1
00:00:07,670 --> 00:00:05,030
this is the sts-133 interview with

2
00:00:09,830 --> 00:00:07,680
mission specialist dr michael barrett uh

3
00:00:11,350 --> 00:00:09,840
mike tell us tell us about your hometown

4
00:00:13,509 --> 00:00:11,360
what it was like growing up there and

5
00:00:16,230 --> 00:00:13,519
and how that place influenced you well

6
00:00:18,150 --> 00:00:16,240
my hometown was canvas washington up in

7
00:00:20,310 --> 00:00:18,160
washington state in the southern

8
00:00:22,070 --> 00:00:20,320
southwestern area around right around

9
00:00:24,710 --> 00:00:22,080
the columbia river very beautiful very

10
00:00:26,630 --> 00:00:24,720
green farming community and it was just

11
00:00:28,710 --> 00:00:26,640
a perfect upbringing just working on the

12
00:00:30,710 --> 00:00:28,720
farm and going to school

13
00:00:32,310 --> 00:00:30,720

we learned about building and repairing

14
00:00:33,910 --> 00:00:32,320
and maintenance and taking care of

15
00:00:35,510 --> 00:00:33,920
animals along with just the standard

16
00:00:37,350 --> 00:00:35,520
educational stuff and it was just a

17
00:00:39,190 --> 00:00:37,360
perfect place to grow up

18
00:00:40,790 --> 00:00:39,200
okay so that that

19
00:00:42,709 --> 00:00:40,800
the opportunity probably to have

20
00:00:44,470 --> 00:00:42,719
hands-on with doing things i'm sure that

21
00:00:46,229 --> 00:00:44,480
that helped oh absolutely

22
00:00:47,910 --> 00:00:46,239
on the farm you're always fixing things

23
00:00:49,910 --> 00:00:47,920
and the same is more or less true on

24
00:00:51,590 --> 00:00:49,920
space station so

25
00:00:54,630 --> 00:00:51,600
i think it definitely prepared me well

26
00:00:56,630 --> 00:00:54,640
we grew up knowing how to use tools and

27
00:00:58,470 --> 00:00:56,640
both of my parents worked in spite of

28
00:01:01,110 --> 00:00:58,480
having a farm so we also grew up knowing

29
00:01:02,950 --> 00:01:01,120
how to prepare meals and and run a

30
00:01:04,950 --> 00:01:02,960
household so i think for my two brothers

31
00:01:07,190 --> 00:01:04,960
and it was perfect preparation for a lot

32
00:01:09,750 --> 00:01:07,200
of different paths okay

33
00:01:12,950 --> 00:01:09,760
did you have a chance to to see that

34
00:01:15,109 --> 00:01:12,960
region uh from space at all oh i sure

35
00:01:17,429 --> 00:01:15,119
did any chance that i got i would pretty

36
00:01:19,350 --> 00:01:17,439
much look at the passes that we would be

37
00:01:21,910 --> 00:01:19,360
taking over the pacific northwest and i

38
00:01:23,429 --> 00:01:21,920

was always ready with a camera

39
00:01:25,030 --> 00:01:23,439
it's a it's called the evergreen state

40
00:01:26,550 --> 00:01:25,040
for a reason there's quite a bit of rain

41
00:01:28,390 --> 00:01:26,560
there and that keeps our forests

42
00:01:30,469 --> 00:01:28,400
beautiful so it also makes it very

43
00:01:31,429 --> 00:01:30,479
difficult to photograph much of the year

44
00:01:33,190 --> 00:01:31,439
but fortunately i was up there

45
00:01:34,789 --> 00:01:33,200
throughout the summer and i was able to

46
00:01:36,550 --> 00:01:34,799
take lots of photographs during really

47
00:01:38,550 --> 00:01:36,560
clear weather i could see my hometown

48
00:01:40,310 --> 00:01:38,560
the little lake i grew up on so yeah

49
00:01:41,830 --> 00:01:40,320
lots of good imagery what was the

50
00:01:43,910 --> 00:01:41,840
reaction when you when you the first

51
00:01:47,030 --> 00:01:43,920
time you saw it and just realizing hey

52
00:01:49,270 --> 00:01:47,040
i'm i'm way up here and i was there well

53
00:01:51,190 --> 00:01:49,280
first reaction was gosh we're going over

54
00:01:52,710 --> 00:01:51,200
this awfully fast you get your camera

55
00:01:54,870 --> 00:01:52,720
ready and you take a couple of pictures

56
00:01:55,749 --> 00:01:54,880
and you're already gone

57
00:01:57,350 --> 00:01:55,759
but

58
00:01:59,830 --> 00:01:57,360
the good thing is that it looks just as

59
00:02:01,510 --> 00:01:59,840
beautiful from space as it does from the

60
00:02:03,590 --> 00:02:01,520
ground from where you live in there so

61
00:02:07,590 --> 00:02:03,600
it's just natural beauty of that region

62
00:02:11,990 --> 00:02:09,910
recount for us um the steps that that

63
00:02:14,309 --> 00:02:12,000

you've taken uh in your professional

64
00:02:15,670 --> 00:02:14,319
career that that have led you here to

65
00:02:18,550 --> 00:02:15,680
nasa

66
00:02:20,550 --> 00:02:18,560
well interestingly i i probably uh have

67
00:02:22,630 --> 00:02:20,560
a story common to a lot of the people in

68
00:02:24,390 --> 00:02:22,640
the astronaut corps and that we go

69
00:02:27,190 --> 00:02:24,400
through career crisis because we have so

70
00:02:29,830 --> 00:02:27,200
many broad interests a lot of us

71
00:02:32,229 --> 00:02:29,840
are interested in science and technology

72
00:02:34,710 --> 00:02:32,239
but we're also interested in in flying

73
00:02:36,470 --> 00:02:34,720
and engineering and practical things

74
00:02:37,990 --> 00:02:36,480
and i don't think i knew what i wanted

75
00:02:40,470 --> 00:02:38,000
to be when i grew up until i was in my

76
00:02:42,150 --> 00:02:40,480
mid-30s or so

77
00:02:45,350 --> 00:02:42,160
i wanted to be a marine biologist at one

78
00:02:46,710 --> 00:02:45,360
time an astronomer an archaeologist and

79
00:02:49,110 --> 00:02:46,720
when i went to undergrad at the

80
00:02:50,630 --> 00:02:49,120
university of washington my focus was

81
00:02:51,350 --> 00:02:50,640
marine zoology

82
00:02:58,710 --> 00:02:51,360
i

83
00:03:02,229 --> 00:02:58,720
and probably

84
00:03:04,710 --> 00:03:02,239
late during my undergrad years i started

85
00:03:06,550 --> 00:03:04,720
getting interested in space and the more

86
00:03:09,350 --> 00:03:06,560
i went through medical school i realized

87
00:03:11,670 --> 00:03:09,360
that space is a field that puts so many

88
00:03:14,229 --> 00:03:11,680

things together that that i love

89
00:03:16,309 --> 00:03:14,239
and i ended up in

90
00:03:18,470 --> 00:03:16,319
specializing in internal medicine mostly

91
00:03:21,190 --> 00:03:18,480
to learn pathophysiology well that i

92
00:03:23,430 --> 00:03:21,200
could then apply to the space program

93
00:03:25,190 --> 00:03:23,440
and then i went to a formal aerospace

94
00:03:26,869 --> 00:03:25,200
medical program in

95
00:03:28,710 --> 00:03:26,879
ohio at wright state university in

96
00:03:30,869 --> 00:03:28,720
wright-patterson air force base

97
00:03:33,509 --> 00:03:30,879
and the closer i got the more i realized

98
00:03:35,589 --> 00:03:33,519
that my suspicions were correct that

99
00:03:38,550 --> 00:03:35,599
nothing puts everything together like

100
00:03:40,550 --> 00:03:38,560
the aerospace industry and having spent

101
00:03:42,070 --> 00:03:40,560
about nine years as a flight surgeon

102
00:03:43,110 --> 00:03:42,080
here and then coming to the astronaut

103
00:03:44,470 --> 00:03:43,120
corps

104
00:03:46,390 --> 00:03:44,480
that strengthened all of those

105
00:03:48,390 --> 00:03:46,400
suspicions we use

106
00:03:50,869 --> 00:03:48,400
earth observation ocean science

107
00:03:52,789 --> 00:03:50,879
engineering flight

108
00:03:54,390 --> 00:03:52,799
biomedical science of course all of

109
00:03:57,270 --> 00:03:54,400
these things are all together into one

110
00:03:58,869 --> 00:03:57,280
job there's nothing better than that

111
00:04:00,550 --> 00:03:58,879
then that obviously made it very

112
00:04:02,070 --> 00:04:00,560
attractive then to because you had all

113
00:04:04,070 --> 00:04:02,080

these interests yeah absolutely

114
00:04:05,670 --> 00:04:04,080
absolutely and i think i found my peers

115
00:04:06,630 --> 00:04:05,680
here like a lot of us have we find

116
00:04:08,149 --> 00:04:06,640
people

117
00:04:10,149 --> 00:04:08,159
the same way who really didn't know what

118
00:04:12,710 --> 00:04:10,159
they wanted to be necessarily because

119
00:04:14,550 --> 00:04:12,720
everything interests them and again this

120
00:04:16,310 --> 00:04:14,560
rolls it all together so i'm with a

121
00:04:17,990 --> 00:04:16,320
bunch of people who

122
00:04:20,310 --> 00:04:18,000
have solved their career anxiety by

123
00:04:21,349 --> 00:04:20,320
coming to uh johnson space center okay

124
00:04:23,030 --> 00:04:21,359
okay

125
00:04:24,550 --> 00:04:23,040
what then was it that that that

126
00:04:27,430 --> 00:04:24,560
motivated you to

127
00:04:29,030 --> 00:04:27,440
to want to apply to

128
00:04:30,629 --> 00:04:29,040
going to the astronaut corps and and

129
00:04:32,950 --> 00:04:30,639
tell us that story

130
00:04:35,270 --> 00:04:32,960
i came down here to do space medicine my

131
00:04:37,270 --> 00:04:35,280
express interest and passion and it was

132
00:04:39,510 --> 00:04:37,280
space medicine is space medicine to me

133
00:04:40,790 --> 00:04:39,520
it's just one of the most amazing

134
00:04:42,710 --> 00:04:40,800
specialties

135
00:04:44,469 --> 00:04:42,720
that you could possibly imagine

136
00:04:46,870 --> 00:04:44,479
and it was really when we started

137
00:04:48,310 --> 00:04:46,880
working the long duration flights with

138
00:04:50,070 --> 00:04:48,320

the russians in the shuttle mirror

139
00:04:51,990 --> 00:04:50,080
program that i came to a couple of

140
00:04:54,150 --> 00:04:52,000
realizations first of all

141
00:04:55,990 --> 00:04:54,160
if we want to get somewhere out of low

142
00:04:58,629 --> 00:04:56,000
earth orbit it's probably going to

143
00:04:59,990 --> 00:04:58,639
involve long periods of space flight and

144
00:05:01,909 --> 00:05:00,000
in particular long periods of

145
00:05:04,390 --> 00:05:01,919
weightlessness going to mars

146
00:05:06,629 --> 00:05:04,400
going to asteroids and further

147
00:05:08,070 --> 00:05:06,639
and that's why the long duration flight

148
00:05:09,430 --> 00:05:08,080
experience with the russians and of

149
00:05:10,870 --> 00:05:09,440
course eventually the international

150
00:05:13,110 --> 00:05:10,880
space station really started to interest

151
00:05:15,189 --> 00:05:13,120
me the second thing was that

152
00:05:16,710 --> 00:05:15,199
to really understand this environment

153
00:05:18,710 --> 00:05:16,720
you really need to experience it

154
00:05:21,590 --> 00:05:18,720
yourself and that's what really

155
00:05:23,270 --> 00:05:21,600
motivated me to apply obviously i'd

156
00:05:25,749 --> 00:05:23,280
been close to the program met a lot of

157
00:05:27,510 --> 00:05:25,759
the astronauts in the office and got to

158
00:05:29,670 --> 00:05:27,520
understand what their job was like i

159
00:05:31,029 --> 00:05:29,680
could potentially see myself fitting

160
00:05:32,230 --> 00:05:31,039
into that job although i didn't think

161
00:05:34,870 --> 00:05:32,240
there was much of a chance of being

162
00:05:38,710 --> 00:05:34,880
accepted but that was really the draw

163
00:05:44,070 --> 00:05:40,629

tell us how you would characterize the

164
00:05:46,070 --> 00:05:44,080
value of education uh in your life oh

165
00:05:49,350 --> 00:05:46,080
without i mean education of course gives

166
00:05:52,710 --> 00:05:49,360
you the tools to act on your interests

167
00:05:55,830 --> 00:05:52,720
i think uh you don't have to come from

168
00:05:57,110 --> 00:05:55,840
an educational powerhouse to be educated

169
00:05:59,110 --> 00:05:57,120
enough to

170
00:06:01,350 --> 00:05:59,120
pursue things that really interest you

171
00:06:03,990 --> 00:06:01,360
and pursue your dreams if you will i

172
00:06:06,710 --> 00:06:04,000
came from a fairly small community with

173
00:06:09,270 --> 00:06:06,720
good solid schools no question about it

174
00:06:11,110 --> 00:06:09,280
not wealthy schools but very good

175
00:06:13,590 --> 00:06:11,120
idealistic teachers

176
00:06:15,670 --> 00:06:13,600
and they empowered me to really act on

177
00:06:17,670 --> 00:06:15,680
all those various interests that i had

178
00:06:20,870 --> 00:06:17,680
and nurtured when i grew up

179
00:06:22,870 --> 00:06:20,880
education is is an absolute right to

180
00:06:25,029 --> 00:06:22,880
people everybody should have the right

181
00:06:27,510 --> 00:06:25,039
to pursue those dreams and again just to

182
00:06:32,070 --> 00:06:27,520
be empowered to do that education is is

183
00:06:36,150 --> 00:06:34,230
in 2009 you spent some time on board

184
00:06:38,710 --> 00:06:36,160
international space station as a member

185
00:06:40,469 --> 00:06:38,720
of the expeditions 19 and 20 crew uh

186
00:06:43,990 --> 00:06:40,479
talk about that time how it was living

187
00:06:45,749 --> 00:06:44,000
and working on iss and and how

188
00:06:47,430 --> 00:06:45,759

actually getting to that environment

189
00:06:48,870 --> 00:06:47,440
like you said and experiencing it for

190
00:06:50,629 --> 00:06:48,880
yourself

191
00:06:52,070 --> 00:06:50,639
what were your thoughts about that

192
00:06:53,909 --> 00:06:52,080
well that's a great question i think

193
00:06:55,830 --> 00:06:53,919
flying in space is a wonderful

194
00:06:58,230 --> 00:06:55,840
experience for anybody no matter what

195
00:06:59,350 --> 00:06:58,240
their background but as a space medical

196
00:07:00,950 --> 00:06:59,360
specialist

197
00:07:03,029 --> 00:07:00,960
my flight experience was like a dream

198
00:07:06,150 --> 00:07:03,039
come true first of all it was a good

199
00:07:08,710 --> 00:07:06,160
long flight i spent 199 days in space

200
00:07:10,870 --> 00:07:08,720
and i had a tremendous crew

201
00:07:12,629 --> 00:07:10,880
we saw the transition from three people

202
00:07:14,309 --> 00:07:12,639
to six people as a permanent crew so

203
00:07:17,189 --> 00:07:14,319
that was very interesting

204
00:07:19,670 --> 00:07:17,199
but also very fortunate for me

205
00:07:21,670 --> 00:07:19,680
i saw 22 other people during my flight

206
00:07:24,070 --> 00:07:21,680
experience besides myself

207
00:07:26,629 --> 00:07:24,080
so i was able to kind of personally look

208
00:07:28,550 --> 00:07:26,639
at my own adaptation process both

209
00:07:30,469 --> 00:07:28,560
physiologic what the body does in

210
00:07:32,950 --> 00:07:30,479
response to zero gravity

211
00:07:35,270 --> 00:07:32,960
and behavioral how you learn to operate

212
00:07:37,510 --> 00:07:35,280
and perform well in zero gravity and

213
00:07:40,469 --> 00:07:37,520

then i saw that in various other people

214
00:07:42,469 --> 00:07:40,479
as well people who had had rich flight

215
00:07:45,110 --> 00:07:42,479
experiences had spent over a year in

216
00:07:47,189 --> 00:07:45,120
space like my commander gennady padalka

217
00:07:48,710 --> 00:07:47,199
people who were doing their first space

218
00:07:51,189 --> 00:07:48,720
flights and only being there for a short

219
00:07:51,990 --> 00:07:51,199
period of time and all of these folks

220
00:07:55,510 --> 00:07:52,000
had

221
00:07:56,950 --> 00:07:55,520
i think a fairly wide envelope of

222
00:07:59,430 --> 00:07:56,960
performance

223
00:08:01,270 --> 00:07:59,440
capabilities and flight experiences all

224
00:08:02,790 --> 00:08:01,280
of them very successful

225
00:08:05,189 --> 00:08:02,800
but it allowed me to make some

226
00:08:06,469 --> 00:08:05,199
observations some recommendations if you

227
00:08:09,110 --> 00:08:06,479
will

228
00:08:11,029 --> 00:08:09,120
it i think allowed us to

229
00:08:13,110 --> 00:08:11,039
systematically write down some of these

230
00:08:14,629 --> 00:08:13,120
milestones that i otherwise wouldn't

231
00:08:16,230 --> 00:08:14,639
have been able to do without being up

232
00:08:17,670 --> 00:08:16,240
there and seeing so many people and

233
00:08:19,830 --> 00:08:17,680
hopefully to pass on some of these

234
00:08:20,869 --> 00:08:19,840
little pearls to others who fly and help

235
00:08:22,469 --> 00:08:20,879
them

236
00:08:25,589 --> 00:08:22,479
get a little bit ahead of this curve and

237
00:08:28,230 --> 00:08:25,599
and be good performers quicker okay

238
00:08:30,390 --> 00:08:28,240

uh now although you've been

239
00:08:31,430 --> 00:08:30,400
been on iss before and you've been up

240
00:08:33,430 --> 00:08:31,440
there

241
00:08:35,029 --> 00:08:33,440
for for a bit this is going to be your

242
00:08:36,709 --> 00:08:35,039
first shuttle flight

243
00:08:38,230 --> 00:08:36,719
that's right tell us about that the

244
00:08:41,110 --> 00:08:38,240
anticipation with that what are you what

245
00:08:42,870 --> 00:08:41,120
are your thoughts about that well

246
00:08:44,949 --> 00:08:42,880
it again it will be my first shuttle

247
00:08:47,110 --> 00:08:44,959
flight first of all i never expected to

248
00:08:50,230 --> 00:08:47,120
have a shuttle flight when i went away

249
00:08:51,910 --> 00:08:50,240
to russia to fly on the soyuz

250
00:08:55,110 --> 00:08:51,920
we already knew that the shuttle program

251
00:08:56,630 --> 00:08:55,120
was winding down and i actually recycled

252
00:08:58,070 --> 00:08:56,640
all of my shuttle training materials

253
00:08:59,590 --> 00:08:58,080
before i got on the plane to go to

254
00:09:01,670 --> 00:08:59,600
russia because i thought that door had

255
00:09:02,870 --> 00:09:01,680
been closed so i was very very surprised

256
00:09:05,190 --> 00:09:02,880
honored

257
00:09:07,190 --> 00:09:05,200
shocked if you will to be assigned to a

258
00:09:08,710 --> 00:09:07,200
shuttle flight before i even landed then

259
00:09:10,710 --> 00:09:08,720
of course i had to scramble to find my

260
00:09:13,269 --> 00:09:10,720
training materials

261
00:09:15,110 --> 00:09:13,279
but there's two things the

262
00:09:17,190 --> 00:09:15,120
chance to fly on a brand new vehicle and

263
00:09:18,870 --> 00:09:17,200

to learn a new system obviously was was

264
00:09:21,030 --> 00:09:18,880
a wonderful thing and i'm really

265
00:09:22,389 --> 00:09:21,040
enjoying that right now with my crew

266
00:09:24,550 --> 00:09:22,399
the other thing is that i've already

267
00:09:27,190 --> 00:09:24,560
been in space so a lot of the anxieties

268
00:09:27,829 --> 00:09:27,200
about being in zero gravity and how will

269
00:09:54,230 --> 00:09:27,839
i

270
00:09:55,910 --> 00:09:54,240
just huge to be able to carry

271
00:09:57,590 --> 00:09:55,920
the load to orbit that it does the

272
00:09:59,990 --> 00:09:57,600
number of people that it does it's a

273
00:10:02,870 --> 00:10:00,000
very complex machine and i'm really

274
00:10:04,790 --> 00:10:02,880
looking forward to flying in that okay

275
00:10:07,110 --> 00:10:04,800
everyone on this crew has has been to

276
00:10:09,030 --> 00:10:07,120
space before uh including three crew

277
00:10:11,350 --> 00:10:09,040
members including yourself who've spent

278
00:10:13,509 --> 00:10:11,360
time on iss um

279
00:10:15,910 --> 00:10:13,519
how much of a benefit is it going to be

280
00:10:18,230 --> 00:10:15,920
having that experience base to

281
00:10:20,150 --> 00:10:18,240
successfully completing this mission i

282
00:10:22,470 --> 00:10:20,160
think it's tremendously beneficial to

283
00:10:23,990 --> 00:10:22,480
have veteran crew members on on a flight

284
00:10:27,430 --> 00:10:24,000
and our flight happens to be all

285
00:10:30,310 --> 00:10:27,440
veterans it's a bit of a luxury in a way

286
00:10:32,230 --> 00:10:30,320
the experience for nicole stott and tim

287
00:10:34,870 --> 00:10:32,240
copra happened to coincide with my

288
00:10:36,310 --> 00:10:34,880

flight so not only do we all have that

289
00:10:38,389 --> 00:10:36,320
long duration experience we know how

290
00:10:39,990 --> 00:10:38,399
each other works how one another works

291
00:10:42,230 --> 00:10:40,000
up there and how to work together and so

292
00:10:44,069 --> 00:10:42,240
i think that's a tremendous benefit as

293
00:10:45,990 --> 00:10:44,079
we start doing training

294
00:10:47,750 --> 00:10:46,000
events together we already know how to

295
00:10:49,509 --> 00:10:47,760
communicate with one another we know one

296
00:10:51,990 --> 00:10:49,519
another's habits and i think we work

297
00:10:53,670 --> 00:10:52,000
very effectively and efficiently so uh

298
00:10:55,350 --> 00:10:53,680
training in preparation for this flight

299
00:10:57,269 --> 00:10:55,360
has been very very smooth largely

300
00:10:59,030 --> 00:10:57,279
because of that okay

301
00:11:01,350 --> 00:10:59,040
and speaking of the training the content

302
00:11:03,829 --> 00:11:01,360
of the mission has changed

303
00:11:05,829 --> 00:11:03,839
since she began training and it's

304
00:11:06,870 --> 00:11:05,839
as we speak i'm sure probably still

305
00:11:08,790 --> 00:11:06,880
being

306
00:11:10,150 --> 00:11:08,800
solidified

307
00:11:11,829 --> 00:11:10,160
has it been

308
00:11:13,030 --> 00:11:11,839
have there been much many challenges

309
00:11:15,190 --> 00:11:13,040
into

310
00:11:17,750 --> 00:11:15,200
i guess uh adjusting to those changes at

311
00:11:19,430 --> 00:11:17,760
all well the changes are are good news

312
00:11:22,069 --> 00:11:19,440
for us because

313
00:11:23,509 --> 00:11:22,079

our flight has been extended we have an

314
00:11:24,949 --> 00:11:23,519
11-day mission now rather than an

315
00:11:27,910 --> 00:11:24,959
eight-day mission and that's because the

316
00:11:29,990 --> 00:11:27,920
addition of two spacewalks that tim

317
00:11:32,069 --> 00:11:30,000
copra and al drew will be doing so we're

318
00:11:33,990 --> 00:11:32,079
actually very happy to get those

319
00:11:35,750 --> 00:11:34,000
and the training

320
00:11:38,310 --> 00:11:35,760
flow hasn't really extended that much

321
00:11:39,750 --> 00:11:38,320
we've added six weeks or so and the pace

322
00:11:41,670 --> 00:11:39,760
of training is already fairly

323
00:11:45,030 --> 00:11:41,680
comfortable and so to get that extra

324
00:11:47,350 --> 00:11:45,040
time to fit these training events in

325
00:11:49,350 --> 00:11:47,360
i think helps us out a lot we'll have a

326
00:11:51,350 --> 00:11:49,360
good pace but not an exhausting pace and

327
00:11:52,550 --> 00:11:51,360
getting ready for a flight so we're

328
00:11:54,310 --> 00:11:52,560
actually very happy to have the

329
00:11:55,990 --> 00:11:54,320
additional spacewalks and and some of

330
00:11:58,230 --> 00:11:56,000
the robotics activities that go with

331
00:12:00,150 --> 00:11:58,240
that

332
00:12:01,750 --> 00:12:00,160
tell us how you would uh characterize

333
00:12:04,230 --> 00:12:01,760
the contributions of the thousands of

334
00:12:06,470 --> 00:12:04,240
people who work behind the scenes to

335
00:12:08,790 --> 00:12:06,480
ensure the success and safety

336
00:12:10,790 --> 00:12:08,800
of the crew in every mission

337
00:12:12,550 --> 00:12:10,800
as we've prepared for our shuttle

338
00:12:14,150 --> 00:12:12,560

mission we've certainly gone to visit

339
00:12:15,910 --> 00:12:14,160
some of these places we just got back

340
00:12:18,389 --> 00:12:15,920
from the kennedy space center here

341
00:12:20,389 --> 00:12:18,399
recently to look at discovery

342
00:12:22,870 --> 00:12:20,399
we went to michoud to look at our

343
00:12:24,949 --> 00:12:22,880
external tank and met with the workers

344
00:12:27,509 --> 00:12:24,959
who are getting that all prepared and

345
00:12:28,790 --> 00:12:27,519
the one thing that really strikes you

346
00:12:30,310 --> 00:12:28,800
aside from the fact that they're very

347
00:12:32,150 --> 00:12:30,320
professional experience is that they're

348
00:12:34,949 --> 00:12:32,160
very dedicated

349
00:12:37,190 --> 00:12:34,959
and almost everybody there is working

350
00:12:39,269 --> 00:12:37,200
extra hours and and going extra miles to

351
00:12:41,350 --> 00:12:39,279
make everything work and this is not a

352
00:12:42,870 --> 00:12:41,360
new thing that's their standard

353
00:12:45,110 --> 00:12:42,880
operating curve

354
00:12:47,269 --> 00:12:45,120
everybody keeps their head in the game

355
00:12:49,990 --> 00:12:47,279
and the orbiters have been looking very

356
00:12:51,190 --> 00:12:50,000
very clean recently and largely uh

357
00:12:53,509 --> 00:12:51,200
because of that when you look at the

358
00:12:55,590 --> 00:12:53,519
fact that the the program is winding

359
00:12:57,350 --> 00:12:55,600
down and everybody's aware of that but

360
00:12:59,590 --> 00:12:57,360
then you look at the quality

361
00:13:01,269 --> 00:12:59,600
metrics if you will with the uh

362
00:13:03,030 --> 00:13:01,279
uh

363
00:13:04,949 --> 00:13:03,040

indicators that tell you what shape the

364
00:13:08,069 --> 00:13:04,959
orbiter and its parts are in there

365
00:13:10,389 --> 00:13:08,079
they're very very good nobody has

366
00:13:12,550 --> 00:13:10,399
let me rephrase that everybody is just

367
00:13:15,350 --> 00:13:12,560
maintaining an incredibly high if not

368
00:13:17,910 --> 00:13:15,360
higher standard of professionalism

369
00:13:19,269 --> 00:13:17,920
to keep this program running so we we

370
00:13:21,750 --> 00:13:19,279
have nothing but admiration and

371
00:13:24,310 --> 00:13:21,760
gratitude for what these people do it's

372
00:13:27,350 --> 00:13:24,320
i would have to say that uh of all that

373
00:13:28,790 --> 00:13:27,360
nasa is our hardware our technology our

374
00:13:30,790 --> 00:13:28,800
exploration

375
00:13:32,310 --> 00:13:30,800
it's our people and our brain trust that

376
00:13:34,550 --> 00:13:32,320
probably constitute the greatest

377
00:13:36,310 --> 00:13:34,560
treasure and you know these people who

378
00:13:39,829 --> 00:13:36,320
process the orbiters and our payloads

379
00:13:44,230 --> 00:13:42,310
if your launch schedule holds you're

380
00:13:45,509 --> 00:13:44,240
scheduled to be on orbit

381
00:13:47,430 --> 00:13:45,519
right around the time of the 10th

382
00:13:48,790 --> 00:13:47,440
anniversary of the arrival of expedition

383
00:13:51,829 --> 00:13:48,800
one that's the crew that established

384
00:13:53,990 --> 00:13:51,839
continuous human presence on iss right

385
00:13:58,550 --> 00:13:54,000
discuss the the significance of of the

386
00:14:00,949 --> 00:13:58,560
their milestone uh and um the uh

387
00:14:02,310 --> 00:14:00,959
the future of how space station's gonna

388
00:14:04,629 --> 00:14:02,320

to

389
00:14:06,470 --> 00:14:04,639
help the future of space exploration

390
00:14:09,189 --> 00:14:06,480
well i think 10 years is a huge

391
00:14:10,949 --> 00:14:09,199
milestone and it's not just an

392
00:14:12,949 --> 00:14:10,959
anniversary of a platform we put up

393
00:14:13,750 --> 00:14:12,959
there and and put people on and they did

394
00:14:17,030 --> 00:14:13,760
work

395
00:14:19,189 --> 00:14:17,040
this program this platform has grown

396
00:14:20,870 --> 00:14:19,199
tremendously during that 10-year period

397
00:14:23,590 --> 00:14:20,880
it continues to add in size and

398
00:14:25,189 --> 00:14:23,600
complexity it's been continually manned

399
00:14:26,550 --> 00:14:25,199
through that 10-year period which is an

400
00:14:28,870 --> 00:14:26,560
amazing thing

401
00:14:31,670 --> 00:14:28,880
and the maturity of the program i think

402
00:14:32,629 --> 00:14:31,680
is what really shows after 10 years

403
00:14:34,470 --> 00:14:32,639
you

404
00:14:37,430 --> 00:14:34,480
have a tremendous challenge in front of

405
00:14:40,150 --> 00:14:37,440
you to plan out every

406
00:14:41,430 --> 00:14:40,160
every turn of a screw every push of a

407
00:14:43,509 --> 00:14:41,440
button

408
00:14:45,670 --> 00:14:43,519
every opening of a power channel that

409
00:14:47,509 --> 00:14:45,680
makes a space station work it's the

410
00:14:50,310 --> 00:14:47,519
things you don't anticipate that really

411
00:14:53,110 --> 00:14:50,320
challenge you and after 10 years we have

412
00:14:56,150 --> 00:14:53,120
learned how to work in space and how to

413
00:14:58,949 --> 00:14:56,160

solve problems that we didn't anticipate

414
00:15:00,790 --> 00:14:58,959
and only experience teaches you that and

415
00:15:02,550 --> 00:15:00,800
the 10 years of experience we've accrued

416
00:15:03,829 --> 00:15:02,560
on space station has just made us so

417
00:15:05,990 --> 00:15:03,839
much better

418
00:15:08,230 --> 00:15:06,000
you uh you can look at the maturity by

419
00:15:09,430 --> 00:15:08,240
just the day-to-day operations right now

420
00:15:11,509 --> 00:15:09,440
and

421
00:15:13,350 --> 00:15:11,519
filling six people's timeline with

422
00:15:14,629 --> 00:15:13,360
science and maintenance activities and

423
00:15:17,110 --> 00:15:14,639
all the people on the ground that have

424
00:15:19,110 --> 00:15:17,120
to come together to make that work it's

425
00:15:21,990 --> 00:15:19,120
like conducting a symphony and and it

426
00:15:23,590 --> 00:15:22,000
works very well right now so aside from

427
00:15:25,030 --> 00:15:23,600
the fact that we did what we said we

428
00:15:26,629 --> 00:15:25,040
were going to do we've also done a lot

429
00:15:28,069 --> 00:15:26,639
of things we didn't anticipate that we

430
00:15:29,350 --> 00:15:28,079
were going to do and and are very much

431
00:15:31,269 --> 00:15:29,360
richer for it

432
00:15:32,150 --> 00:15:31,279
that's the kind of experience that you

433
00:15:34,629 --> 00:15:32,160
need

434
00:15:36,470 --> 00:15:34,639
to go further when you are fielding new

435
00:15:37,749 --> 00:15:36,480
systems and feeling new

436
00:15:40,550 --> 00:15:37,759
operational

437
00:15:42,069 --> 00:15:40,560
procedures if you will plans you really

438
00:15:44,230 --> 00:15:42,079

have to have that base of experience to

439
00:15:45,670 --> 00:15:44,240
do it confidently and station has given

440
00:15:48,550 --> 00:15:45,680
us that and will continue to give us

441
00:15:52,470 --> 00:15:50,790
tell us if you will in a nutshell what

442
00:15:54,670 --> 00:15:52,480
the what the key objectives are for

443
00:15:58,310 --> 00:15:54,680
sts-133

444
00:15:59,670 --> 00:15:58,320
sds-133 will be delivering a

445
00:16:01,110 --> 00:15:59,680
multi-purpose

446
00:16:04,389 --> 00:16:01,120
logistics module which is being

447
00:16:06,470 --> 00:16:04,399
converted into a permanent module and

448
00:16:09,030 --> 00:16:06,480
that will actually stay on the station

449
00:16:10,550 --> 00:16:09,040
normally these modules take cargo up and

450
00:16:12,949 --> 00:16:10,560
and bring them back

451
00:16:14,790 --> 00:16:12,959
this one is being converted into

452
00:16:16,629 --> 00:16:14,800
a closet if you will a really

453
00:16:19,269 --> 00:16:16,639
magnificent closet

454
00:16:21,350 --> 00:16:19,279
that will allow storage and we really

455
00:16:24,470 --> 00:16:21,360
need storage room on the international

456
00:16:26,949 --> 00:16:24,480
station so the pmm as it's called will

457
00:16:29,350 --> 00:16:26,959
be attached to node one and stay there

458
00:16:31,990 --> 00:16:29,360
is probably the the last largest u.s

459
00:16:34,069 --> 00:16:32,000
piece that will add to the station's uh

460
00:16:36,550 --> 00:16:34,079
structure we're also taking up an

461
00:16:39,110 --> 00:16:36,560
express logistics carrier with a large

462
00:16:40,949 --> 00:16:39,120
radiator on it and we'll be attaching

463
00:16:42,790 --> 00:16:40,959

that to the truss and that radiator will

464
00:16:45,590 --> 00:16:42,800
be available as a spare for the station

465
00:16:47,430 --> 00:16:45,600
as we need it and a lot of cargo

466
00:16:49,749 --> 00:16:47,440
transfer as for every shuttle that

467
00:16:51,670 --> 00:16:49,759
visits the station now we bring

468
00:16:53,910 --> 00:16:51,680
pressurized cargo from

469
00:16:55,749 --> 00:16:53,920
whatever modules we're taking up and we

470
00:16:57,749 --> 00:16:55,759
transfer that to the station

471
00:16:59,829 --> 00:16:57,759
we bring water to the station which we

472
00:17:02,629 --> 00:16:59,839
produce on the space shuttle with our

473
00:17:04,789 --> 00:17:02,639
fuel cells and very importantly the

474
00:17:06,870 --> 00:17:04,799
shuttle will be able to return things

475
00:17:08,789 --> 00:17:06,880
from the space station to the ground a

476
00:17:10,710 --> 00:17:08,799
lot of science results for instance

477
00:17:13,270 --> 00:17:10,720
consist of frozen samples which we'll be

478
00:17:15,110 --> 00:17:13,280
transferring to our glacier freezer on

479
00:17:17,189 --> 00:17:15,120
the shuttle mid deck and bringing those

480
00:17:18,470 --> 00:17:17,199
down to the ground for analysis and that

481
00:17:20,069 --> 00:17:18,480
helps us to complete a lot of our

482
00:17:22,069 --> 00:17:20,079
biomedical science

483
00:17:24,230 --> 00:17:22,079
so our mission has a lot of

484
00:17:26,309 --> 00:17:24,240
diverse aspects about it the things that

485
00:17:28,630 --> 00:17:26,319
really make space flight wonderful cargo

486
00:17:31,190 --> 00:17:28,640
transfer new modules

487
00:17:33,350 --> 00:17:31,200
the big logistics carrier and science

488
00:17:35,990 --> 00:17:33,360

transfer okay

489
00:17:38,390 --> 00:17:36,000
uh and as mission specialist three uh on

490
00:17:40,870 --> 00:17:38,400
the flight tell us what some of your key

491
00:17:43,669 --> 00:17:40,880
responsibilities are for the mission

492
00:17:45,270 --> 00:17:43,679
my responsibilities are a bit diverse i

493
00:17:47,510 --> 00:17:45,280
think like everybody's and again that's

494
00:17:49,270 --> 00:17:47,520
what makes the flight experience quite

495
00:17:51,350 --> 00:17:49,280
wonderful i'll be doing a lot of

496
00:17:53,750 --> 00:17:51,360
robotics activities um helping to

497
00:17:55,909 --> 00:17:53,760
install the pmm into its permanent place

498
00:17:58,230 --> 00:17:55,919
and i'll be actually flying tim copper

499
00:18:00,870 --> 00:17:58,240
around on the station arm as he goes

500
00:18:03,190 --> 00:18:00,880
about his eva work which for me will be

501
00:18:05,909 --> 00:18:03,200
very interesting and very exciting

502
00:18:07,590 --> 00:18:05,919
i will be in charge of the the

503
00:18:09,270 --> 00:18:07,600
after launch so as we call the post

504
00:18:11,590 --> 00:18:09,280
insertion plan and getting the orbiter

505
00:18:13,270 --> 00:18:11,600
ready to be a spaceship rather than a

506
00:18:14,950 --> 00:18:13,280
rocket ship that goes to the atmosphere

507
00:18:17,830 --> 00:18:14,960
and then at the end of the mission

508
00:18:19,909 --> 00:18:17,840
uh helping to turn us back into a an

509
00:18:22,549 --> 00:18:19,919
airplane a space plane

510
00:18:24,470 --> 00:18:22,559
to get ready to deorbit and land

511
00:18:26,950 --> 00:18:24,480
i'll be obviously the crew medical

512
00:18:30,710 --> 00:18:26,960
officer on board doing some science

513
00:18:32,470 --> 00:18:30,720

experiments as well and um

514
00:18:36,070 --> 00:18:32,480
various other sundry

515
00:18:38,150 --> 00:18:36,080
things can't they get too much else okay

516
00:18:42,070 --> 00:18:38,160
food guy food guy yeah yeah that's

517
00:18:46,549 --> 00:18:42,789
us

518
00:18:48,310 --> 00:18:46,559
a little bit about how the the pmm um

519
00:18:51,430 --> 00:18:48,320
differs um

520
00:18:53,350 --> 00:18:51,440
i guess in in form how it's been

521
00:18:55,750 --> 00:18:53,360
outfitted or retrofitted uh to be

522
00:18:58,230 --> 00:18:55,760
different from an mplm

523
00:18:59,590 --> 00:18:58,240
to make it a permanent part of the

524
00:19:02,630 --> 00:18:59,600
station

525
00:19:04,470 --> 00:19:02,640
well the mplms of course are designed to

526
00:19:06,150 --> 00:19:04,480
take cargo up and bring them back so

527
00:19:07,510 --> 00:19:06,160
they never spend

528
00:19:10,310 --> 00:19:07,520
much more than

529
00:19:12,549 --> 00:19:10,320
10 days or so on station and so they're

530
00:19:14,390 --> 00:19:12,559
they're built accordingly uh to leave

531
00:19:16,549 --> 00:19:14,400
one up there permanently and and these

532
00:19:18,070 --> 00:19:16,559
when they go up are roughly 22 000

533
00:19:20,310 --> 00:19:18,080
pounds so we're talking about a fairly

534
00:19:22,390 --> 00:19:20,320
large module to leave one permanently

535
00:19:23,270 --> 00:19:22,400
you have to shield it against some of

536
00:19:26,950 --> 00:19:23,280
the

537
00:19:28,789 --> 00:19:26,960
that you didn't need to

538
00:19:30,950 --> 00:19:28,799

for a short period of time

539
00:19:33,110 --> 00:19:30,960
we had to add some shielding for micro

540
00:19:34,950 --> 00:19:33,120
meteoroid protection there's a lot of

541
00:19:35,830 --> 00:19:34,960
debris flying around in low earth orbit

542
00:19:37,270 --> 00:19:35,840
and

543
00:19:39,270 --> 00:19:37,280
we have to give it a little bit better

544
00:19:40,789 --> 00:19:39,280
shielding to stay up there permanently

545
00:19:42,789 --> 00:19:40,799
and also

546
00:19:45,510 --> 00:19:42,799
we had to condition it for the heat

547
00:19:47,350 --> 00:19:45,520
cycles and a few days of heat cycling

548
00:19:49,510 --> 00:19:47,360
between the extremes of being in the sun

549
00:19:51,750 --> 00:19:49,520
up there which can give you 150 degrees

550
00:19:53,669 --> 00:19:51,760
centigrade and then being in shadow

551
00:19:54,950 --> 00:19:53,679
which can be minus 150 degrees

552
00:19:56,710 --> 00:19:54,960
centigrade

553
00:19:58,310 --> 00:19:56,720
you have to protect against that if

554
00:20:01,110 --> 00:19:58,320
you're planning to keep a module up

555
00:20:03,590 --> 00:20:01,120
there continually we've had to change

556
00:20:04,950 --> 00:20:03,600
some of the ventilation in there and

557
00:20:07,110 --> 00:20:04,960
change some of the electronics and the

558
00:20:09,830 --> 00:20:07,120
control aspects of it

559
00:20:12,149 --> 00:20:09,840
but for the most part the mplm was very

560
00:20:14,230 --> 00:20:12,159
amenable to this kind of change and all

561
00:20:16,789 --> 00:20:14,240
that i mentioned has not taken the

562
00:20:19,110 --> 00:20:16,799
italian space agency very long to effect

563
00:20:21,029 --> 00:20:19,120

so it tells you that the modules are

564
00:20:22,870 --> 00:20:21,039
already fairly robust and we're quite

565
00:20:24,230 --> 00:20:22,880
amenable to leaving up there on a

566
00:20:25,270 --> 00:20:24,240
permanent basis

567
00:20:26,870 --> 00:20:25,280
and i believe

568
00:20:29,270 --> 00:20:26,880
that the leonardo module that we're

569
00:20:31,909 --> 00:20:29,280
taking up has already flown seven times

570
00:20:33,590 --> 00:20:31,919
so this is a very experienced module its

571
00:20:35,830 --> 00:20:33,600
final flight i believe its eighth flight

572
00:20:38,710 --> 00:20:35,840
will be to park it and become a big part

573
00:20:39,590 --> 00:20:38,720
of the space station so okay

574
00:20:41,430 --> 00:20:39,600
uh

575
00:20:43,990 --> 00:20:41,440
your crew is also scheduled to deliver

576
00:20:44,870 --> 00:20:44,000
robonaut uh r2 uh tell us what you know

577
00:20:47,590 --> 00:20:44,880
about

578
00:20:50,870 --> 00:20:47,600
its purpose and and the plan for it well

579
00:20:53,590 --> 00:20:50,880
robonaut r2 is very interesting

580
00:20:56,549 --> 00:20:53,600
uh we've been looking at ways to

581
00:20:58,310 --> 00:20:56,559
help the human in space flight and

582
00:21:00,710 --> 00:20:58,320
it's probably no coincidence that as you

583
00:21:02,230 --> 00:21:00,720
look at the human tasks that are

584
00:21:05,110 --> 00:21:02,240
required for space flight and you look

585
00:21:07,909 --> 00:21:05,120
at a machine if you will that will help

586
00:21:09,830 --> 00:21:07,919
with that it starts to resemble a human

587
00:21:12,789 --> 00:21:09,840
for the higher fidelity support that it

588
00:21:15,270 --> 00:21:12,799

can give the human so robonaut 2 indeed

589
00:21:17,750 --> 00:21:15,280
becomes the first humanoid robot in

590
00:21:18,710 --> 00:21:17,760
space so we're very excited about that

591
00:21:20,870 --> 00:21:18,720
and

592
00:21:23,270 --> 00:21:20,880
unfortunately we won't be able to

593
00:21:25,669 --> 00:21:23,280
unpack it and use it it'll be a complex

594
00:21:27,110 --> 00:21:25,679
process and we'll go on for for future

595
00:21:28,630 --> 00:21:27,120
station crews

596
00:21:31,110 --> 00:21:28,640
with any luck some of us will get back

597
00:21:33,669 --> 00:21:31,120
on station and be able to see it but

598
00:21:34,870 --> 00:21:33,679
robonaut becomes the first test bed to

599
00:21:37,669 --> 00:21:34,880
really

600
00:21:40,310 --> 00:21:37,679
see what a dexterous humanoid robot can

601
00:21:42,070 --> 00:21:40,320
do in space robonaut is is very

602
00:21:43,830 --> 00:21:42,080
impressive to me as a medical doctor i

603
00:21:46,310 --> 00:21:43,840
was able to look at it shake hands with

604
00:21:47,750 --> 00:21:46,320
it and one of the first things i noted

605
00:21:49,909 --> 00:21:47,760
was that the

606
00:21:50,789 --> 00:21:49,919
control actuators in the fingers are

607
00:21:54,870 --> 00:21:50,799
very

608
00:21:57,590 --> 00:21:54,880
the tendons in a human hand

609
00:22:00,070 --> 00:21:57,600
and they can vary the sensitivity in the

610
00:22:01,430 --> 00:22:00,080
grip on this just like a human would do

611
00:22:02,870 --> 00:22:01,440
when it's doing different different

612
00:22:04,230 --> 00:22:02,880
tasks

613
00:22:06,070 --> 00:22:04,240

some things require more manual

614
00:22:07,909 --> 00:22:06,080
dexterity less force some things

615
00:22:10,149 --> 00:22:07,919
obviously a little bit more force and

616
00:22:12,549 --> 00:22:10,159
robonaut can be smart enough to know

617
00:22:14,230 --> 00:22:12,559
when to use more and less force

618
00:22:17,029 --> 00:22:14,240
so i think it's very exciting to be able

619
00:22:20,390 --> 00:22:17,039
to test bed these concepts with robonaut

620
00:22:21,350 --> 00:22:20,400
2 with r2 rather and see what it can do

621
00:22:23,270 --> 00:22:21,360
i think

622
00:22:24,630 --> 00:22:23,280
we will see the beginning of a very long

623
00:22:26,950 --> 00:22:24,640
and fruitful

624
00:22:30,390 --> 00:22:26,960
life as we develop the the technologies

625
00:22:33,430 --> 00:22:30,400
to make a humanoid robot useful in space

626
00:22:37,029 --> 00:22:35,510
on the day after you make it to orbit

627
00:22:38,789 --> 00:22:37,039
the crew is scheduled to do an

628
00:22:41,190 --> 00:22:38,799
inspection of the shuttle's exterior

629
00:22:43,190 --> 00:22:41,200
tiles what tell us about your day today

630
00:22:44,950 --> 00:22:43,200
what are you involved with that day

631
00:22:47,430 --> 00:22:44,960
well the second day

632
00:22:48,630 --> 00:22:47,440
is a very busy day a lot of different

633
00:22:50,549 --> 00:22:48,640
activities

634
00:22:52,390 --> 00:22:50,559
mostly getting ready for

635
00:22:53,669 --> 00:22:52,400
the docking and the transfer activities

636
00:22:54,789 --> 00:22:53,679
that we're going to be doing on the next

637
00:22:57,029 --> 00:22:54,799
day

638
00:22:59,190 --> 00:22:57,039

my job among other things is to get the

639
00:23:00,710 --> 00:22:59,200
network set up on the space shuttle and

640
00:23:02,390 --> 00:23:00,720
most of that i'll do on flight day one

641
00:23:05,029 --> 00:23:02,400
but i'll be completing that network

642
00:23:07,590 --> 00:23:05,039
setup on flight day two we will be

643
00:23:10,149 --> 00:23:07,600
checking out the emu's the space suits

644
00:23:12,470 --> 00:23:10,159
that al drew and tim copra will be using

645
00:23:13,909 --> 00:23:12,480
and that'll take a goodly bit of time

646
00:23:15,750 --> 00:23:13,919
something i'm really looking forward to

647
00:23:17,510 --> 00:23:15,760
i did that on space station several

648
00:23:20,230 --> 00:23:17,520
times and to do that on the shuttle now

649
00:23:21,669 --> 00:23:20,240
will be i think very interesting for me

650
00:23:23,909 --> 00:23:21,679
i will be checking out the rendezvous

651
00:23:26,789 --> 00:23:23,919
tools that we'll be using the next day

652
00:23:28,630 --> 00:23:26,799
and i'll be uh kind of driving the

653
00:23:30,149 --> 00:23:28,640
overall big picture for rendezvous on

654
00:23:31,830 --> 00:23:30,159
flight day three

655
00:23:33,190 --> 00:23:31,840
so flight day two will give us a chance

656
00:23:34,870 --> 00:23:33,200
to make sure everything is connected and

657
00:23:36,789 --> 00:23:34,880
works right and that's something i'm

658
00:23:39,510 --> 00:23:36,799
very interested in as well plus some

659
00:23:41,269 --> 00:23:39,520
science activities we'll have the

660
00:23:42,549 --> 00:23:41,279
vaccine experiment and the cells

661
00:23:44,470 --> 00:23:42,559
experiment on the mid-deck of the

662
00:23:45,990 --> 00:23:44,480
shuttle and i'll be checking after their

663
00:23:48,149 --> 00:23:46,000

health and making sure that they're

664
00:23:49,590 --> 00:23:48,159
functioning properly and just the

665
00:23:51,350 --> 00:23:49,600
day-to-day maintenance on the shuttle

666
00:23:55,110 --> 00:23:51,360
cleaning filters and

667
00:23:58,710 --> 00:23:57,190
and then the following day rendezvous

668
00:24:00,070 --> 00:23:58,720
and docking as you mentioned

669
00:24:01,350 --> 00:24:00,080
walk us through if you will what you'll

670
00:24:02,630 --> 00:24:01,360
be doing

671
00:24:04,870 --> 00:24:02,640
on that day

672
00:24:06,710 --> 00:24:04,880
well docking day as we call it d-day is

673
00:24:08,549 --> 00:24:06,720
a very big day for all of us it involves

674
00:24:09,830 --> 00:24:08,559
the entire crew all six of us will be

675
00:24:12,070 --> 00:24:09,840
involved in that

676
00:24:13,669 --> 00:24:12,080
steve lindsey and eric bowe as the

677
00:24:16,710 --> 00:24:13,679
commander and pilots will obviously be

678
00:24:18,549 --> 00:24:16,720
doing all the dynamic flight operations

679
00:24:20,870 --> 00:24:18,559
my job will be to follow the entire

680
00:24:23,110 --> 00:24:20,880
docking timeline along with those two

681
00:24:24,789 --> 00:24:23,120
gentlemen and make sure that all of our

682
00:24:26,710 --> 00:24:24,799
navigational sensors the things that

683
00:24:28,789 --> 00:24:26,720
allow us to come together to make our

684
00:24:30,870 --> 00:24:28,799
correction burns and eventually to dock

685
00:24:33,190 --> 00:24:30,880
with the station are all working in an

686
00:24:36,310 --> 00:24:33,200
integrated fashion we have a rendezvous

687
00:24:37,669 --> 00:24:36,320
radar we have a laser range finder which

688
00:24:39,590 --> 00:24:37,679

helps us out

689
00:24:41,669 --> 00:24:39,600
we've got the overall navigation

690
00:24:43,909 --> 00:24:41,679
information that goes to the shuttle all

691
00:24:46,630 --> 00:24:43,919
of those come together on a laptop based

692
00:24:48,630 --> 00:24:46,640
program we call rpop and i'll be as we

693
00:24:49,990 --> 00:24:48,640
call it the rpop driver making sure that

694
00:24:51,990 --> 00:24:50,000
all of those sensors are giving us a

695
00:24:53,269 --> 00:24:52,000
coherent picture which feeds

696
00:24:55,110 --> 00:24:53,279
all of our

697
00:24:56,230 --> 00:24:55,120
flight activities

698
00:24:57,909 --> 00:24:56,240
and

699
00:24:59,430 --> 00:24:57,919
i'm really looking forward to seeing all

700
00:25:01,590 --> 00:24:59,440
that work together we've been training

701
00:25:03,590 --> 00:25:01,600
very hard to make sure that

702
00:25:06,549 --> 00:25:03,600
if one of those navigational sensors

703
00:25:08,470 --> 00:25:06,559
drops out we can use the other ones to

704
00:25:10,470 --> 00:25:08,480
make our rendezvous work but

705
00:25:12,149 --> 00:25:10,480
overall it's again like conducting a

706
00:25:13,590 --> 00:25:12,159
little symphony of information and

707
00:25:15,029 --> 00:25:13,600
making sure that we get a good sound out

708
00:25:16,149 --> 00:25:15,039
of it and end up with a good docking at

709
00:25:18,230 --> 00:25:16,159
the end

710
00:25:20,310 --> 00:25:18,240
and and once you dock the work doesn't

711
00:25:22,310 --> 00:25:20,320
stop there you'll you'll then have to

712
00:25:24,070 --> 00:25:22,320
get right into getting that logistics

713
00:25:25,430 --> 00:25:24,080

carrier alc4

714
00:25:26,870 --> 00:25:25,440
out of the payload pay talk us through

715
00:25:28,870 --> 00:25:26,880
what's going to happen and and how

716
00:25:30,870 --> 00:25:28,880
you're going to accomplish that okay

717
00:25:32,870 --> 00:25:30,880
i'll do my best because again i'm not

718
00:25:34,549 --> 00:25:32,880
scheduled to do it and i don't

719
00:25:36,310 --> 00:25:34,559
i haven't trained on it but here goes

720
00:25:37,990 --> 00:25:36,320
okay

721
00:25:40,549 --> 00:25:38,000
well you're right we'll have to be very

722
00:25:42,950 --> 00:25:40,559
busy immediately after docking we'll be

723
00:25:44,630 --> 00:25:42,960
able to get a quick handshake with our

724
00:25:46,070 --> 00:25:44,640
crewmates on station we're really

725
00:25:48,070 --> 00:25:46,080
looking forward to seeing them we'll get

726
00:25:49,909 --> 00:25:48,080
a quick safety briefing and make sure

727
00:25:51,750 --> 00:25:49,919
that everybody knows how to

728
00:25:53,669 --> 00:25:51,760
be safe on that magnificent stack up

729
00:25:56,149 --> 00:25:53,679
there and then we'll go right to work

730
00:25:58,870 --> 00:25:56,159
the elc 4 does come out on that first

731
00:26:00,789 --> 00:25:58,880
doc day and it'll be a very interesting

732
00:26:03,029 --> 00:26:00,799
time because it requires coordination

733
00:26:05,110 --> 00:26:03,039
between two robotic arms which is always

734
00:26:07,590 --> 00:26:05,120
kind of exciting we'll be using the

735
00:26:09,430 --> 00:26:07,600
station arm to actually remove that

736
00:26:11,269 --> 00:26:09,440
express logistics carrier from the

737
00:26:13,110 --> 00:26:11,279
shuttle payload bay and that's a pretty

738
00:26:14,310 --> 00:26:13,120

big piece of equipment by the way with

739
00:26:15,990 --> 00:26:14,320
the uh

740
00:26:18,230 --> 00:26:16,000
radiator on it without the radiator

741
00:26:20,789 --> 00:26:18,240
weighs about ten thousand pounds and uh

742
00:26:22,630 --> 00:26:20,799
so it's actually fairly massive

743
00:26:25,269 --> 00:26:22,640
once we pluck it out with the space

744
00:26:27,029 --> 00:26:25,279
station arm will then hand that off to

745
00:26:29,430 --> 00:26:27,039
space shuttle arm

746
00:26:32,070 --> 00:26:29,440
while that space station arm then can

747
00:26:34,149 --> 00:26:32,080
walk off from where it is attached

748
00:26:36,310 --> 00:26:34,159
originally which is on node 2.

749
00:26:39,029 --> 00:26:36,320
it will then attach itself to our mobile

750
00:26:41,190 --> 00:26:39,039
base servicer which is a an arm carrier

751
00:26:43,669 --> 00:26:41,200
if you will that goes along the truss

752
00:26:46,710 --> 00:26:43,679
and once it's established on that mobile

753
00:26:48,950 --> 00:26:46,720
base it will then take again the elc

754
00:26:51,029 --> 00:26:48,960
from the shuttle arm and then we'll be

755
00:26:52,470 --> 00:26:51,039
able to park it in its final parking

756
00:26:54,950 --> 00:26:52,480
place which is down on the starboard

757
00:26:55,830 --> 00:26:54,960
truss so it's a bit of choreography and

758
00:26:59,430 --> 00:26:55,840
it's a

759
00:27:01,830 --> 00:26:59,440
we are if we want to get something from

760
00:27:04,549 --> 00:27:01,840
point a to point b and point b is a long

761
00:27:06,549 --> 00:27:04,559
way away but we have to do it precisely

762
00:27:08,230 --> 00:27:06,559
and accurately and fairly quickly

763
00:27:10,310 --> 00:27:08,240

because all of these things can't stay

764
00:27:12,950 --> 00:27:10,320
out in the space weather for too long

765
00:27:15,430 --> 00:27:12,960
without being connected to power

766
00:27:20,149 --> 00:27:15,440
this is how we we are able to do it so

767
00:27:23,909 --> 00:27:21,830
much the same as you just did with the

768
00:27:25,350 --> 00:27:23,919
elc-4 if you would describe how you're

769
00:27:27,590 --> 00:27:25,360
going to get the pmm out of the payload

770
00:27:29,750 --> 00:27:27,600
band attached to the station and uh tell

771
00:27:32,389 --> 00:27:29,760
me your involvement and uh with that in

772
00:27:33,590 --> 00:27:32,399
any activation activities after that

773
00:27:35,590 --> 00:27:33,600
okay

774
00:27:37,669 --> 00:27:35,600
well the pmm will be a little simpler

775
00:27:40,549 --> 00:27:37,679
than the elc-4 because we're only using

776
00:27:41,590 --> 00:27:40,559
one arm to do it but it by its sheer

777
00:27:43,430 --> 00:27:41,600
size

778
00:27:45,350 --> 00:27:43,440
will be i think quite an amazing thing

779
00:27:48,149 --> 00:27:45,360
to see we have a lot of experience

780
00:27:49,590 --> 00:27:48,159
taking the mplms out of our shuttle

781
00:27:51,269 --> 00:27:49,600
payload bay and docking those to

782
00:27:53,350 --> 00:27:51,279
stations and obviously this is a one-way

783
00:27:55,350 --> 00:27:53,360
trip we're going to take it out and

784
00:27:56,950 --> 00:27:55,360
attach it to node one almost in the

785
00:27:58,149 --> 00:27:56,960
center of the stack and of course we'll

786
00:28:00,789 --> 00:27:58,159
leave it there

787
00:28:03,269 --> 00:28:00,799
tim kopra and i will be doing that task

788
00:28:04,310 --> 00:28:03,279

tim being the lead robotics officer for

789
00:28:06,789 --> 00:28:04,320
pmm

790
00:28:08,630 --> 00:28:06,799
and we will grab on to it we'll make

791
00:28:10,870 --> 00:28:08,640
sure that the shuttle guys undo the

792
00:28:13,510 --> 00:28:10,880
latches and unlock it so it's free

793
00:28:15,909 --> 00:28:13,520
floating and we'll take it out and back

794
00:28:17,590 --> 00:28:15,919
it off from the shuttle payload bay and

795
00:28:19,430 --> 00:28:17,600
then we will fly it

796
00:28:21,029 --> 00:28:19,440
quite a distance actually from the very

797
00:28:22,070 --> 00:28:21,039
front of the station to the middle of

798
00:28:24,630 --> 00:28:22,080
the stack

799
00:28:27,029 --> 00:28:24,640
and attach it to node 1. now a couple of

800
00:28:29,990 --> 00:28:27,039
differences are that when i was there

801
00:28:31,510 --> 00:28:30,000
last there was no cupola which is a big

802
00:28:34,389 --> 00:28:31,520
domed

803
00:28:36,470 --> 00:28:34,399
wonderfully windowed extension on node

804
00:28:38,549 --> 00:28:36,480
3. we actually have a robotics

805
00:28:40,070 --> 00:28:38,559
workstation there so aside from our

806
00:28:42,789 --> 00:28:40,080
camera views we're going to have this

807
00:28:44,470 --> 00:28:42,799
magnificent view of the pmm coming out

808
00:28:46,470 --> 00:28:44,480
of the shuttle payload bay and we're

809
00:28:48,549 --> 00:28:46,480
actually docking it almost right next to

810
00:28:50,389 --> 00:28:48,559
us on node one so we'll have that view

811
00:28:52,630 --> 00:28:50,399
and i think it's going to be wonderful

812
00:28:54,950 --> 00:28:52,640
and again it's a one-way trip

813
00:28:56,549 --> 00:28:54,960

when we put it there it's there

814
00:28:57,590 --> 00:28:56,559
we think probably for the station

815
00:28:59,510 --> 00:28:57,600
lifetime

816
00:29:01,350 --> 00:28:59,520
and once we get it there then we'll be

817
00:29:03,590 --> 00:29:01,360
able to do some of the outfitting we

818
00:29:05,350 --> 00:29:03,600
need so that bleak checks for instance

819
00:29:07,190 --> 00:29:05,360
are done we know that the ventilation

820
00:29:09,350 --> 00:29:07,200
circuit is good in there we've powered

821
00:29:11,669 --> 00:29:09,360
it and eventually we'll be able to crack

822
00:29:12,870 --> 00:29:11,679
the hatch and go inside so very much

823
00:29:14,710 --> 00:29:12,880
looking forward to getting that on

824
00:29:17,990 --> 00:29:14,720
station

825
00:29:21,269 --> 00:29:18,000
you'll undock

826
00:29:23,190 --> 00:29:21,279
and prepare for your trip back home

827
00:29:25,029 --> 00:29:23,200
it may be one of the last opportunities

828
00:29:26,630 --> 00:29:25,039
for anybody to see

829
00:29:28,950 --> 00:29:26,640
the station from the vantage point of

830
00:29:31,029 --> 00:29:28,960
the inside from inside of the shuttle

831
00:29:32,710 --> 00:29:31,039
as you sit here today trying to imagine

832
00:29:35,269 --> 00:29:32,720
what that's going to be like what what

833
00:29:36,789 --> 00:29:35,279
are your thoughts about that

834
00:29:39,350 --> 00:29:36,799
i think that

835
00:29:40,950 --> 00:29:39,360
the view of the space station

836
00:29:43,110 --> 00:29:40,960
from the shuttle

837
00:29:46,470 --> 00:29:43,120
from everything i've seen

838
00:29:48,230 --> 00:29:46,480

from returned crew members in the videos

839
00:29:51,110 --> 00:29:48,240
has to be one of the most breathtaking

840
00:29:52,470 --> 00:29:51,120
sites available today and

841
00:29:54,389 --> 00:29:52,480
that's probably one of the things i'm

842
00:29:55,750 --> 00:29:54,399
looking forward to most as we approach

843
00:29:59,750 --> 00:29:55,760
the station

844
00:30:03,029 --> 00:29:59,760
have made it bigger we will have been

845
00:30:05,750 --> 00:30:03,039
with our friends for about eight days or

846
00:30:08,310 --> 00:30:05,760
so we will work very hard and i think

847
00:30:10,310 --> 00:30:08,320
we'll hopefully be whooped but very

848
00:30:12,070 --> 00:30:10,320
satisfied with the work we did

849
00:30:14,549 --> 00:30:12,080
and i think all of that is going to add

850
00:30:15,909 --> 00:30:14,559
to that view as we pull away and fly

851
00:30:16,630 --> 00:30:15,919
around it

852
00:31:57,190 --> 00:30:16,640
i

853
00:31:59,269 --> 00:31:57,200
program have returned so much to us

854
00:32:01,509 --> 00:31:59,279
in operating knowledge and scientific

855
00:32:03,350 --> 00:32:01,519
knowledge and