:16,640
and what is the current plan for eva 2

777
00:28:18,870 --> 00:28:17,440
then

778
00:28:20,870 --> 00:28:18,880
so eva 2

779
00:28:23,830 --> 00:28:20,880
unlike on eva 1 where al and i were

780
00:28:26,870 --> 00:28:23,840
together most of the time on eva 2 we

781
00:28:29,190 --> 00:28:26,880
have very distinct and separate tasks

782
00:28:31,669 --> 00:28:29,200
al is going to be working on

783
00:28:34,710 --> 00:28:31,679
on getting this box prepared that we

784
00:28:36,789 --> 00:28:34,720
brought up on this large platform taking

785
00:28:38,630 --> 00:28:36,799
off some multi-layer insulation and

786
00:28:41,750 --> 00:28:38,640
working on some troubleshooting on some

787
00:28:43,430 --> 00:28:41,760
beams which are used to potentially stow

788
00:28:44,470 --> 00:28:43,440

a radiator in the future and some other

789
00:28:46,710 --> 00:28:44,480
tasks

790
00:28:48,549 --> 00:28:46,720
whereas i will be on the robotic arm so

791
00:28:51,029 --> 00:28:48,559
i'm going to move out to the very front

792
00:28:54,310 --> 00:28:51,039
of space station on columbus which is

793
00:28:56,549 --> 00:28:54,320
the european lab on space station and

794
00:28:58,310 --> 00:28:56,559
then configure the robotic arm with a

795
00:29:01,269 --> 00:28:58,320
foot restraint hop in that foot

796
00:29:03,669 --> 00:29:01,279
restraint and again mike is going to fly

797
00:29:05,669 --> 00:29:03,679
me in a position to remove this large

798
00:29:08,630 --> 00:29:05,679
platform called an el wapa

799
00:29:11,269 --> 00:29:08,640
and it has some scientific data in a box

800
00:29:13,350 --> 00:29:11,279
on this platform and our intention is to

801
00:29:16,470 --> 00:29:13,360
move that mike will fly me over to the

802
00:29:19,350 --> 00:29:16,480
payload bay and we'll install that on a

803
00:29:21,190 --> 00:29:19,360
sidewall care inside the payload bay

804
00:29:23,510 --> 00:29:21,200
when i go out there i'll have a large

805
00:29:26,149 --> 00:29:23,520
bag that has some equipment in it to

806
00:29:28,549 --> 00:29:26,159
include a camera that i will install on

807
00:29:30,230 --> 00:29:28,559
the special purpose dextrous manipulator

808
00:29:33,029 --> 00:29:30,240
which is an extension for the robotic

809
00:29:34,789 --> 00:29:33,039
arm that's stowed on the outside of lab

810
00:29:36,789 --> 00:29:34,799
so after mike flies me out to the

811
00:29:39,830 --> 00:29:36,799
payload bay of the space shuttle he'll

812
00:29:41,990 --> 00:29:39,840
fly me to the spdm and i'll install this

813
00:29:43,750 --> 00:29:42,000

camera and i have one additional task

814
00:29:46,230 --> 00:29:43,760
out there to remove some multi-layer

815
00:29:48,789 --> 00:29:46,240
insulation on one of the boxes after

816
00:29:50,630 --> 00:29:48,799
that he'll fly me back to columbus and

817
00:29:52,230 --> 00:29:50,640
i'll undo all the things that i did to

818
00:29:54,149 --> 00:29:52,240
configure the arm take off this foot

819
00:29:55,590 --> 00:29:54,159
restraint and put things in the right

820
00:29:56,389 --> 00:29:55,600
configuration

821
00:29:57,990 --> 00:29:56,399
and

822
00:30:00,070 --> 00:29:58,000
if we have some more time at the end of

823
00:30:03,110 --> 00:30:00,080
the eva we have a few additional tasks

824
00:30:04,549 --> 00:30:03,120
we have some some covers that we put on

825
00:30:05,590 --> 00:30:04,559
some of the cameras to protect the

826
00:30:07,909 --> 00:30:05,600
lenses

827
00:30:09,350 --> 00:30:07,919
and just a few other get-ahead tasks to

828
00:30:11,110 --> 00:30:09,360
really put the station in the best

829
00:30:13,269 --> 00:30:11,120
configuration okay

830
00:30:14,630 --> 00:30:13,279
hey can you tell us real quickly about

831
00:30:15,590 --> 00:30:14,640
you have something called message in a

832
00:30:17,350 --> 00:30:15,600
bottle

833
00:30:19,750 --> 00:30:17,360
we do have something called message in a

834
00:30:22,230 --> 00:30:19,760
bottle and it's a it's a japanese piece

835
00:30:24,549 --> 00:30:22,240
of hardware and

836
00:30:26,549 --> 00:30:24,559
the intention here is to use this

837
00:30:29,190 --> 00:30:26,559
outside space station and all we're

838
00:30:32,149 --> 00:30:29,200

going to do is open a valve and and it's

839
00:30:34,070 --> 00:30:32,159
kind of a unique and uh and a thoughtful

840
00:30:35,990 --> 00:30:34,080
sort of experiment the japanese have

841
00:30:38,149 --> 00:30:36,000
have designed where we're just going to

842
00:30:41,909 --> 00:30:38,159
fill it with a vacuum of space and and

843
00:30:44,230 --> 00:30:41,919
really i think it's really just more um

844
00:30:46,389 --> 00:30:44,240
to demonstrate that uh hey this is the

845
00:30:48,230 --> 00:30:46,399
vacuum of space and clearly a vacuum is

846
00:30:51,190 --> 00:30:48,240
a vacuum whether it's space or if it's

847
00:30:52,710 --> 00:30:51,200
in a vacuum chamber here at nasa but

848
00:30:55,430 --> 00:30:52,720
this is a little bit special especially

849
00:30:57,350 --> 00:30:55,440
for the japanese because it's the vacuum

850
00:30:59,430 --> 00:30:57,360
of space and so we'll do that capture

851
00:31:03,509 --> 00:30:59,440
that in pictures and provide that to the

852
00:31:06,549 --> 00:31:05,029
uh after your work on station is

853
00:31:09,509 --> 00:31:06,559
complete you will undock from the

854
00:31:12,149 --> 00:31:09,519
station uh and for your preparation uh

855
00:31:13,430 --> 00:31:12,159
for the return trip back to earth

856
00:31:15,590 --> 00:31:13,440
it might be one of the last

857
00:31:17,430 --> 00:31:15,600
opportunities for for anybody to see the

858
00:31:18,389 --> 00:31:17,440
space station from that vantage point

859
00:31:20,789 --> 00:31:18,399
from inside

860
00:31:22,630 --> 00:31:20,799
of a shuttle backing away

861
00:31:24,389 --> 00:31:22,640
as you sit here today trying to imagine

862
00:31:25,590 --> 00:31:24,399
that moment what do you

863
00:31:27,029 --> 00:31:25,600

what do you

864
00:31:29,830 --> 00:31:27,039
think that's that's that's how do you

865
00:31:32,389 --> 00:31:29,840
think it's going to impact you

866
00:31:34,950 --> 00:31:32,399
you know i remember seeing uh space

867
00:31:38,070 --> 00:31:34,960
station as we uh undocked and moved away

868
00:31:40,389 --> 00:31:38,080
on sts-128 and uh one of the things i

869
00:31:43,110 --> 00:31:40,399
realized especially in retrospect from

870
00:31:44,950 --> 00:31:43,120
my time on space station was that

871
00:31:46,950 --> 00:31:44,960
there are lots of very distinct memories

872
00:31:49,669 --> 00:31:46,960
that you carry away and one of those was

873
00:31:51,990 --> 00:31:49,679
seeing the space station

874
00:31:53,830 --> 00:31:52,000
as we moved away and and recognizing

875
00:31:55,269 --> 00:31:53,840
that

876
00:31:57,830 --> 00:31:55,279
for all the uh

877
00:31:59,430 --> 00:31:57,840
the the hardship and hard work and

878
00:32:01,350 --> 00:31:59,440
effort that's gone into building this

879
00:32:03,269 --> 00:32:01,360
this is what the final result is this

880
00:32:05,190 --> 00:32:03,279
tremendous uh

881
00:32:06,630 --> 00:32:05,200
international achievement

882
00:32:10,070 --> 00:32:06,640
and i think i'll have that same

883
00:32:12,149 --> 00:32:10,080
sensation as as we see space station now

884
00:32:15,029 --> 00:32:12,159
with a lot more components one of which

885
00:32:15,750 --> 00:32:15,039
we've added on sts-133

886
00:32:16,950 --> 00:32:15,760
and

887
00:32:19,029 --> 00:32:16,960
i think that

888
00:32:21,110 --> 00:32:19,039

everybody that's involved in the space

889
00:32:23,190 --> 00:32:21,120
shuttle and space station program has a

890
00:32:24,789 --> 00:32:23,200
lot to be proud of it's just an

891
00:32:25,909 --> 00:32:24,799
unbelievable achievement when you see

892
00:32:27,350 --> 00:32:25,919
this thing

893
00:32:28,389 --> 00:32:27,360
going around our planet it's like a

894
00:32:29,110 --> 00:32:28,399
flying city

895
00:32:31,269 --> 00:32:29,120
and

896
00:32:33,750 --> 00:32:31,279
you recognize that that it's not just

897
00:32:35,830 --> 00:32:33,760
the hardware but you have six people

898
00:32:39,110 --> 00:32:35,840
that they're living in a place that

899
00:32:41,669 --> 00:32:39,120
ordinarily you can't live it's a vacuum

900
00:32:43,669 --> 00:32:41,679
it's in space it's not something that is

901
00:32:45,430 --> 00:32:43,679
normal by any means and it's something

902
00:32:48,070 --> 00:32:45,440
that's been done through a lot of

903
00:32:50,070 --> 00:32:48,080
dedication hard work over a couple of

904
00:32:50,950 --> 00:32:50,080
decades and so uh

905
00:32:52,950 --> 00:32:50,960
to me

906
00:32:55,350 --> 00:32:52,960
i think uh i'll be thankful that we've

907
00:32:56,789 --> 00:32:55,360
been able to get our portion of the

908
00:32:59,430 --> 00:32:56,799
mission complete

909
00:33:01,110 --> 00:32:59,440
and uh and thankful that uh

910
00:33:04,870 --> 00:33:01,120
that so many people have put such great

911
00:33:08,789 --> 00:33:06,870
uh this mission is currently scheduled

912
00:33:10,470 --> 00:33:08,799
to be one of the last space shuttle

913
00:33:13,110 --> 00:33:10,480

flights um

914
00:33:15,909 --> 00:33:13,120
what does it mean to you to have been

915
00:33:18,149 --> 00:33:15,919
part of the space shuttle program

916
00:33:20,389 --> 00:33:18,159
it's something that's been or that is

917
00:33:21,909 --> 00:33:20,399
considered an institution by many many

918
00:33:23,350 --> 00:33:21,919
people

919
00:33:25,110 --> 00:33:23,360
even more than an institution i would

920
00:33:27,029 --> 00:33:25,120
say that the space shuttle is is an

921
00:33:29,830 --> 00:33:27,039
american icon

922
00:33:32,470 --> 00:33:29,840
and it represents the best

923
00:33:35,430 --> 00:33:32,480
that america has to offer

924
00:33:37,350 --> 00:33:35,440
it it combines

925
00:33:39,830 --> 00:33:37,360
long-term planning

926
00:33:41,830 --> 00:33:39,840
hard work and dedication

927
00:33:43,909 --> 00:33:41,840
exceeding the capabilities that we ever

928
00:33:44,710 --> 00:33:43,919
thought that it was able to do

929
00:33:50,789 --> 00:33:44,720
and

930
00:33:54,070 --> 00:33:50,799
are our great

931
00:33:55,430 --> 00:33:54,080
american achievements and values and so

932
00:33:57,430 --> 00:33:55,440
every time

933
00:33:59,509 --> 00:33:57,440
i've been able to spend time around the

934
00:34:02,149 --> 00:33:59,519
space shuttle and the people that have

935
00:34:04,470 --> 00:34:02,159
built it and maintained it and and

936
00:34:06,149 --> 00:34:04,480
worked with it and trained us on it

937
00:34:08,310 --> 00:34:06,159
it's just uh

938
00:34:10,950 --> 00:34:08,320

it really makes me proud to be part of

939
00:34:13,109 --> 00:34:10,960
it we just spent some time at a crew

940
00:34:15,030 --> 00:34:13,119
equipment interface test at kennedy

941
00:34:17,109 --> 00:34:15,040
space center and the level of dedication

942
00:34:18,069 --> 00:34:17,119
of the people there to make this vehicle

943
00:34:20,629 --> 00:34:18,079
perfect

944
00:34:22,869 --> 00:34:20,639
for every flight is just really really

945
00:34:26,149 --> 00:34:22,879
awe-inspiring and so i'm just happy to

946
00:34:29,030 --> 00:34:26,159
be a part of it and um to me if if i

947
00:34:31,030 --> 00:34:29,040
look back on on uh the initial things

948
00:34:33,030 --> 00:34:31,040
that that space shuttle was designed to

949
00:34:34,550 --> 00:34:33,040
do and that it accomplished and look at

950
00:34:37,030 --> 00:34:34,560
what we're doing now

951
00:34:39,349 --> 00:34:37,040
it's just unbelievable to me you know we

952
00:34:41,190 --> 00:34:39,359
started out with this vehicle that we

953
00:34:42,869 --> 00:34:41,200
put a few experiments in the back and

954
00:34:44,710 --> 00:34:42,879
not discount those early achievements

955
00:34:46,790 --> 00:34:44,720
because they were building blocks but

956
00:34:50,550 --> 00:34:46,800
experiments in the back and very brief

957
00:34:52,629 --> 00:34:50,560
spacewalks to today where we've built an

958
00:34:55,030 --> 00:34:52,639
international space station largely on

959
00:34:57,430 --> 00:34:55,040
the back of the space shuttle and very

960
00:34:59,109 --> 00:34:57,440
very complex spacewalks in order to

961
00:35:01,910 --> 00:34:59,119
complete that assembly along with

962
00:35:04,310 --> 00:35:01,920
robotic operations that involve two and

963
00:35:05,750 --> 00:35:04,320

sometimes three robotic arms