



STD-138/AMS

1
00:00:19,429 --> 00:00:17,029
why did you want to be an astronaut um

2
00:00:21,990 --> 00:00:19,439
so i wanted i remember thinking about

3
00:00:25,029 --> 00:00:22,000
being an astronaut during apollo

4
00:00:26,870 --> 00:00:25,039
probably not apollo 11 i was

5
00:00:28,390 --> 00:00:26,880
five i think or

6
00:00:29,589 --> 00:00:28,400
four years old

7
00:00:31,029 --> 00:00:29,599
is that right i was five years old

8
00:00:32,870 --> 00:00:31,039
during apollo 11.

9
00:00:34,229 --> 00:00:32,880
but in those later apollo missions i

10
00:00:36,069 --> 00:00:34,239
remember thinking boy that would be

11
00:00:37,910 --> 00:00:36,079
something to be able to you know fly a

12
00:00:39,110 --> 00:00:37,920
rocket ship in this space

13
00:00:41,190 --> 00:00:39,120

and then for a long period of time i

14

00:00:42,549 --> 00:00:41,200

didn't think about it just seemed like

15

00:00:44,790 --> 00:00:42,559

you know just completely out of the

16

00:00:46,310 --> 00:00:44,800

question like other people did that and

17

00:00:47,990 --> 00:00:46,320

some kid from new jersey wouldn't

18

00:00:49,750 --> 00:00:48,000

wouldn't have that opportunity even

19

00:00:52,549 --> 00:00:49,760

though i lived my town was next door to

20

00:00:53,830 --> 00:00:52,559

where buzz aldrin grew up but anyway i

21

00:00:55,510 --> 00:00:53,840

didn't think i'd have that opportunity

22

00:00:57,670 --> 00:00:55,520

but later

23

00:00:59,670 --> 00:00:57,680

once i was flying airplanes off the

24

00:01:01,430 --> 00:00:59,680

aircraft carrier and later decided to

25

00:01:03,510 --> 00:01:01,440

become a test pilot and went to graduate

26
00:01:06,230 --> 00:01:03,520
school i thought you know maybe somebody

27
00:01:08,149 --> 00:01:06,240
like me could have that opportunity so

28
00:01:10,390 --> 00:01:08,159
started thinking more seriously about it

29
00:01:11,590 --> 00:01:10,400
eventually applied and got selected let

30
00:01:13,510 --> 00:01:11,600
me get you to fill in some of the

31
00:01:15,190 --> 00:01:13,520
details of that story start with with

32
00:01:16,710 --> 00:01:15,200
your hometown tell me what it was like

33
00:01:19,749 --> 00:01:16,720
there and and what it was like for you

34
00:01:21,590 --> 00:01:19,759
growing up there yes so i grew up in

35
00:01:24,950 --> 00:01:21,600
west orange new jersey

36
00:01:26,390 --> 00:01:24,960
which is a suburb of new york city

37
00:01:28,310 --> 00:01:26,400
at the time i thought it was more like

38
00:01:31,350 --> 00:01:28,320

the suburbs but it was actually

39

00:01:33,030 --> 00:01:31,360

you know kind of like more of an urban

40

00:01:35,030 --> 00:01:33,040

suburb community

41

00:01:36,789 --> 00:01:35,040

uh just being that close to new york and

42

00:01:38,870 --> 00:01:36,799

very you know new jersey's the most

43

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

densely popular populated state so it's

44

00:01:42,710 --> 00:01:41,280

pretty densely populated place

45

00:01:43,910 --> 00:01:42,720

good schools

46

00:01:47,190 --> 00:01:43,920

um

47

00:01:50,789 --> 00:01:47,200

you know the community that uh

48

00:01:54,950 --> 00:01:52,389

you know very diverse

49

00:01:56,870 --> 00:01:54,960

and i think it had a good influence on

50

00:01:59,270 --> 00:01:56,880

me growing up my parents were

51
00:02:01,350 --> 00:01:59,280
uh local you know police officers in the

52
00:02:02,870 --> 00:02:01,360
town so

53
00:02:04,950 --> 00:02:02,880
stayed out of trouble i think because of

54
00:02:06,709 --> 00:02:04,960
that so you do have a sense that that

55
00:02:09,669 --> 00:02:06,719
there really was an influence on you

56
00:02:11,910 --> 00:02:09,679
from that place i think so i think so

57
00:02:13,589 --> 00:02:11,920
when i go back there i talk about it

58
00:02:16,869 --> 00:02:13,599
you know i think the big influence is

59
00:02:18,470 --> 00:02:16,879
they had a good public school system

60
00:02:21,270 --> 00:02:18,480
did you get the have you been able to

61
00:02:22,869 --> 00:02:21,280
make it out as you've flown over

62
00:02:24,309 --> 00:02:22,879
no you know i've actually tried to do

63
00:02:26,710 --> 00:02:24,319

that i've tried to get a good picture of

64
00:02:29,030 --> 00:02:26,720
west orange new jersey just you know new

65
00:02:31,030 --> 00:02:29,040
jersey's just so densely populated and

66
00:02:33,990 --> 00:02:31,040
it's very hard to tell one town from the

67
00:02:35,430 --> 00:02:34,000
from the next i've taken you know big

68
00:02:37,350 --> 00:02:35,440
pictures of the whole area so it's in

69
00:02:39,430 --> 00:02:37,360
there somewhere but i've never taken out

70
00:02:42,070 --> 00:02:39,440
the 400 millimeter lens and grabbed a

71
00:02:44,070 --> 00:02:42,080
picture where you can tell it's the town

72
00:02:45,910 --> 00:02:44,080
tell me about the the path then from

73
00:02:47,990 --> 00:02:45,920
from west orange new jersey what's your

74
00:02:50,150 --> 00:02:48,000
your educational and professional path

75
00:02:52,070 --> 00:02:50,160
that that led to astronaut yes so after

76

00:02:54,550 --> 00:02:52,080

i graduated from high school

77

00:02:56,309 --> 00:02:54,560

at 18 i went to the us merchant marine

78

00:02:58,229 --> 00:02:56,319

academy so i never actually lived back

79

00:03:00,790 --> 00:02:58,239

in new jersey again since i was 18 years

80

00:03:01,910 --> 00:03:00,800

old and that's on long island new york

81

00:03:03,430 --> 00:03:01,920

the united states merchant marine

82

00:03:05,190 --> 00:03:03,440

academy graduated from there went

83

00:03:06,949 --> 00:03:05,200

directly to flight school four days

84

00:03:09,670 --> 00:03:06,959

later i mean immediately got in my car

85

00:03:12,630 --> 00:03:09,680

drove to pensacola no vacation

86

00:03:14,949 --> 00:03:12,640

and started started flight school

87

00:03:17,030 --> 00:03:14,959

later i was flying

88

00:03:19,589 --> 00:03:17,040

the a-6 intruder in the persian gulf

89

00:03:21,350 --> 00:03:19,599

during operation desert storm flew 39

90

00:03:23,509 --> 00:03:21,360

combat missions there

91

00:03:24,789 --> 00:03:23,519

and after that went to grad school

92

00:03:25,990 --> 00:03:24,799

for a couple years in monterey

93

00:03:27,990 --> 00:03:26,000

california

94

00:03:29,750 --> 00:03:28,000

and then on to the u.s naval test pilot

95

00:03:32,229 --> 00:03:29,760

school in patuxent river

96

00:03:34,789 --> 00:03:32,239

later i was an instructor there and as

97

00:03:37,350 --> 00:03:34,799

an instructor at tps the test pilot

98

00:03:39,509 --> 00:03:37,360

school i was selected to be an astronaut

99

00:03:43,110 --> 00:03:39,519

and come to the johnson space center

100

00:03:45,030 --> 00:03:43,120

in 1996 so 14 years ago

101
00:03:48,229 --> 00:03:45,040
what was it that got you interested in

102
00:03:51,110 --> 00:03:48,239
being in aviation and being a pilot

103
00:03:54,309 --> 00:03:53,110
so i went to a school that was focused

104
00:03:56,390 --> 00:03:54,319
on ships

105
00:03:58,229 --> 00:03:56,400
the merchant marine academy and at the

106
00:03:59,990 --> 00:03:58,239
time i was really interested

107
00:04:01,429 --> 00:04:00,000
i still am i mention you know i like

108
00:04:04,949 --> 00:04:01,439
being on the water

109
00:04:06,390 --> 00:04:04,959
uh i like sailing ships or power boats

110
00:04:10,229 --> 00:04:06,400
and

111
00:04:11,750 --> 00:04:10,239
um though i do remember being on a grain

112
00:04:14,070 --> 00:04:11,760
carrier

113
00:04:16,229 --> 00:04:14,080

going from seattle to a place called

114

00:04:18,550 --> 00:04:16,239

savaga egypt it's in the southern part

115

00:04:19,670 --> 00:04:18,560

of egypt on the red sea

116

00:04:21,590 --> 00:04:19,680

and

117

00:04:23,590 --> 00:04:21,600

getting across the pacific that ship

118

00:04:25,749 --> 00:04:23,600

went 12 knots

119

00:04:27,430 --> 00:04:25,759

and it took us over a month

120

00:04:29,990 --> 00:04:27,440

to get across the pacific ocean and get

121

00:04:31,270 --> 00:04:30,000

us to singapore and i thought oh this is

122

00:04:32,550 --> 00:04:31,280

way too slow

123

00:04:35,270 --> 00:04:32,560

so that's when i started thinking about

124

00:04:37,749 --> 00:04:35,280

flying airplanes in the navy

125

00:04:38,710 --> 00:04:37,759

and and then as you referred to a minute

126
00:04:41,030 --> 00:04:38,720
ago

127
00:04:42,710 --> 00:04:41,040
as a test pilot you started looking at

128
00:04:44,310 --> 00:04:42,720
astronaut again

129
00:04:46,230 --> 00:04:44,320
yeah i think a lot of test pilots do

130
00:04:48,790 --> 00:04:46,240
that you know being a test pilot's fun

131
00:04:50,310 --> 00:04:48,800
you get to test new things and sometimes

132
00:04:52,230 --> 00:04:50,320
fly new airplanes

133
00:04:55,590 --> 00:04:52,240
not in my case well i mean i flew the

134
00:04:56,950 --> 00:04:55,600
f-18 as a test pilot the a6 the a6b

135
00:04:59,270 --> 00:04:56,960
prowler but these were airplanes that

136
00:05:01,350 --> 00:04:59,280
were already in the fleet occasionally

137
00:05:03,189 --> 00:05:01,360
you know some test pilots get to fly

138
00:05:05,670 --> 00:05:03,199

brand new airplanes but we get to test

139

00:05:08,710 --> 00:05:05,680

new new weapon systems

140

00:05:10,629 --> 00:05:08,720

and modifications to airplanes

141

00:05:14,790 --> 00:05:10,639

and the space shuttle you know after

142

00:05:17,110 --> 00:05:14,800

sts-134 only has 134 flights so

143

00:05:20,710 --> 00:05:17,120

in

144

00:05:22,550 --> 00:05:20,720

far as when you look at number of

145

00:05:24,150 --> 00:05:22,560

flights go it's still

146

00:05:25,990 --> 00:05:24,160

more or less in a test program even

147

00:05:29,909 --> 00:05:26,000

though we've been flying it for

148

00:05:36,390 --> 00:05:33,029

so it's like the ultimate test pilot job

149

00:05:38,629 --> 00:05:36,400

well this ultimate test pilot job is a

150

00:05:40,550 --> 00:05:38,639

job that we know has elements of danger

151
00:05:41,909 --> 00:05:40,560
to it like some of the other jobs you've

152
00:05:44,469 --> 00:05:41,919
had but

153
00:05:46,070 --> 00:05:44,479
an element that that most people don't

154
00:05:48,310 --> 00:05:46,080
have in their jobs

155
00:05:51,029 --> 00:05:48,320
mark what is it that you feel we get as

156
00:05:53,270 --> 00:05:51,039
a result of flying people in space

157
00:05:55,189 --> 00:05:53,280
that makes it worth taking that risk

158
00:05:56,950 --> 00:05:55,199
yeah i think people need to you know

159
00:05:59,990 --> 00:05:56,960
each individual needs

160
00:06:03,270 --> 00:06:00,000
in in any job that's dangerous you got

161
00:06:04,950 --> 00:06:03,280
to evaluate the the risk and the reward

162
00:06:07,670 --> 00:06:04,960
you know so for something that's really

163
00:06:09,430 --> 00:06:07,680

dangerous there's got to be a pretty big

164

00:06:11,830 --> 00:06:09,440

you know impact and not only to me

165

00:06:13,670 --> 00:06:11,840

personally like in the case of

166

00:06:15,990 --> 00:06:13,680

me flying the space shuttle you know i

167

00:06:17,350 --> 00:06:16,000

look at what's the impact to

168

00:06:19,430 --> 00:06:17,360

you know the country i mean what does

169

00:06:21,029 --> 00:06:19,440

the country get out of having having the

170

00:06:22,790 --> 00:06:21,039

space shuttle and flying people in space

171

00:06:25,510 --> 00:06:22,800

and i think it's pretty significant

172

00:06:27,830 --> 00:06:25,520

um you know our space program

173

00:06:30,629 --> 00:06:27,840

you know over the last 30 years has

174

00:06:32,790 --> 00:06:30,639

resulted in incredible advancements you

175

00:06:34,870 --> 00:06:32,800

know for industry in the united states

176

00:06:37,510 --> 00:06:34,880

and for the economy

177

00:06:39,029 --> 00:06:37,520

we've invented i mean nasa's invented

178

00:06:42,230 --> 00:06:39,039

you know technologies that are used

179

00:06:44,150 --> 00:06:42,240

every day i mean the fact that computers

180

00:06:45,830 --> 00:06:44,160

are you know don't fill up an entire

181

00:06:47,670 --> 00:06:45,840

room right now has

182

00:06:50,070 --> 00:06:47,680

a lot to do with the fact that we needed

183

00:06:51,189 --> 00:06:50,080

to miniaturize computer systems to be

184

00:06:52,950 --> 00:06:51,199

able to get

185

00:06:55,270 --> 00:06:52,960

you know the lamb onto the surface of

186

00:06:57,830 --> 00:06:55,280

the moon and then back off you know with

187

00:06:59,830 --> 00:06:57,840

very small lightweight computers

188

00:07:02,390 --> 00:06:59,840

um things like computational fluid

189

00:07:03,909 --> 00:07:02,400

dynamics when we were designing the

190

00:07:06,469 --> 00:07:03,919

space shuttle it's a winged vehicle

191

00:07:08,629 --> 00:07:06,479

flies into the atmosphere at mach 25 we

192

00:07:10,870 --> 00:07:08,639

didn't have wind tunnels to do that

193

00:07:13,270 --> 00:07:10,880

prior to that for any any tests of any

194

00:07:14,870 --> 00:07:13,280

kind of airplane wing we just stick it

195

00:07:16,550 --> 00:07:14,880

in a wind tunnel well there aren't wind

196

00:07:18,710 --> 00:07:16,560

tunnels that can

197

00:07:21,430 --> 00:07:18,720

that can are designed to be able to get

198

00:07:24,629 --> 00:07:21,440

you data at mach 25 so we had to do it

199

00:07:26,629 --> 00:07:24,639

on on very high speed computers well cfd

200

00:07:29,350 --> 00:07:26,639

computational fluid dynamics is now used

201
00:07:32,870 --> 00:07:29,360
to design anything that has flow over it

202
00:07:35,670 --> 00:07:32,880
i mean cars pipes surfboards skateboards

203
00:07:38,309 --> 00:07:35,680
i mean just bicycles i mean it's used i

204
00:07:39,510 --> 00:07:38,319
mean it's a yearly it's a three i think

205
00:07:42,070 --> 00:07:39,520
it's like a three billion dollar

206
00:07:44,070 --> 00:07:42,080
industry so we got that

207
00:07:49,029 --> 00:07:44,080
just because we decided we wanted to fly

208
00:07:52,469 --> 00:07:50,469
mark you're a member of the shuttle

209
00:07:53,350 --> 00:07:52,479
mission sts-134

210
00:07:55,189 --> 00:07:53,360
crew

211
00:07:57,110 --> 00:07:55,199
summarize the overall goals of that

212
00:08:00,550 --> 00:07:57,120
mission for us and tell me what your job

213
00:08:02,070 --> 00:08:00,560

is well i'm the commander of sts-134

214

00:08:04,070 --> 00:08:02,080

we've got a whole list of mission

215

00:08:05,110 --> 00:08:04,080

objectives probably 30 things on the

216

00:08:07,189 --> 00:08:05,120

list

217

00:08:09,990 --> 00:08:07,199

but the big objectives is to get the

218

00:08:12,150 --> 00:08:10,000

alpha magnetic spectrometer installed on

219

00:08:13,110 --> 00:08:12,160

the outside of the space station it's

220

00:08:16,390 --> 00:08:13,120

the

221

00:08:17,830 --> 00:08:16,400

you know a premier uh physics experiment

222

00:08:19,670 --> 00:08:17,840

it's probably the most expensive thing

223

00:08:21,749 --> 00:08:19,680

ever flown by the space shuttle we also

224

00:08:24,230 --> 00:08:21,759

have a pallet of external spares called

225

00:08:25,909 --> 00:08:24,240

elc3 that has some spare parts we're

226

00:08:26,950 --> 00:08:25,919

going to do four space walks with really

227

00:08:28,390 --> 00:08:26,960

critical

228

00:08:31,909 --> 00:08:28,400

uh iss

229

00:08:33,909 --> 00:08:31,919

assembly slash maintenance tasks uh

230

00:08:36,630 --> 00:08:33,919

during the mission and then a host of

231

00:08:39,350 --> 00:08:36,640

other things uh transferring cargo

232

00:08:40,949 --> 00:08:39,360

and um you know primarily the cargo

233

00:08:43,909 --> 00:08:40,959

transfer is a big part of it and then we

234

00:08:45,509 --> 00:08:43,919

have a objective called uh the storm dto

235

00:08:47,750 --> 00:08:45,519

which is a sensor for follow-on

236

00:08:49,350 --> 00:08:47,760

spacecraft it's a nice variety to keep

237

00:08:50,710 --> 00:08:49,360

you from getting bored

238

00:08:52,710 --> 00:08:50,720

busy mission

239

00:08:54,550 --> 00:08:52,720

now almost everybody on your crew has

240

00:08:56,310 --> 00:08:54,560

been to the space station before in fact

241

00:08:58,710 --> 00:08:56,320

two of them have done long duration

242

00:09:00,550 --> 00:08:58,720

missions there has that benefited your

243

00:09:02,550 --> 00:09:00,560

crew as you've been training preparing

244

00:09:04,310 --> 00:09:02,560

for this flight absolutely

245

00:09:06,230 --> 00:09:04,320

this is the first time i've had a long

246

00:09:08,949 --> 00:09:06,240

duration crew member as one of my

247

00:09:10,630 --> 00:09:08,959

shuttle crew members and typically on

248

00:09:12,550 --> 00:09:10,640

previous flights for a space station

249

00:09:14,470 --> 00:09:12,560

flow you always have all these questions

250

00:09:15,990 --> 00:09:14,480

about station where stuff is located how

251
00:09:17,110 --> 00:09:16,000
the station crew would do something what

252
00:09:18,710 --> 00:09:17,120
they would think

253
00:09:20,070 --> 00:09:18,720
and normally you have to go and you know

254
00:09:22,630 --> 00:09:20,080
spend some time and track down that

255
00:09:25,190 --> 00:09:22,640
answer but in our case with greg

256
00:09:26,710 --> 00:09:25,200
chamotov and mike fink two long-duration

257
00:09:28,389 --> 00:09:26,720
crew members i don't have to go very far

258
00:09:30,070 --> 00:09:28,399
for the answer which has been pretty

259
00:09:31,670 --> 00:09:30,080
convenient for me

260
00:09:33,750 --> 00:09:31,680
let's talk about some of the cargo that

261
00:09:36,550 --> 00:09:33,760
you're bringing up you mentioned express

262
00:09:37,829 --> 00:09:36,560
logistics carrier three tell me what its

263
00:09:39,829 --> 00:09:37,839

function is

264

00:09:42,310 --> 00:09:39,839

well on the outside of the space station

265

00:09:44,389 --> 00:09:42,320

we have these carriers that hold

266

00:09:46,790 --> 00:09:44,399

external spare parts

267

00:09:48,710 --> 00:09:46,800

and we've got a number of them and this

268

00:09:50,710 --> 00:09:48,720

one's elc-3 and it's got a spare part

269

00:09:52,470 --> 00:09:50,720

for the spin them it has some other

270

00:09:54,310 --> 00:09:52,480

orus

271

00:09:57,670 --> 00:09:54,320

some other components on it that if

272

00:10:00,150 --> 00:09:57,680

something fails like a pump module

273

00:10:02,389 --> 00:10:00,160

which we recently had happen you know

274

00:10:04,790 --> 00:10:02,399

so when parts like that fail

275

00:10:07,269 --> 00:10:04,800

we have these elcs positioned

276

00:10:09,269 --> 00:10:07,279

uh along the truss in a in a few

277

00:10:10,790 --> 00:10:09,279

locations and we can take the spare

278

00:10:13,269 --> 00:10:10,800

parts off of there and replace them

279

00:10:15,670 --> 00:10:13,279

during a spacewalk now how does it get

280

00:10:17,670 --> 00:10:15,680

out of the payload bay and into position

281

00:10:19,430 --> 00:10:17,680

up on the port side of the truck so what

282

00:10:21,829 --> 00:10:19,440

we're going to do on flight day three

283

00:10:24,550 --> 00:10:21,839

right after we rendezvous we we will

284

00:10:26,470 --> 00:10:24,560

already have grappled elc3 before we

285

00:10:28,790 --> 00:10:26,480

rendezvous with the space station and

286

00:10:30,310 --> 00:10:28,800

once we get docked and get the hatches

287

00:10:31,910 --> 00:10:30,320

open one of the first things we do is

288

00:10:33,990 --> 00:10:31,920

we're going to pull the elc3 out of the

289

00:10:36,150 --> 00:10:34,000

payload bay i'm going to hand it off to

290

00:10:39,030 --> 00:10:36,160

the space station robotic arm and then

291

00:10:41,350 --> 00:10:39,040

we're going to install it on on top of

292

00:10:43,269 --> 00:10:41,360

the on the port side of the truss so

293

00:10:46,389 --> 00:10:43,279

it's a if you'll forgive the phrase a

294

00:10:48,230 --> 00:10:46,399

simple robotics operation uh

295

00:10:50,710 --> 00:10:48,240

you know none of them are really that

296

00:10:52,949 --> 00:10:50,720

simple i mean it's going to take

297

00:10:54,550 --> 00:10:52,959

two people on the space shuttle arm two

298

00:10:57,190 --> 00:10:54,560

two crew members on the space station

299

00:10:58,710 --> 00:10:57,200

arm and you know several hours to do

300

00:11:01,110 --> 00:10:58,720

this complicated

301
00:11:02,550 --> 00:11:01,120
task of safely pulling out pulling it

302
00:11:04,069 --> 00:11:02,560
out of endeavour's bay

303
00:11:05,670 --> 00:11:04,079
and then handing it off to the arm and

304
00:11:07,990 --> 00:11:05,680
then get it getting it successfully

305
00:11:09,670 --> 00:11:08,000
installed and i understand this is it's

306
00:11:11,829 --> 00:11:09,680
sort of just a plug-in and then it's

307
00:11:13,990 --> 00:11:11,839
there and the work is done yeah it is i

308
00:11:16,949 --> 00:11:14,000
mean once we get it attached it just

309
00:11:19,350 --> 00:11:16,959
sits there on you know in standby with

310
00:11:20,710 --> 00:11:19,360
you know different spare parts located

311
00:11:22,389 --> 00:11:20,720
on it and

312
00:11:24,069 --> 00:11:22,399
you know whether we you know maybe we'll

313
00:11:25,509 --> 00:11:24,079

need something in a year

314

00:11:27,750 --> 00:11:25,519

maybe we'll need one of those parts in

315

00:11:29,990 --> 00:11:27,760

10 years we just don't know

316

00:11:32,069 --> 00:11:30,000

the other major uh

317

00:11:34,870 --> 00:11:32,079

piece of hardware is the alpha magnetic

318

00:11:36,949 --> 00:11:34,880

spectrometer talk a bit more about what

319

00:11:39,829 --> 00:11:36,959

that is and what it's going to do once

320

00:11:42,550 --> 00:11:39,839

it's installed yeah so ams is a two

321

00:11:44,949 --> 00:11:42,560

billion dollar cosmic particle detector

322

00:11:46,630 --> 00:11:44,959

it's got 16 partner nations including

323

00:11:47,910 --> 00:11:46,640

the united states that are involved in

324

00:11:49,829 --> 00:11:47,920

designing

325

00:11:51,750 --> 00:11:49,839

and building this instrument

326

00:11:53,670 --> 00:11:51,760

it's got six sixty

327

00:11:54,710 --> 00:11:53,680

six zero different universities that are

328

00:11:56,710 --> 00:11:54,720

involved

329

00:11:59,910 --> 00:11:56,720

a lot of physicists

330

00:12:03,190 --> 00:11:59,920

it's managed by the department of energy

331

00:12:05,829 --> 00:12:03,200

but the program is located in in cern in

332

00:12:07,670 --> 00:12:05,839

geneva outside of geneva switzerland

333

00:12:09,509 --> 00:12:07,680

and the program specifically the

334

00:12:11,110 --> 00:12:09,519

principal investigator

335

00:12:13,829 --> 00:12:11,120

is a

336

00:12:15,590 --> 00:12:13,839

phd physicist nobel prize winner named

337

00:12:17,430 --> 00:12:15,600

dr samuel ting

338

00:12:19,190 --> 00:12:17,440

who envisioned

339

00:12:22,389 --> 00:12:19,200

and appropriated the money and

340

00:12:25,030 --> 00:12:22,399

constructed ams with a big team of

341

00:12:26,870 --> 00:12:25,040

engineers but mostly physicists

342

00:12:27,829 --> 00:12:26,880

and we're going to launch that as you

343

00:12:30,389 --> 00:12:27,839

know it's

344

00:12:31,990 --> 00:12:30,399

pretty much our primary payload and on

345

00:12:34,150 --> 00:12:32,000

flight day five of the mission we'll

346

00:12:36,710 --> 00:12:34,160

install it on station but

347

00:12:38,310 --> 00:12:36,720

ams is a cosmic particle detector that's

348

00:12:40,389 --> 00:12:38,320

going to look for a bunch of different

349

00:12:41,590 --> 00:12:40,399

things including

350

00:12:43,990 --> 00:12:41,600

antimatter

351
00:12:45,829 --> 00:12:44,000
dark matter and dark energy stuff that

352
00:12:47,990 --> 00:12:45,839
we don't know a lot about

353
00:12:50,069 --> 00:12:48,000
we think there's any matter in the

354
00:12:52,710 --> 00:12:50,079
universe naturally occurring we

355
00:12:55,190 --> 00:12:52,720
physicists believe that at the big bang

356
00:12:56,550 --> 00:12:55,200
there were equal parts of matter in any

357
00:12:59,269 --> 00:12:56,560
matter and we don't know where the

358
00:13:00,710 --> 00:12:59,279
antimatter is so we're going to the ams

359
00:13:01,829 --> 00:13:00,720
is going to try to answer a lot of those

360
00:13:03,990 --> 00:13:01,839
questions

361
00:13:05,430 --> 00:13:04,000
the question would always be to wonder

362
00:13:07,829 --> 00:13:05,440
about the significance of what it's

363
00:13:09,430 --> 00:13:07,839

going to do is understanding the origin

364

00:13:11,590 --> 00:13:09,440

of the universe

365

00:13:14,310 --> 00:13:11,600

seems relatively significant yeah

366

00:13:16,230 --> 00:13:14,320

absolutely i mean this is one of the i

367

00:13:17,910 --> 00:13:16,240

think you know one of the premier

368

00:13:18,949 --> 00:13:17,920

experiments that space station is going

369

00:13:21,509 --> 00:13:18,959

to have

370

00:13:23,910 --> 00:13:21,519

and since we've made some modifications

371

00:13:26,069 --> 00:13:23,920

to ams it's going to be able to function

372

00:13:27,910 --> 00:13:26,079

all the way through 2020 and beyond as

373

00:13:29,590 --> 00:13:27,920

long as the space station

374

00:13:31,430 --> 00:13:29,600

is in operation

375

00:13:33,590 --> 00:13:31,440

and it'll collect data that whole time

376

00:13:34,790 --> 00:13:33,600

and it sends you know daily it'll be

377

00:13:37,350 --> 00:13:34,800

sending

378

00:13:39,910 --> 00:13:37,360

you know gigabytes i think gigabytes of

379

00:13:42,629 --> 00:13:39,920

data to the ground that'll be analyzed

380

00:13:44,949 --> 00:13:42,639

initially here and then later in cern

381

00:13:46,310 --> 00:13:44,959

they're building a big operations center

382

00:13:49,030 --> 00:13:46,320

just for ams

383

00:13:51,430 --> 00:13:49,040

to analyze this data and you know over

384

00:13:53,269 --> 00:13:51,440

the course of the next 10 or 15 years

385

00:13:55,110 --> 00:13:53,279

hopefully we'll answer a lot of those

386

00:13:57,350 --> 00:13:55,120

questions about you know fundamental

387

00:14:00,629 --> 00:13:57,360

questions about how the universe began

388

00:14:01,350 --> 00:14:00,639

and what it's what its makeup is

389

00:14:03,350 --> 00:14:01,360

it

390

00:14:06,310 --> 00:14:03,360

gets installed in sort of the same way

391

00:14:08,310 --> 00:14:06,320

that elc does right it does so the next

392

00:14:11,350 --> 00:14:08,320

day on flight day five

393

00:14:13,670 --> 00:14:11,360

uh with the roberto vittori flying the

394

00:14:15,910 --> 00:14:13,680

space shuttle robot arm

395

00:14:18,150 --> 00:14:15,920

my italian crew member pull it out of

396

00:14:19,590 --> 00:14:18,160

the payload bay and just like we did on

397

00:14:21,269 --> 00:14:19,600

flight day four we'll hand it off to the

398

00:14:23,189 --> 00:14:21,279

space station arm

399

00:14:25,030 --> 00:14:23,199

but this time ams will be installed on

400

00:14:28,550 --> 00:14:25,040

the starboard side of the troughs of the

401

00:14:30,230 --> 00:14:28,560

space station once it's out there it it

402

00:14:32,230 --> 00:14:30,240

it works just by sitting there and

403

00:14:34,949 --> 00:14:32,240

gathering what comes by right well it's

404

00:14:37,269 --> 00:14:34,959

on you know it's it's functioning it's

405

00:14:39,750 --> 00:14:37,279

operated primarily from the ground

406

00:14:40,629 --> 00:14:39,760

it's a big magnet with a magnetic field

407

00:14:42,710 --> 00:14:40,639

that's

408

00:14:45,110 --> 00:14:42,720

two thousand times the strength of the

409

00:14:47,189 --> 00:14:45,120

earth's magnetic field i believe don't

410

00:14:47,910 --> 00:14:47,199

well it's too late you quoted me on that

411

00:14:52,389 --> 00:14:47,920

but

412

00:14:55,750 --> 00:14:52,399

it uh with this magnetic field it can

413

00:14:58,310 --> 00:14:55,760

detect characteristics of particles

414

00:15:00,550 --> 00:14:58,320

and send that info to the ground so it

415

00:15:03,030 --> 00:15:00,560

can tell the difference you know for

416

00:15:07,269 --> 00:15:03,040

instance between a helium

417

00:15:09,990 --> 00:15:07,279

atom and an anti-helium atom

418

00:15:11,750 --> 00:15:10,000

and could so it could

419

00:15:13,829 --> 00:15:11,760

detect whether there's you know

420

00:15:15,990 --> 00:15:13,839

antimatter flowing through it or not and

421

00:15:18,230 --> 00:15:16,000

over a period of time you know we we

422

00:15:19,910 --> 00:15:18,240

expect that it'll make some

423

00:15:21,910 --> 00:15:19,920

uh pretty amazing discoveries because

424

00:15:23,590 --> 00:15:21,920

the analysis of what it finds that's

425

00:15:25,269 --> 00:15:23,600

done by people on the ground will lead

426

00:15:27,750 --> 00:15:25,279

to that yes it's gonna and it's going to

427

00:15:29,829 --> 00:15:27,760

take a while to analyze that data

428

00:15:30,949 --> 00:15:29,839

no immediate answers about where where's

429

00:15:33,430 --> 00:15:30,959

the anti-matter i don't think we're

430

00:15:34,710 --> 00:15:33,440

going to turn it on and before we undock

431

00:15:36,150 --> 00:15:34,720

find out that we've discovered

432

00:15:37,670 --> 00:15:36,160

antimatter no

433

00:15:39,110 --> 00:15:37,680

you mentioned that the plan for your

434

00:15:41,189 --> 00:15:39,120

flight is that your crew is going to

435

00:15:43,189 --> 00:15:41,199

conduct four spacewalks and this could

436

00:15:45,350 --> 00:15:43,199

be done by three different teams of

437

00:15:47,670 --> 00:15:45,360

space walkers going outside

438

00:15:49,350 --> 00:15:47,680

as the commander of the shuttle crew

439

00:15:50,870 --> 00:15:49,360

what is your role going to be during the

440

00:15:52,550 --> 00:15:50,880

spacewalk so it's not so much three

441

00:15:53,910 --> 00:15:52,560

different teams i have three crew

442

00:15:56,550 --> 00:15:53,920

members that are going to be doing space

443

00:15:58,310 --> 00:15:56,560

walks and there's two on each

444

00:16:00,069 --> 00:15:58,320

on each eva

445

00:16:01,590 --> 00:16:00,079

so on

446

00:16:04,389 --> 00:16:01,600

so for instance

447

00:16:06,230 --> 00:16:04,399

drew feustel will do eda's one two and

448

00:16:08,629 --> 00:16:06,240

three mike fink will do

449

00:16:10,550 --> 00:16:08,639

two three and four and greg chamotov

450

00:16:12,230 --> 00:16:10,560

will do one and four

451
00:16:15,110 --> 00:16:12,240
so it's three people

452
00:16:17,990 --> 00:16:15,120
uh going outside in pairs over those

453
00:16:20,069 --> 00:16:18,000
four space walks my role as a the

454
00:16:21,670 --> 00:16:20,079
commander of endeavor just like i did

455
00:16:24,230 --> 00:16:21,680
when i was the commander of space

456
00:16:26,550 --> 00:16:24,240
shuttle discovery for sds 124 storing

457
00:16:29,030 --> 00:16:26,560
the evas

458
00:16:30,550 --> 00:16:29,040
my primary primary role after getting

459
00:16:32,389 --> 00:16:30,560
them suited up

460
00:16:34,470 --> 00:16:32,399
and outside

461
00:16:36,949 --> 00:16:34,480
safely is to make sure

462
00:16:39,509 --> 00:16:36,959
that you know the eba is conducted

463
00:16:41,110 --> 00:16:39,519

safely and all their tethers are correct

464

00:16:43,269 --> 00:16:41,120

so i spent a lot of time actually

465

00:16:46,069 --> 00:16:43,279

looking out the window or on camera

466

00:16:48,389 --> 00:16:46,079

zoomed in on the crew member or

467

00:16:49,670 --> 00:16:48,399

in a window with binoculars making sure

468

00:16:51,590 --> 00:16:49,680

that they don't you know something

469

00:16:53,829 --> 00:16:51,600

doesn't come untethered

470

00:16:55,350 --> 00:16:53,839

that there isn't like a safety hazard

471

00:16:56,629 --> 00:16:55,360

so i just spent a lot of time just

472

00:16:57,990 --> 00:16:56,639

watching them

473

00:16:59,749 --> 00:16:58,000

we have another

474

00:17:02,069 --> 00:16:59,759

astronaut on board

475

00:17:03,430 --> 00:17:02,079

who's called the task iv crew member

476
00:17:04,870 --> 00:17:03,440
that's kind of leading them through the

477
00:17:06,390 --> 00:17:04,880
spacewalk he's got the checklist he's

478
00:17:09,350 --> 00:17:06,400
telling him what's next he's telling the

479
00:17:11,829 --> 00:17:09,360
settings for the tools they have and

480
00:17:14,390 --> 00:17:11,839
you know which connector to disconnect

481
00:17:16,789 --> 00:17:14,400
next and i mean just he's doing the the

482
00:17:18,710 --> 00:17:16,799
choreographing of the eva

483
00:17:22,309 --> 00:17:18,720
well i'm pretty much just watching to

484
00:17:24,230 --> 00:17:22,319
make sure we don't make a major mistake

485
00:17:25,750 --> 00:17:24,240
give us a sense of the kinds of jobs

486
00:17:27,510 --> 00:17:25,760
that they're going to be performing on

487
00:17:28,870 --> 00:17:27,520
these four different spacewalks i'm not

488
00:17:30,630 --> 00:17:28,880

looking for the each of the four

489

00:17:32,150 --> 00:17:30,640

timelines but what kind of work are they

490

00:17:34,630 --> 00:17:32,160

going to be doing out there yeah so on

491

00:17:35,990 --> 00:17:34,640

eva 1 we're going to install these

492

00:17:38,150 --> 00:17:36,000

external

493

00:17:42,150 --> 00:17:38,160

science experiments these missy these

494

00:17:43,590 --> 00:17:42,160

boxes with materials and circuit boards

495

00:17:47,270 --> 00:17:43,600

and stuff like that some of this stuff

496

00:17:49,029 --> 00:17:47,280

is for for for doe uh so we're gonna

497

00:17:50,950 --> 00:17:49,039

we're gonna bring in

498

00:17:52,230 --> 00:17:50,960

bring back to the shuttle some old ones

499

00:17:54,630 --> 00:17:52,240

that are ready to come home to be

500

00:17:56,230 --> 00:17:54,640

analyzed and we're gonna reinstall some

501
00:17:57,669 --> 00:17:56,240
some new misses on the outside of the

502
00:17:58,789 --> 00:17:57,679
space station

503
00:17:59,750 --> 00:17:58,799
and then

504
00:18:01,110 --> 00:17:59,760
uh

505
00:18:03,990 --> 00:18:01,120
we're going to get

506
00:18:08,070 --> 00:18:04,000
the some of the jumpers connected for

507
00:18:12,870 --> 00:18:10,630
and on eva2 we've got this big ammonia

508
00:18:15,110 --> 00:18:12,880
fill task that's a primary

509
00:18:17,270 --> 00:18:15,120
part of eva2

510
00:18:19,590 --> 00:18:17,280
along with some other things like a

511
00:18:21,669 --> 00:18:19,600
sarge lubrication so we have to take the

512
00:18:23,430 --> 00:18:21,679
covers off the sarge we're going to

513
00:18:25,110 --> 00:18:23,440

lubricate it and that's

514

00:18:27,190 --> 00:18:25,120

the bearing

515

00:18:29,590 --> 00:18:27,200

for the solar array

516

00:18:34,390 --> 00:18:29,600

so we're going to lubricate one of those

517

00:18:38,390 --> 00:18:34,400

and then on eba 3 we have some tasks

518

00:18:40,390 --> 00:18:38,400

to do on the russian segment on the fgb

519

00:18:42,710 --> 00:18:40,400

and fortunately one of our crew members

520

00:18:44,710 --> 00:18:42,720

mike fink has done

521

00:18:46,710 --> 00:18:44,720

a number of russian evas so he spent a

522

00:18:49,430 --> 00:18:46,720

lot of time on the russian segment so

523

00:18:50,950 --> 00:18:49,440

he's one he's he and uh drew feustel my

524

00:18:53,430 --> 00:18:50,960

ev1 will be

525

00:18:54,710 --> 00:18:53,440

we'll be doing ev eda3 and he's got

526

00:18:57,029 --> 00:18:54,720

experience there with the russian

527

00:18:59,750 --> 00:18:57,039

segment and then in the eva4 we're going

528

00:19:02,549 --> 00:18:59,760

to leave the obss behind so the boom

529

00:19:04,710 --> 00:19:02,559

that we use to inspect the space shuttle

530

00:19:08,230 --> 00:19:04,720

to make sure that there's no holes in

531

00:19:09,350 --> 00:19:08,240

the leading edge or no tile damage

532

00:19:10,789 --> 00:19:09,360

we're going to leave that behind on

533

00:19:13,510 --> 00:19:10,799

space station

534

00:19:15,590 --> 00:19:13,520

um presumably i mean right now that that

535

00:19:17,990 --> 00:19:15,600

that look that's the plan

536

00:19:20,070 --> 00:19:18,000

uh it probably is not going to depend on

537

00:19:21,510 --> 00:19:20,080

whether there's an sts-135 or not but

538

00:19:23,590 --> 00:19:21,520

we're going to leave our boom behind so

539

00:19:25,990 --> 00:19:23,600

the space station will have

540

00:19:27,669 --> 00:19:26,000

the obss if it needs it in the future as

541

00:19:30,150 --> 00:19:27,679

an extension

542

00:19:31,590 --> 00:19:30,160

of uh the space station arm

543

00:19:33,990 --> 00:19:31,600

and you're going to put it there after

544

00:19:36,549 --> 00:19:34,000

you presumably are done using it yes

545

00:19:38,390 --> 00:19:36,559

yeah we'll do a late inspection

546

00:19:40,390 --> 00:19:38,400

on flight day

547

00:19:42,390 --> 00:19:40,400

10 no flight date

548

00:19:45,029 --> 00:19:42,400

but while you're still docked

549

00:19:47,110 --> 00:19:45,039

uh yes we'll while we're docked

550

00:19:49,669 --> 00:19:47,120

we'll do a late inspection and then

551
00:19:50,710 --> 00:19:49,679
we'll hand the boom off on flight day 10

552
00:19:53,350 --> 00:19:50,720
actually

553
00:19:55,909 --> 00:19:53,360
the third spacewalk uh the tasks there

554
00:19:57,190 --> 00:19:55,919
were a relatively late addition to uh to

555
00:19:59,190 --> 00:19:57,200
your timeline

556
00:20:02,390 --> 00:19:59,200
what were the circumstances that led

557
00:20:03,270 --> 00:20:02,400
those jobs to being put onto your plate

558
00:20:05,390 --> 00:20:03,280
well

559
00:20:07,909 --> 00:20:05,400
if we add an additional shuttle flight

560
00:20:08,950 --> 00:20:07,919
sts-135 which i think looks pretty

561
00:20:10,950 --> 00:20:08,960
likely

562
00:20:13,350 --> 00:20:10,960
it's a crew of four

563
00:20:15,190 --> 00:20:13,360

they're limited by

564

00:20:16,470 --> 00:20:15,200

well a number of things one is you have

565

00:20:18,310 --> 00:20:16,480

to be able to

566

00:20:20,870 --> 00:20:18,320

get this crew safely home somehow

567

00:20:24,230 --> 00:20:20,880

without a space shuttle rescue flight on

568

00:20:26,230 --> 00:20:24,240

standby so they'd come home via soyuz

569

00:20:27,510 --> 00:20:26,240

at a later date if there was a problem

570

00:20:36,630 --> 00:20:27,520

so

571

00:20:39,110 --> 00:20:36,640

last real shuttle crew that does

572

00:20:41,190 --> 00:20:39,120

spacewalks

573

00:20:43,029 --> 00:20:41,200

so

574

00:20:44,870 --> 00:20:43,039

if we could fit it in our timeline and

575

00:20:46,549 --> 00:20:44,880

we can we can

576

00:20:49,110 --> 00:20:46,559

right now our mission is going to be 14

577

00:20:50,470 --> 00:20:49,120

days and with four spacewalks since we

578

00:20:51,590 --> 00:20:50,480

can fit it in the timeline there were

579

00:20:53,190 --> 00:20:51,600

things that

580

00:20:55,669 --> 00:20:53,200

that we wanted to get done

581

00:20:56,549 --> 00:20:55,679

and in this case for eva3 at some some

582

00:20:58,789 --> 00:20:56,559

stuff

583

00:21:00,390 --> 00:20:58,799

on the russian segment and that got

584

00:21:02,870 --> 00:21:00,400

delayed because of

585

00:21:04,549 --> 00:21:02,880

other events that uh yeah things always

586

00:21:06,390 --> 00:21:04,559

happen and then they you know they kind

587

00:21:08,470 --> 00:21:06,400

of roll down here roll down

588

00:21:10,230 --> 00:21:08,480

uh you also mentioned earlier about a

589

00:21:12,470 --> 00:21:10,240

storm this is coming up during your

590

00:21:14,870 --> 00:21:12,480

rendezvous and docking and again

591

00:21:17,830 --> 00:21:14,880

during undocking and fly around for a

592

00:21:19,830 --> 00:21:17,840

dto storm by the way is sensor test for

593

00:21:21,430 --> 00:21:19,840

orion relative navigation risk

594

00:21:23,190 --> 00:21:21,440

mitigation and yes i read it because i

595

00:21:24,830 --> 00:21:23,200

can't memorize it

596

00:21:27,190 --> 00:21:24,840

but this is something new it includes a

597

00:21:28,630 --> 00:21:27,200

re-rendezvous with the station tell me

598

00:21:29,669 --> 00:21:28,640

what's going on here yeah so it's the

599

00:21:31,590 --> 00:21:29,679

first time we'll be doing a

600

00:21:33,669 --> 00:21:31,600

re-rendezvous with space station and

601
00:21:35,510 --> 00:21:33,679
it's a different kind of rendezvous it's

602
00:21:37,909 --> 00:21:35,520
different than what we normally do with

603
00:21:40,390 --> 00:21:37,919
with shuttles so the plan is after we

604
00:21:41,990 --> 00:21:40,400
undock we'll go out to about 400 feet

605
00:21:44,149 --> 00:21:42,000
we'll do a fly around like we normally

606
00:21:46,070 --> 00:21:44,159
do and then we come up back in front of

607
00:21:47,750 --> 00:21:46,080
the space station again we're then going

608
00:21:50,230 --> 00:21:47,760
to do these series of burns where we're

609
00:21:52,149 --> 00:21:50,240
going to fall behind the space station

610
00:21:54,070 --> 00:21:52,159
you know a couple hundred

611
00:21:57,029 --> 00:21:54,080
thousand feet

612
00:21:59,029 --> 00:21:57,039
and then we're going to come back in

613
00:22:00,870 --> 00:21:59,039

doing a profile that's actually quite

614

00:22:03,029 --> 00:22:00,880

similar to what apollo used for

615

00:22:04,789 --> 00:22:03,039

rendezvous and instead of coming up on

616

00:22:07,669 --> 00:22:04,799

the r bar which is right underneath the

617

00:22:09,669 --> 00:22:07,679

space station or the v bar which is the

618

00:22:12,950 --> 00:22:09,679

direction it's going we're going to come

619

00:22:14,789 --> 00:22:12,960

up on a 45 degree angle from behind

620

00:22:17,270 --> 00:22:14,799

and

621

00:22:19,430 --> 00:22:17,280

this sensor is what was planned to be

622

00:22:20,710 --> 00:22:19,440

used for orion and i imagine if when

623

00:22:22,710 --> 00:22:20,720

orion

624

00:22:24,470 --> 00:22:22,720

one day rendezvous and docks with the

625

00:22:27,190 --> 00:22:24,480

international space station will use

626
00:22:29,909 --> 00:22:27,200
this this storm sensor

627
00:22:31,190 --> 00:22:29,919
and it's just more advanced laser system

628
00:22:32,549 --> 00:22:31,200
cameras

629
00:22:34,470 --> 00:22:32,559
that can give

630
00:22:36,950 --> 00:22:34,480
you know some very accurate

631
00:22:38,630 --> 00:22:36,960
range and range rate data you know it's

632
00:22:40,470 --> 00:22:38,640
just using new technology so we're going

633
00:22:41,590 --> 00:22:40,480
to test that as we come up to the space

634
00:22:44,950 --> 00:22:41,600
station we're only going to get about

635
00:22:47,590 --> 00:22:44,960
600 feet away before we uh eventually

636
00:22:50,149 --> 00:22:47,600
you know do another burn and fall away

637
00:22:52,310 --> 00:22:50,159
and get ready for for re-entry a couple

638
00:22:54,230 --> 00:22:52,320

days later so is the hardware for this

639

00:22:56,230 --> 00:22:54,240

in your payload bay but transmitting a

640

00:22:58,310 --> 00:22:56,240

signal that bounce off the station yeah

641

00:23:00,230 --> 00:22:58,320

exactly so the the hardware sits in the

642

00:23:02,710 --> 00:23:00,240

forward part of the payload bay and then

643

00:23:04,470 --> 00:23:02,720

we have a computer on board and one of

644

00:23:06,230 --> 00:23:04,480

my crew members is going to be operating

645

00:23:09,110 --> 00:23:06,240

storm from this one computer and that's

646

00:23:10,549 --> 00:23:09,120

his only role so instead of your typical

647

00:23:12,630 --> 00:23:10,559

you know four-person team for the

648

00:23:13,990 --> 00:23:12,640

rendezvous we have a fifth person that

649

00:23:17,750 --> 00:23:14,000

their only

650

00:23:19,830 --> 00:23:17,760

to make sure storm is functioning and

651
00:23:21,909 --> 00:23:19,840
goes through its correct modes and that

652
00:23:23,990 --> 00:23:21,919
we're successfully gathering the data

653
00:23:25,430 --> 00:23:24,000
and to handle any any contingencies if

654
00:23:26,870 --> 00:23:25,440
it's not working right

655
00:23:29,029 --> 00:23:26,880
right up to the very last flight of

656
00:23:31,110 --> 00:23:29,039
endeavour and still doing new things we

657
00:23:33,029 --> 00:23:31,120
are right well this is to get to get

658
00:23:34,870 --> 00:23:33,039
ready for what we're doing next

659
00:23:36,310 --> 00:23:34,880
your flight is the last flight of

660
00:23:38,470 --> 00:23:36,320
endeavor

661
00:23:40,310 --> 00:23:38,480
what are your thoughts about this ship's

662
00:23:43,029 --> 00:23:40,320
place in the history of human space

663
00:23:44,549 --> 00:23:43,039

flight well endeavor was the replacement

664

00:23:45,510 --> 00:23:44,559

for challenger after the challenger

665

00:23:47,430 --> 00:23:45,520

accident

666

00:23:50,310 --> 00:23:47,440

uh you know congress appropriated money

667

00:23:52,230 --> 00:23:50,320

to build a new to build endeavor at the

668

00:23:53,350 --> 00:23:52,240

time the thought was well maybe we could

669

00:23:55,029 --> 00:23:53,360

modify

670

00:23:56,230 --> 00:23:55,039

enterprise which was the approach and

671

00:23:57,269 --> 00:23:56,240

landing

672

00:23:59,909 --> 00:23:57,279

test

673

00:24:01,990 --> 00:23:59,919

orbiter and it was decided that

674

00:24:04,070 --> 00:24:02,000

to build a new one would actually be

675

00:24:05,590 --> 00:24:04,080

more cost effective to do build a brand

676
00:24:07,430 --> 00:24:05,600
new orbiter

677
00:24:09,510 --> 00:24:07,440
and that became endeavor there was a

678
00:24:11,029 --> 00:24:09,520
little contest to decide how we're going

679
00:24:12,950 --> 00:24:11,039
to name it

680
00:24:14,710 --> 00:24:12,960
but endeavour's now been flying i think

681
00:24:15,669 --> 00:24:14,720
this is going to be the 25th flight of

682
00:24:18,789 --> 00:24:15,679
endeavor

683
00:24:20,870 --> 00:24:18,799
the 12th to the space station it's been

684
00:24:22,710 --> 00:24:20,880
you know for the it hasn't been around

685
00:24:23,909 --> 00:24:22,720
as long as discovery in atlantis but

686
00:24:25,590 --> 00:24:23,919
it's done some

687
00:24:27,029 --> 00:24:25,600
you know pretty major things did the

688
00:24:28,549 --> 00:24:27,039

first hubble

689

00:24:31,110 --> 00:24:28,559

repair mission

690

00:24:34,149 --> 00:24:31,120

uh and since then you know it's been

691

00:24:37,510 --> 00:24:34,159

back and forth to space station 12 times

692

00:24:40,070 --> 00:24:37,520

so it got its own little slice of the

693

00:24:41,750 --> 00:24:40,080

space shuttle story but it did i've

694

00:24:43,590 --> 00:24:41,760

flown on endeavor before so i'm excited

695

00:24:45,430 --> 00:24:43,600

to fly on it again and my brother's

696

00:24:46,549 --> 00:24:45,440

flown on endeavor how do you feel about

697

00:24:49,990 --> 00:24:46,559

the

698

00:24:52,710 --> 00:24:50,000

history

699

00:24:54,390 --> 00:24:52,720

well the space shuttle was designed to

700

00:24:56,870 --> 00:24:54,400

build the space station that's why it

701
00:24:58,710 --> 00:24:56,880
has this big payload bay

702
00:25:01,510 --> 00:24:58,720
and it never really got to do that for

703
00:25:04,070 --> 00:25:01,520
the first 20 years of its life

704
00:25:06,630 --> 00:25:04,080
and now in the last 10 i mean it's been

705
00:25:07,990 --> 00:25:06,640
critical in building iss maybe without

706
00:25:10,230 --> 00:25:08,000
the space shuttle

707
00:25:11,990 --> 00:25:10,240
international space station would not

708
00:25:14,070 --> 00:25:12,000
be what it is today i mean we would not

709
00:25:15,110 --> 00:25:14,080
have been able to build the space

710
00:25:17,669 --> 00:25:15,120
station

711
00:25:19,190 --> 00:25:17,679
so i think it's it's somewhat fitting

712
00:25:20,470 --> 00:25:19,200
that you know the end of the shuttle

713
00:25:23,029 --> 00:25:20,480

error is the

714

00:25:24,710 --> 00:25:23,039

the beginning of the complete

715

00:25:26,149 --> 00:25:24,720

uh

716

00:25:28,870 --> 00:25:26,159

being finished with the assembly of the

717

00:25:31,269 --> 00:25:28,880

space station and the utilization part

718

00:25:32,630 --> 00:25:31,279

for the next 10 or 15 years

719

00:25:35,510 --> 00:25:32,640

now you're going to be flying this

720

00:25:37,430 --> 00:25:35,520

mission in relative proximity to a

721

00:25:39,029 --> 00:25:37,440

couple of significant anniversaries on

722

00:25:40,630 --> 00:25:39,039

april 12th we've got the 50th

723

00:25:42,230 --> 00:25:40,640

anniversary of the first human space

724

00:25:44,310 --> 00:25:42,240

flight as well as the first flight of

725

00:25:47,190 --> 00:25:44,320

the space shuttle and then on may 5th

726

00:25:49,990 --> 00:25:47,200

the first american space flight 50 years

727

00:25:51,990 --> 00:25:50,000

since alan shepard's first flight

728

00:25:54,149 --> 00:25:52,000

what do you think about the fact that

729

00:25:55,990 --> 00:25:54,159

you are going to be in space around the

730

00:25:57,750 --> 00:25:56,000

time that people are paying attention to

731

00:25:59,510 --> 00:25:57,760

these kind of significant anniversaries

732

00:26:00,710 --> 00:25:59,520

well while we're in space i could tell

733

00:26:01,909 --> 00:26:00,720

you we're probably not going to be

734

00:26:04,149 --> 00:26:01,919

thinking all that much about it because

735

00:26:05,990 --> 00:26:04,159

we're really usually really busy i do

736

00:26:08,230 --> 00:26:06,000

think it would be a pretty neat thing

737

00:26:10,470 --> 00:26:08,240

though if we could launch on april 12th

738

00:26:12,870 --> 00:26:10,480

you know 30 years

739

00:26:14,230 --> 00:26:12,880

since sts-1 you know that would be

740

00:26:16,710 --> 00:26:14,240

something

741

00:26:18,310 --> 00:26:16,720

you know to reflect on

742

00:26:19,990 --> 00:26:18,320

you know the space shuttle again and

743

00:26:22,230 --> 00:26:20,000

what it's meant to the

744

00:26:23,669 --> 00:26:22,240

u.s space program i mean more people

745

00:26:26,470 --> 00:26:23,679

have flown on the space shuttle than any

746

00:26:28,549 --> 00:26:26,480

other spacecraft i mean including soyuz

747

00:26:30,230 --> 00:26:28,559

i mean the ability to fly seven people

748

00:26:32,470 --> 00:26:30,240

into space and to have this huge payload

749

00:26:34,390 --> 00:26:32,480

bay and an airlock and a robotic arm and

750

00:26:36,070 --> 00:26:34,400

to be able to bring payloads home and

751
00:26:37,830 --> 00:26:36,080
land on a runway

752
00:26:39,350 --> 00:26:37,840
i mean this is the most capable

753
00:26:41,990 --> 00:26:39,360
spacecraft

754
00:26:44,470 --> 00:26:42,000
that's ever been built and probably will

755
00:26:46,789 --> 00:26:44,480
be built for a long period of time

756
00:26:48,390 --> 00:26:46,799
and i think you know americans should be

757
00:26:51,190 --> 00:26:48,400
proud that we've you know that we've

758
00:26:52,950 --> 00:26:51,200
been able to to build such a thing and

759
00:26:55,190 --> 00:26:52,960
operate it successfully for such a long

760
00:26:57,029 --> 00:26:55,200
period of time

761
00:27:01,029 --> 00:26:57,039
space flight's changed an awful lot

762
00:27:02,870 --> 00:27:01,039
since yuri gagarin's flight to today

763
00:27:04,470 --> 00:27:02,880

where do you think we're going to be 50

764

00:27:07,269 --> 00:27:04,480

years off in the future

765

00:27:09,590 --> 00:27:07,279

yeah so gagarin flew 50 years ago

766

00:27:11,190 --> 00:27:09,600

today we fly routinely

767

00:27:12,230 --> 00:27:11,200

uh a space shuttle up to the space

768

00:27:14,230 --> 00:27:12,240

station

769

00:27:15,909 --> 00:27:14,240

50 years from now you know it's it's

770

00:27:16,870 --> 00:27:15,919

hard to say it's hard to predict the

771

00:27:19,430 --> 00:27:16,880

future

772

00:27:22,310 --> 00:27:19,440

you know what i hope is that we

773

00:27:24,470 --> 00:27:22,320

you know like 50 years from now like we

774

00:27:27,029 --> 00:27:24,480

you know send orbiter up to the space

775

00:27:29,510 --> 00:27:27,039

station maybe we're sending

776

00:27:30,310 --> 00:27:29,520

people to a base on mars

777

00:27:32,549 --> 00:27:30,320

you know that would be pretty

778

00:27:33,510 --> 00:27:32,559

spectacular if we could do that i also

779

00:27:36,070 --> 00:27:33,520

hope

780

00:27:38,710 --> 00:27:36,080

that you know for intercontinental

781

00:27:40,710 --> 00:27:38,720

travel like we do on an airplane today

782

00:27:42,470 --> 00:27:40,720

then maybe it'll be spacecraft that are

783

00:27:43,590 --> 00:27:42,480

used to get somebody

784

00:27:45,590 --> 00:27:43,600

you know from

785

00:27:48,470 --> 00:27:45,600

new york to tokyo instead of it being an

786

00:27:50,549 --> 00:27:48,480

11 or 12-hour flight you know it's a