
PAO

1
00:00:04,710 --> 00:00:02,790
yes hey everybody uh welcome inside of

2
00:00:06,550 --> 00:00:04,720
mission control houston i'm dan hewitt

3
00:00:08,710 --> 00:00:06,560
one of our nasa public affairs officers

4
00:00:09,830 --> 00:00:08,720
and i'm joined by senate chulan and

5
00:00:11,270 --> 00:00:09,840
really excited to take a bunch of

6
00:00:13,190 --> 00:00:11,280
questions for you real quick about the

7
00:00:15,509 --> 00:00:13,200
room that we're in you can see great big

8
00:00:17,109 --> 00:00:15,519
ground map behind us a bunch of screens

9
00:00:18,710 --> 00:00:17,119
things like that this is the nerve

10
00:00:20,150 --> 00:00:18,720
center this is where the international

11
00:00:21,590 --> 00:00:20,160
space station flight control room is

12
00:00:23,429 --> 00:00:21,600
actually flown from

13
00:00:25,269 --> 00:00:23,439

we have flight controllers a bunch of

14
00:00:28,150 --> 00:00:25,279
different consoles monitoring things

15
00:00:29,830 --> 00:00:28,160
like life support systems the cruise day

16
00:00:31,669 --> 00:00:29,840
you name it they're watching it from

17
00:00:33,270 --> 00:00:31,679
right here in this room

18
00:00:34,630 --> 00:00:33,280
but with that you know we're really

19
00:00:37,590 --> 00:00:34,640
excited to get to your questions so why

20
00:00:39,990 --> 00:00:37,600
don't we go ahead and get started

21
00:00:42,229 --> 00:00:40,000
okay um what language is spoken at the

22
00:00:44,709 --> 00:00:42,239
international space station

23
00:00:47,350 --> 00:00:44,719
well there's various languages spoke

24
00:00:49,110 --> 00:00:47,360
and in the space station because it's a

25
00:00:51,350 --> 00:00:49,120
multi-cultural

26
00:00:53,590 --> 00:00:51,360
environment we have

27
00:00:54,389 --> 00:00:53,600
multiple different astronauts that go

28
00:00:55,110 --> 00:00:54,399
there

29
00:00:59,029 --> 00:00:55,120
and

30
00:01:00,549 --> 00:00:59,039
times depending upon the astronaut

31
00:01:02,630 --> 00:01:00,559
that's there we could actually be

32
00:01:04,869 --> 00:01:02,640
speaking the language that they have

33
00:01:07,350 --> 00:01:04,879
yeah i mean we have right now we have

34
00:01:08,870 --> 00:01:07,360
three russians on board so a lot of

35
00:01:11,190 --> 00:01:08,880
russian and pretty much half the

36
00:01:12,630 --> 00:01:11,200
international space station is russian

37
00:01:14,310 --> 00:01:12,640
and all of our american astronauts

38
00:01:16,070 --> 00:01:14,320

launch on russian vehicles so they all

39
00:01:17,510 --> 00:01:16,080
get pretty proficient in speaking

40
00:01:19,109 --> 00:01:17,520
russian but i mean you also have

41
00:01:21,190 --> 00:01:19,119
japanese astronauts up there all the

42
00:01:23,510 --> 00:01:21,200
time we'll have an italian launching

43
00:01:28,310 --> 00:01:23,520
later this month so you know quite a few

44
00:01:30,149 --> 00:01:28,320
languages going on great question yes

45
00:01:31,590 --> 00:01:30,159
um how extreme is the weight training

46
00:01:33,670 --> 00:01:31,600
that prepares an astronaut to go into

47
00:01:35,190 --> 00:01:33,680
space and i know the other guy was

48
00:01:36,469 --> 00:01:35,200
talking about how you lose muscle mass

49
00:01:37,429 --> 00:01:36,479
in space

50
00:01:39,749 --> 00:01:37,439
well

51
00:01:41,749 --> 00:01:39,759
the astronauts have a training facility

52
00:01:43,510 --> 00:01:41,759
that they actually train in

53
00:01:45,749 --> 00:01:43,520
it's kind of like a gym that you would

54
00:01:47,749 --> 00:01:45,759
go to but it's we've set it aside just

55
00:01:48,950 --> 00:01:47,759
for the astronauts

56
00:01:50,950 --> 00:01:48,960
i teach

57
00:01:52,950 --> 00:01:50,960
exercise myself

58
00:01:55,510 --> 00:01:52,960
i'm actually in the process of learning

59
00:01:58,310 --> 00:01:55,520
taekwondo from dr stan love which is an

60
00:02:01,030 --> 00:01:58,320
astronaut so he uses taekwondo to keep

61
00:02:03,590 --> 00:02:01,040
himself in shape and they also do

62
00:02:06,469 --> 00:02:03,600
different techniques to hone certain

63
00:02:08,229 --> 00:02:06,479

skills that they may need for example

64
00:02:09,990 --> 00:02:08,239
there was just an announcement that was

65
00:02:12,070 --> 00:02:10,000
made that

66
00:02:14,470 --> 00:02:12,080
all of our astronauts are need to be

67
00:02:16,710 --> 00:02:14,480
trained to do an extra vehicular

68
00:02:18,869 --> 00:02:16,720
activity so if that's the case they have

69
00:02:20,790 --> 00:02:18,879
to be super fit to do that that's a very

70
00:02:22,470 --> 00:02:20,800
difficult task to do to be in the suit

71
00:02:25,510 --> 00:02:22,480
and to work and operate

72
00:02:27,110 --> 00:02:25,520
and so there's they do weight training a

73
00:02:29,589 --> 00:02:27,120
lot of them jog

74
00:02:32,390 --> 00:02:29,599
they do very specific training with them

75
00:02:33,990 --> 00:02:32,400
at this gym facility and then they can

76
00:02:35,350 --> 00:02:34,000
pick their own things to do like

77
00:02:37,350 --> 00:02:35,360
taekwondo

78
00:02:39,190 --> 00:02:37,360
yeah and like you would mention uh

79
00:02:40,710 --> 00:02:39,200
losing muscle mass on orbit is actually

80
00:02:42,949 --> 00:02:40,720
a pretty serious problem for the

81
00:02:44,229 --> 00:02:42,959
astronauts when they're up there

82
00:02:45,910 --> 00:02:44,239
i mean when you're up there for six

83
00:02:48,390 --> 00:02:45,920
months at a time you're floating around

84
00:02:50,150 --> 00:02:48,400
you don't use your legs you lose muscle

85
00:02:52,070 --> 00:02:50,160
bone mass so these astronauts actually

86
00:02:55,350 --> 00:02:52,080
work out for about two and a half hours

87
00:02:57,270 --> 00:02:55,360
every single day so we have a number of

88
00:02:58,390 --> 00:02:57,280

weight lifting simulation devices on

89
00:02:59,830 --> 00:02:58,400
board because you can't really pick

90
00:03:01,509 --> 00:02:59,840
something up and lift it because it'll

91
00:03:04,790 --> 00:03:01,519
just float away

92
00:03:06,949 --> 00:03:04,800
so they will actually get strapped into

93
00:03:09,509 --> 00:03:06,959
harnesses to run on treadmills we have a

94
00:03:11,589 --> 00:03:09,519
device called a-red which

95
00:03:12,869 --> 00:03:11,599
kind of simulates like a squat rack and

96
00:03:15,190 --> 00:03:12,879
a number of different devices it

97
00:03:16,949 --> 00:03:15,200
actually uses pneumatic tubes to

98
00:03:18,790 --> 00:03:16,959
simulate weight so

99
00:03:19,750 --> 00:03:18,800
they have a lot of options to them but

100
00:03:21,589 --> 00:03:19,760
they

101
00:03:23,030 --> 00:03:21,599
literally work out every single day just

102
00:03:24,470 --> 00:03:23,040
to combat

103
00:03:26,390 --> 00:03:24,480
what happens when you float around in

104
00:03:28,869 --> 00:03:26,400
microgravity right

105
00:03:29,670 --> 00:03:28,879
next question

106
00:03:31,190 --> 00:03:29,680
uh

107
00:03:34,630 --> 00:03:31,200
what is the coolest thing you've ever

108
00:03:38,470 --> 00:03:36,550
coolest thing well unfortunately neither

109
00:03:41,110 --> 00:03:38,480
of us have been responsible

110
00:03:43,110 --> 00:03:41,120
we have not but to me i'm a spacesuit

111
00:03:45,910 --> 00:03:43,120
engineer so to me the coolest thing i've

112
00:03:48,550 --> 00:03:45,920
ever seen in space is an astronaut going

113
00:03:51,509 --> 00:03:48,560

on eva that's what we call it a

114
00:03:54,630 --> 00:03:51,519
spacewalk so whenever they go out and do

115
00:03:57,589 --> 00:03:54,640
a spacewalk in their spacesuit it's cool

116
00:04:00,070 --> 00:03:57,599
to me because i know that it's hardware

117
00:04:01,990 --> 00:04:00,080
that i've worked on and when i see them

118
00:04:03,190 --> 00:04:02,000
doing the ebas and they're successful

119
00:04:05,270 --> 00:04:03,200
then that knows

120
00:04:06,869 --> 00:04:05,280
that makes me feel successful as well as

121
00:04:08,390 --> 00:04:06,879
an engineer

122
00:04:11,670 --> 00:04:08,400
and i know a lot of the astronauts will

123
00:04:13,670 --> 00:04:11,680
talk about it and you can actually see

124
00:04:15,910 --> 00:04:13,680
over the past couple of over the past

125
00:04:17,590 --> 00:04:15,920
year or so we've gotten some spectacular

126
00:04:19,670 --> 00:04:17,600
videos of the northern lights and the

127
00:04:21,509 --> 00:04:19,680
southern lights from the international

128
00:04:22,950 --> 00:04:21,519
space station and i mean they look

129
00:04:24,870 --> 00:04:22,960
spectacular from the ground they look

130
00:04:26,310 --> 00:04:24,880
even better from space if you actually

131
00:04:28,710 --> 00:04:26,320
if you search for those online you can

132
00:04:30,870 --> 00:04:28,720
find them they're fantastic videos you

133
00:04:32,550 --> 00:04:30,880
can even see hurricanes

134
00:04:35,030 --> 00:04:32,560
so the biggest hurricane we had in

135
00:04:37,590 --> 00:04:35,040
houston was uh hurricane ike

136
00:04:39,670 --> 00:04:37,600
and you they said that they could see it

137
00:04:41,350 --> 00:04:39,680
in space so basically everything that

138
00:04:43,350 --> 00:04:41,360

looks cool down here looks even cooler

139
00:04:45,830 --> 00:04:43,360
from space yes

140
00:04:47,430 --> 00:04:45,840
next question guys

141
00:04:51,110 --> 00:04:47,440
um what is the hardest part about

142
00:04:55,030 --> 00:04:52,390
hardest part about working in mission

143
00:04:57,110 --> 00:04:55,040
control yes i don't actually work in

144
00:04:59,430 --> 00:04:57,120
mission control but i've actually

145
00:05:01,749 --> 00:04:59,440
supported mission control in

146
00:05:04,310 --> 00:05:01,759
what we call a mission evaluation room

147
00:05:06,469 --> 00:05:04,320
and that's where we sit on console as a

148
00:05:08,950 --> 00:05:06,479
technical expert so that if there's

149
00:05:11,590 --> 00:05:08,960
problems occurring with the hardware

150
00:05:14,150 --> 00:05:11,600
then we can be retrieved to

151
00:05:15,909 --> 00:05:14,160
be observant and try to understand

152
00:05:18,550 --> 00:05:15,919
what's going on and help solve the

153
00:05:21,590 --> 00:05:18,560
problem in addition to that of sitting

154
00:05:24,950 --> 00:05:21,600
on console when we do a spacewalk for

155
00:05:27,430 --> 00:05:24,960
example we have a whole team of people

156
00:05:29,510 --> 00:05:27,440
who support

157
00:05:30,310 --> 00:05:29,520
the person on in the mission evaluation

158
00:05:32,469 --> 00:05:30,320
room

159
00:05:34,629 --> 00:05:32,479
in case there's anomalies we have

160
00:05:37,270 --> 00:05:34,639
experts all the way from

161
00:05:40,550 --> 00:05:37,280
we have glove experts we have life

162
00:05:42,070 --> 00:05:40,560
support experts and those people have to

163
00:05:44,550 --> 00:05:42,080

be on call

164
00:05:47,029 --> 00:05:44,560
when we do a spacewalk so

165
00:05:48,070 --> 00:05:47,039
mission control is not just the people

166
00:05:49,749 --> 00:05:48,080
who sit

167
00:05:50,790 --> 00:05:49,759
in the mission control room but it's a

168
00:05:52,629 --> 00:05:50,800
whole

169
00:05:54,950 --> 00:05:52,639
cadre of people

170
00:05:57,029 --> 00:05:54,960
that support them with the technical

171
00:05:59,110 --> 00:05:57,039
expertise to help solve problems if

172
00:06:01,029 --> 00:05:59,120
there's if there are any

173
00:06:02,790 --> 00:06:01,039
and i know one other thing just to throw

174
00:06:03,990 --> 00:06:02,800
in probably the

175
00:06:05,670 --> 00:06:04,000
most difficult thing when you're first

176
00:06:07,749 --> 00:06:05,680
getting used to it is if you can look

177
00:06:09,590 --> 00:06:07,759
just behind me here we have these and

178
00:06:11,510 --> 00:06:09,600
these are our communication devices that

179
00:06:13,990 --> 00:06:11,520
kind of get everybody

180
00:06:16,070 --> 00:06:14,000
locked in and we call them loops and at

181
00:06:17,830 --> 00:06:16,080
any one time you could have four five

182
00:06:19,670 --> 00:06:17,840
six loops punched up and have four or

183
00:06:21,749 --> 00:06:19,680
five conversations going on your head at

184
00:06:23,510 --> 00:06:21,759
the same time so just being able to kind

185
00:06:24,950 --> 00:06:23,520
of keep track of that and think through

186
00:06:27,270 --> 00:06:24,960
everything can be really tough right off

187
00:06:29,510 --> 00:06:27,280
the bat but i mean once you're at it for

188
00:06:31,029 --> 00:06:29,520

a little while it gets a lot easier

189
00:06:32,550 --> 00:06:31,039
right you have to wear headsets like

190
00:06:34,950 --> 00:06:32,560
we're wearing today

191
00:06:37,430 --> 00:06:34,960
to listen to those um

192
00:06:39,909 --> 00:06:37,440
those uh lectures or the information

193
00:06:42,710 --> 00:06:39,919
that's coming across the console

194
00:06:44,790 --> 00:06:42,720
all right next question

195
00:06:47,350 --> 00:06:44,800
can you describe what a day in your life

196
00:06:49,589 --> 00:06:47,360
is like with the careers that you had

197
00:06:52,309 --> 00:06:49,599
a day in life of the career yeah that i

198
00:06:55,830 --> 00:06:52,319
have um well like i said i'm a spacesuit

199
00:06:58,150 --> 00:06:55,840
engineer and as a matter of fact i am i

200
00:07:01,029 --> 00:06:58,160
specialize in life support and my

201
00:07:03,350 --> 00:07:01,039
specific responsibility is i'm in charge

202
00:07:04,629 --> 00:07:03,360
of the hardware to remove the carbon

203
00:07:05,749 --> 00:07:04,639
dioxide

204
00:07:08,230 --> 00:07:05,759
from

205
00:07:10,790 --> 00:07:08,240
the spacesuit so when you're breathing

206
00:07:12,230 --> 00:07:10,800
you're expiring carbon dioxide and that

207
00:07:14,150 --> 00:07:12,240
chemical is

208
00:07:16,710 --> 00:07:14,160
hazardous to your health you cannot

209
00:07:18,790 --> 00:07:16,720
sustain life with it in your suit and

210
00:07:20,629 --> 00:07:18,800
you probably learn that in chemistry

211
00:07:23,510 --> 00:07:20,639
so what we have to do is supply the

212
00:07:26,790 --> 00:07:23,520
oxygen and remove the carbon dioxide and

213
00:07:29,589 --> 00:07:26,800

so the coolest thing is that

214
00:07:31,670 --> 00:07:29,599
for me as an engineer working on a life

215
00:07:32,550 --> 00:07:31,680
support system is that for the first

216
00:07:33,589 --> 00:07:32,560
time

217
00:07:35,589 --> 00:07:33,599
in over

218
00:07:37,830 --> 00:07:35,599
nearly 40 years

219
00:07:41,270 --> 00:07:37,840
we are building a portable life support

220
00:07:44,150 --> 00:07:41,280
system in our laboratory and i i

221
00:07:45,990 --> 00:07:44,160
work in that laboratory to help assemble

222
00:07:47,270 --> 00:07:46,000
the hardware and we're doing it all in

223
00:07:48,869 --> 00:07:47,280
house

224
00:07:49,990 --> 00:07:48,879
in the past we've

225
00:07:51,510 --> 00:07:50,000
the nasa

226
00:07:53,510 --> 00:07:51,520
experts have written the requirements

227
00:07:55,589 --> 00:07:53,520
and we've hired a contractor to actually

228
00:07:58,550 --> 00:07:55,599
build and assemble the hardware

229
00:08:01,029 --> 00:07:58,560
this go around our advanced spacesuit we

230
00:08:04,550 --> 00:08:01,039
are assembling the prototype hardware in

231
00:08:07,589 --> 00:08:04,560
our laboratories and just this past week

232
00:08:10,309 --> 00:08:07,599
we did the final assembly of our very

233
00:08:12,550 --> 00:08:10,319
first prototype packaged portable life

234
00:08:16,230 --> 00:08:12,560
support system we call it a plist and so

235
00:08:17,510 --> 00:08:16,240
the whole team was extremely excited but

236
00:08:21,589 --> 00:08:17,520
my job

237
00:08:23,430 --> 00:08:21,599
i do all kinds of things i help

238
00:08:25,589 --> 00:08:23,440

we can't do everything so we do have

239
00:08:26,390 --> 00:08:25,599
contractors that support us

240
00:08:28,469 --> 00:08:26,400
those are

241
00:08:30,790 --> 00:08:28,479
skills that maybe we don't have and we

242
00:08:32,949 --> 00:08:30,800
help we buy some hardware from them we

243
00:08:34,630 --> 00:08:32,959
bring it in we build some and design

244
00:08:37,190 --> 00:08:34,640
some hardware ourselves

245
00:08:39,430 --> 00:08:37,200
and then we integrate it so we do

246
00:08:40,469 --> 00:08:39,440
systems engineering we do design

247
00:08:43,029 --> 00:08:40,479
engineering

248
00:08:45,670 --> 00:08:43,039
and so we have a whole cad race so i i

249
00:08:47,269 --> 00:08:45,680
have a really cool job

250
00:08:49,509 --> 00:08:47,279
my job is to hear about cool jobs and

251
00:08:50,870 --> 00:08:49,519
then talk about space so really cool

252
00:08:52,550 --> 00:08:50,880
stuff if you guys are ever going to be

253
00:08:54,150 --> 00:08:52,560
interested in you know building space

254
00:08:56,630 --> 00:08:54,160
equipment building the space and stuff

255
00:08:59,509 --> 00:08:56,640
like that think about coming to nasa yes

256
00:09:01,829 --> 00:08:59,519
that's great all right next question

257
00:09:04,070 --> 00:09:01,839
uh were there any missions that you

258
00:09:09,509 --> 00:09:04,080
failed

259
00:09:11,269 --> 00:09:09,519
um yes there have been um one of the

260
00:09:12,949 --> 00:09:11,279
things with space flight is it's

261
00:09:14,870 --> 00:09:12,959
inherently dangerous

262
00:09:16,550 --> 00:09:14,880
i mean when you talk about just a space

263
00:09:18,550 --> 00:09:16,560

launcher talking about strapping human

264
00:09:20,550 --> 00:09:18,560
beings to a controlled explosion sending

265
00:09:22,949 --> 00:09:20,560
the miles up into the air into an

266
00:09:24,630 --> 00:09:22,959
environment that if you were to expose

267
00:09:26,870 --> 00:09:24,640
to it for even a short period of time

268
00:09:28,389 --> 00:09:26,880
you would die so it's inherently one of

269
00:09:29,430 --> 00:09:28,399
the most dangerous things humanity has

270
00:09:31,269 --> 00:09:29,440
ever done

271
00:09:33,829 --> 00:09:31,279
and with that you have to take certain

272
00:09:35,509 --> 00:09:33,839
risks and sometimes things have failed

273
00:09:37,990 --> 00:09:35,519
there were two space shuttle missions

274
00:09:39,430 --> 00:09:38,000
which resulted in a loss of the crew

275
00:09:42,150 --> 00:09:39,440
and then there was a fire back in the

276
00:09:44,550 --> 00:09:42,160
apollo days where a crew was lost during

277
00:09:46,389 --> 00:09:44,560
a testing of the apollo 1 capsule

278
00:09:48,150 --> 00:09:46,399
so it does occur but again that's just

279
00:09:50,470 --> 00:09:48,160
kind of part of what space flight is

280
00:09:53,190 --> 00:09:50,480
it's always going to be dangerous but

281
00:09:55,030 --> 00:09:53,200
the risks always are worth it you know

282
00:09:56,790 --> 00:09:55,040
we're moving humanity out we're

283
00:09:58,230 --> 00:09:56,800
developing amazing technologies we're

284
00:10:00,710 --> 00:09:58,240
doing things that have never been done

285
00:10:02,389 --> 00:10:00,720
before so you have to be willing to kind

286
00:10:04,310 --> 00:10:02,399
of take that

287
00:10:05,829 --> 00:10:04,320
precarious step in that direction if

288
00:10:08,470 --> 00:10:05,839

you're going to be able to accomplish

289
00:10:10,230 --> 00:10:08,480
everything that we've accomplished

290
00:10:12,949 --> 00:10:10,240
yes and i would say

291
00:10:15,829 --> 00:10:12,959
failure for us is uh you know we have to

292
00:10:18,550 --> 00:10:15,839
always be cognizant of the spacewalks

293
00:10:21,670 --> 00:10:18,560
and and monitoring every detail

294
00:10:23,350 --> 00:10:21,680
we've had failures in components on our

295
00:10:26,470 --> 00:10:23,360
portable life support system and in the

296
00:10:27,750 --> 00:10:26,480
suit and we have like i said a cadre of

297
00:10:29,590 --> 00:10:27,760
people that help

298
00:10:31,750 --> 00:10:29,600
try to resolve that on orbit we have

299
00:10:34,069 --> 00:10:31,760
resolved failures on orbit

300
00:10:36,949 --> 00:10:34,079
we have resolved failures while we're

301
00:10:39,269 --> 00:10:36,959
doing spacewalks and so that's why it's

302
00:10:41,430 --> 00:10:39,279
very good to have these experts there to

303
00:10:43,190 --> 00:10:41,440
to help solve the problems we've had

304
00:10:45,190 --> 00:10:43,200
failures where we've had to

305
00:10:47,269 --> 00:10:45,200
terminate the spacewalk and bring the

306
00:10:49,509 --> 00:10:47,279
hardware inside

307
00:10:52,710 --> 00:10:49,519
and then bring it home to

308
00:10:53,910 --> 00:10:52,720
repair it so that we can use it again

309
00:10:56,389 --> 00:10:53,920
yeah

310
00:10:57,910 --> 00:10:56,399
so failures just bring opportunities to

311
00:10:58,710 --> 00:10:57,920
work through and learn something new

312
00:11:05,190 --> 00:10:58,720
right

313
00:11:08,630 --> 00:11:05,200

but what was the hardest part about the

314
00:11:11,430 --> 00:11:10,310
hardest part about marketing sure i can

315
00:11:13,269 --> 00:11:11,440
answer that

316
00:11:15,509 --> 00:11:13,279
well i think one of the things is we

317
00:11:18,550 --> 00:11:15,519
were really just getting started

318
00:11:20,870 --> 00:11:18,560
in the space program um especially for

319
00:11:22,710 --> 00:11:20,880
the suits for the spacesuits it was the

320
00:11:24,870 --> 00:11:22,720
early phases of the spacesuits and we

321
00:11:27,110 --> 00:11:24,880
were transitioning from

322
00:11:29,910 --> 00:11:27,120
the the development of the spacesuits

323
00:11:32,710 --> 00:11:29,920
originated from high altitude aircraft

324
00:11:36,230 --> 00:11:32,720
from the air force and so we took those

325
00:11:37,509 --> 00:11:36,240
and in the mercury program we did some

326
00:11:39,350 --> 00:11:37,519
some

327
00:11:41,430 --> 00:11:39,360
development that

328
00:11:44,150 --> 00:11:41,440
integrated the work that was done

329
00:11:45,190 --> 00:11:44,160
in the high altitude suits and so i

330
00:11:48,150 --> 00:11:45,200
think that

331
00:11:50,470 --> 00:11:48,160
that was for us that was a monumental of

332
00:11:53,030 --> 00:11:50,480
phase for space flight because we

333
00:11:55,430 --> 00:11:53,040
started looking at what we could do

334
00:11:57,590 --> 00:11:55,440
with high altitude suits to integrate it

335
00:11:59,190 --> 00:11:57,600
into spacesuits and i mean really that

336
00:12:00,550 --> 00:11:59,200
kind of applied to the whole program in

337
00:12:03,110 --> 00:12:00,560
general as you said we were just kind of

338
00:12:05,030 --> 00:12:03,120

getting started so i mean at first you

339
00:12:07,030 --> 00:12:05,040
were launching humans on rockets which

340
00:12:09,430 --> 00:12:07,040
up until that point had only launched

341
00:12:11,670 --> 00:12:09,440
missiles and i mean it was really the

342
00:12:13,910 --> 00:12:11,680
first steps that we had ever taken

343
00:12:15,670 --> 00:12:13,920
towards putting human beings in space so

344
00:12:17,269 --> 00:12:15,680
you really want to talk about starting

345
00:12:19,430 --> 00:12:17,279
from scratch you had to figure out how

346
00:12:20,550 --> 00:12:19,440
to do everything so it was really a

347
00:12:22,710 --> 00:12:20,560
great learning

348
00:12:24,870 --> 00:12:22,720
learning step for nasa and just

349
00:12:30,150 --> 00:12:24,880
human spaceflight as a whole

350
00:12:30,160 --> 00:12:34,710
oh are there any plans to explain to iss

351
00:12:40,310 --> 00:12:37,030
i'm sorry we didn't quite catch that

352
00:12:42,230 --> 00:12:40,320
are there any plans to expand the iss

353
00:12:43,110 --> 00:12:42,240
international space station

354
00:12:45,750 --> 00:12:43,120
uh

355
00:12:48,470 --> 00:12:45,760
on the u.s side of everything we're

356
00:12:53,430 --> 00:12:48,480
done uh constructing it uh it's in its

357
00:12:56,470 --> 00:12:55,350
uh well yeah uh and then but the

358
00:12:58,790 --> 00:12:56,480
russians though are planning on

359
00:13:00,470 --> 00:12:58,800
launching a new laboratory module uh

360
00:13:02,710 --> 00:13:00,480
later this year i think in december

361
00:13:04,310 --> 00:13:02,720
right now they're targeting it uh but as

362
00:13:06,470 --> 00:13:04,320
of right now it's pretty much

363
00:13:08,949 --> 00:13:06,480

construction complete the the station

364
00:13:11,269 --> 00:13:08,959
right now weighs almost a million pounds

365
00:13:14,069 --> 00:13:11,279
uh has enough room inside to equate to

366
00:13:15,829 --> 00:13:14,079
basically being a three-bedroom house so

367
00:13:17,590 --> 00:13:15,839
it's very large if you laid it down on a

368
00:13:19,269 --> 00:13:17,600
football field end zone to end zone it

369
00:13:20,870 --> 00:13:19,279
would fill up the whole thing

370
00:13:22,629 --> 00:13:20,880
so it's it's a pretty big spaceship

371
00:13:25,269 --> 00:13:22,639
right now yeah one of the things i would

372
00:13:27,509 --> 00:13:25,279
add is that they have come to us to

373
00:13:30,710 --> 00:13:27,519
evaluate how long the spacesuit would

374
00:13:34,069 --> 00:13:30,720
last on to support this space station

375
00:13:37,190 --> 00:13:34,079
and we have you know good faith that the

376
00:13:39,110 --> 00:13:37,200
that the suit will support it to 2020.

377
00:13:41,030 --> 00:13:39,120
but they've also asked us to look at

378
00:13:41,910 --> 00:13:41,040
what would it be to support it all the

379
00:13:43,430 --> 00:13:41,920
way to

380
00:13:44,470 --> 00:13:43,440
2028.

381
00:13:46,790 --> 00:13:44,480
and so

382
00:13:49,269 --> 00:13:46,800
we have done those calculations and

383
00:13:51,110 --> 00:13:49,279
looked at the hardware and so

384
00:13:53,670 --> 00:13:51,120
i think space station is looking at

385
00:13:56,710 --> 00:13:53,680
really trying to build a brand new

386
00:13:59,189 --> 00:13:56,720
spacesuit and we're funded by advanced

387
00:14:01,110 --> 00:13:59,199
development to do exploration and so we

388
00:14:03,590 --> 00:14:01,120

are just now really collaborating with

389
00:14:05,829 --> 00:14:03,600
station on an advanced suit that they

390
00:14:07,829 --> 00:14:05,839
may be able to synergize some of the

391
00:14:09,670 --> 00:14:07,839
learning that we've had on the advanced

392
00:14:12,389 --> 00:14:09,680
development suit that might be able to

393
00:14:16,470 --> 00:14:12,399
carry over into a space station suit in

394
00:14:19,590 --> 00:14:16,480
case we do extend the station longer

395
00:14:21,670 --> 00:14:19,600
all right great question

396
00:14:25,750 --> 00:14:21,680
uh what has been the most failed mission

397
00:14:31,110 --> 00:14:27,670
most failed mission mission control is

398
00:14:35,430 --> 00:14:32,710
um i mean

399
00:14:37,110 --> 00:14:35,440
you could almost say

400
00:14:38,470 --> 00:14:37,120
i'm sorry was it the most failed mission

401
00:14:41,350 --> 00:14:38,480
that mission control has experienced

402
00:14:44,230 --> 00:14:41,360
just want to clarify

403
00:14:47,430 --> 00:14:44,240
okay um well you could probably talk

404
00:14:48,790 --> 00:14:47,440
about apollo 13 which i mean that was

405
00:14:50,710 --> 00:14:48,800
not only of

406
00:14:52,150 --> 00:14:50,720
what started off as a failure but

407
00:14:54,629 --> 00:14:52,160
eventually turned into one of nasa's

408
00:14:56,389 --> 00:14:54,639
finest moments i mean you had astronauts

409
00:14:58,550 --> 00:14:56,399
being sent on their way to the moon a

410
00:15:00,389 --> 00:14:58,560
quarter of a million miles away an

411
00:15:02,310 --> 00:15:00,399
explosion happened in one of the oxygen

412
00:15:04,470 --> 00:15:02,320
tanks you literally had a huge chunk of

413
00:15:06,389 --> 00:15:04,480

the spacecraft blow off into space while

414
00:15:08,790 --> 00:15:06,399
they're traveling almost 20 000 miles

415
00:15:11,269 --> 00:15:08,800
away from earth and then mission control

416
00:15:12,790 --> 00:15:11,279
worked through to come up with a number

417
00:15:15,189 --> 00:15:12,800
of

418
00:15:16,629 --> 00:15:15,199
workarounds to do things like removing

419
00:15:18,790 --> 00:15:16,639
carbon dioxide from the breathing

420
00:15:20,550 --> 00:15:18,800
atmosphere which is so important i mean

421
00:15:22,629 --> 00:15:20,560
they really had to work to basically

422
00:15:23,750 --> 00:15:22,639
bring these astronauts home

423
00:15:26,150 --> 00:15:23,760
on

424
00:15:27,189 --> 00:15:26,160
no power no breathing air no resupply no

425
00:15:29,430 --> 00:15:27,199
anything

426
00:15:31,269 --> 00:15:29,440
and so that was a very very difficult

427
00:15:33,189 --> 00:15:31,279
mission but it ended up being again one

428
00:15:34,069 --> 00:15:33,199
of nasa's finest hours

429
00:15:39,509 --> 00:15:34,079
yes

430
00:15:43,189 --> 00:15:41,509
what has been the most important mission

431
00:15:45,110 --> 00:15:43,199
over the years on the international

432
00:15:47,509 --> 00:15:45,120
space station

433
00:15:50,230 --> 00:15:47,519
poor most important mission on board the

434
00:15:52,629 --> 00:15:50,240
international space station

435
00:15:54,310 --> 00:15:52,639
i mean that stuff um basically the the

436
00:15:56,470 --> 00:15:54,320
whole assembly of the international

437
00:15:58,790 --> 00:15:56,480
space station yeah like you uh just

438
00:16:00,629 --> 00:15:58,800

mentioned was probably up there uh

439
00:16:02,069 --> 00:16:00,639
this is something that again has never

440
00:16:04,230 --> 00:16:02,079
been accomplished in the history of

441
00:16:06,949 --> 00:16:04,240
mankind we built the space station piece

442
00:16:09,269 --> 00:16:06,959
by piece uh over a decade

443
00:16:10,870 --> 00:16:09,279
i mean you're launching parts that are

444
00:16:13,269 --> 00:16:10,880
that were constructed

445
00:16:14,710 --> 00:16:13,279
all across the globe by different space

446
00:16:16,230 --> 00:16:14,720
agencies from different companies and

447
00:16:18,389 --> 00:16:16,240
you managed to work

448
00:16:20,470 --> 00:16:18,399
with all of those various national

449
00:16:23,030 --> 00:16:20,480
governments and contractors and

450
00:16:26,230 --> 00:16:23,040
companies things like that to build this

451
00:16:29,509 --> 00:16:26,240
massive space complex which is manned

452
00:16:31,269 --> 00:16:29,519
24 7 365 by astronauts that crew from

453
00:16:33,590 --> 00:16:31,279
all over the world

454
00:16:35,110 --> 00:16:33,600
so i would basically say assembly and

455
00:16:36,790 --> 00:16:35,120
that was kind of

456
00:16:37,990 --> 00:16:36,800
an amalgamation of a bunch of different

457
00:16:40,069 --> 00:16:38,000
missions

458
00:16:41,030 --> 00:16:40,079
but that the assembly as a mission as a

459
00:16:42,790 --> 00:16:41,040
whole

460
00:16:44,550 --> 00:16:42,800
was probably the most difficult and it

461
00:16:46,710 --> 00:16:44,560
was very complicated at the beginning

462
00:16:49,670 --> 00:16:46,720
because the configurations

463
00:16:51,269 --> 00:16:49,680

changed over the years in the planning

464
00:16:53,110 --> 00:16:51,279
and so to get it going was very

465
00:16:54,870 --> 00:16:53,120
difficult too

466
00:16:57,030 --> 00:16:54,880
and then once we got it assembled

467
00:16:59,269 --> 00:16:57,040
everyone's very proud of that what we

468
00:17:03,990 --> 00:16:59,279
have in space right now

469
00:17:07,350 --> 00:17:05,189
um

470
00:17:09,510 --> 00:17:07,360
what is the future of the international

471
00:17:11,429 --> 00:17:09,520
space station and how long will it be

472
00:17:13,909 --> 00:17:11,439
functioning

473
00:17:15,909 --> 00:17:13,919
i think i mentioned that a little bit um

474
00:17:18,470 --> 00:17:15,919
i don't think that they

475
00:17:20,390 --> 00:17:18,480
they are assessing it right now how long

476
00:17:22,470 --> 00:17:20,400
that it could potentially last and

477
00:17:24,309 --> 00:17:22,480
they're evaluating all the different

478
00:17:27,909 --> 00:17:24,319
components that help make it operate

479
00:17:30,230 --> 00:17:27,919
properly like for example the spacesuits

480
00:17:31,750 --> 00:17:30,240
like i said we were we're evaluating how

481
00:17:34,150 --> 00:17:31,760
long the spacesuit could last because

482
00:17:36,630 --> 00:17:34,160
it's a it's a critical component

483
00:17:38,150 --> 00:17:36,640
in keeping the space station alive in

484
00:17:39,750 --> 00:17:38,160
case they have problems that they have

485
00:17:42,950 --> 00:17:39,760
to go out and fix

486
00:17:44,710 --> 00:17:42,960
so they have to evaluate every

487
00:17:45,590 --> 00:17:44,720
and they're really in evaluation of that

488
00:17:48,470 --> 00:17:45,600

now

489
00:17:50,870 --> 00:17:48,480
so trying to make a decision on how long

490
00:17:53,029 --> 00:17:50,880
it really can go yeah right now we know

491
00:17:54,710 --> 00:17:53,039
at least until 2020 but like you were

492
00:17:57,270 --> 00:17:54,720
saying a lot of the systems on board are

493
00:17:59,510 --> 00:17:57,280
certified to last until 2028 and even

494
00:18:01,590 --> 00:17:59,520
some even longer so it could be up there

495
00:18:04,549 --> 00:18:01,600
for quite some time

496
00:18:07,270 --> 00:18:05,590
uh

497
00:18:09,830 --> 00:18:07,280
will the new spacesuits be easier to put

498
00:18:12,070 --> 00:18:09,840
on and take off

499
00:18:15,029 --> 00:18:12,080
new spacesuits be easier to take on and

500
00:18:17,830 --> 00:18:15,039
or put on and take off i think so um the

501
00:18:20,230 --> 00:18:17,840
new spacesuits we have them designed so

502
00:18:22,950 --> 00:18:20,240
they can open up in the back

503
00:18:25,350 --> 00:18:22,960
uh versus opening up in the

504
00:18:27,590 --> 00:18:25,360
um where you climb in

505
00:18:30,070 --> 00:18:27,600
like put a shirt on you would climb in

506
00:18:32,310 --> 00:18:30,080
you you get into it you put a shirt on

507
00:18:35,029 --> 00:18:32,320
and then you pull up your

508
00:18:36,870 --> 00:18:35,039
your we call them the upper torso for

509
00:18:39,110 --> 00:18:36,880
the top and the lower torso for the

510
00:18:42,390 --> 00:18:39,120
bottom and the hard part about that is

511
00:18:45,110 --> 00:18:42,400
you actually have to have another

512
00:18:47,590 --> 00:18:45,120
astronaut to actually help you assemble

513
00:18:49,029 --> 00:18:47,600

the hardware when you're in space so you

514
00:18:51,110 --> 00:18:49,039
always have to have the person getting

515
00:18:53,190 --> 00:18:51,120
in it and the person helping the new

516
00:18:56,470 --> 00:18:53,200
spacesuit will work a lot different than

517
00:18:59,190 --> 00:18:56,480
that it will be a contiguous suit

518
00:19:00,789 --> 00:18:59,200
on the on the soft side of the suit and

519
00:19:02,630 --> 00:19:00,799
then the portable life support system

520
00:19:03,669 --> 00:19:02,640
will still be on the back

521
00:19:09,669 --> 00:19:03,679
like the

522
00:19:12,390 --> 00:19:09,679
but the hatch will open from you know

523
00:19:14,390 --> 00:19:12,400
it'll be on your back and it will open

524
00:19:15,909 --> 00:19:14,400
up just like a door

525
00:19:17,909 --> 00:19:15,919
and the portable life support system

526
00:19:20,549 --> 00:19:17,919
will be in that door

527
00:19:23,350 --> 00:19:20,559
and you can actually crawl into the

528
00:19:25,909 --> 00:19:23,360
spacesuit yourself now there will be

529
00:19:28,390 --> 00:19:25,919
some manipulation that someone will have

530
00:19:30,950 --> 00:19:28,400
to do on an astronaut will have to do on

531
00:19:33,270 --> 00:19:30,960
the inside but it won't be as as

532
00:19:34,950 --> 00:19:33,280
rigorous as it is today so it should be

533
00:19:36,789 --> 00:19:34,960
a lot easier

534
00:19:39,029 --> 00:19:36,799
great question yeah and i have some i

535
00:19:40,870 --> 00:19:39,039
have examples of some spacesuits if you

536
00:19:43,430 --> 00:19:40,880
want to if you'd like to take a look at

537
00:19:45,430 --> 00:19:43,440
them um since we're on the topic of

538
00:19:47,990 --> 00:19:45,440

spacesuits i brought some things with me

539
00:19:51,590 --> 00:19:48,000
today this is my the coolest piece of

540
00:19:53,990 --> 00:19:51,600
hardware that we use in space and i like

541
00:19:55,110 --> 00:19:54,000
it because i can say it's the astronauts

542
00:19:58,150 --> 00:19:55,120
underwear

543
00:20:01,110 --> 00:19:58,160
so it is a if you can take if you can

544
00:20:05,669 --> 00:20:03,110
and then you if you you

545
00:20:08,149 --> 00:20:05,679
you can't see it probably from your

546
00:20:09,830 --> 00:20:08,159
you see there's a crisscross in the back

547
00:20:12,390 --> 00:20:09,840
that's a ventilation

548
00:20:14,390 --> 00:20:12,400
tree and that ventilation tree allows

549
00:20:17,029 --> 00:20:14,400
ventilation to go through the suit to

550
00:20:19,669 --> 00:20:17,039
help keep the astronaut cool but also we

551
00:20:20,470 --> 00:20:19,679
have tubes if you see these tubes right

552
00:20:22,870 --> 00:20:20,480
here

553
00:20:25,750 --> 00:20:22,880
they run in little lines that are

554
00:20:29,029 --> 00:20:25,760
threaded throughout the entire structure

555
00:20:30,630 --> 00:20:29,039
of the undergarment we call it the lcvg

556
00:20:33,270 --> 00:20:30,640
the liquid cooling and ventilation

557
00:20:35,190 --> 00:20:33,280
garment and water actually goes through

558
00:20:37,669 --> 00:20:35,200
these tubes to help keep the astronaut

559
00:20:39,830 --> 00:20:37,679
cool because it's very can get very warm

560
00:20:42,789 --> 00:20:39,840
in the suit when you're doing work

561
00:20:45,430 --> 00:20:42,799
say out on space station and that water

562
00:20:47,830 --> 00:20:45,440
circulates in these tubes and it helps

563
00:20:49,029 --> 00:20:47,840

keep the skin of the astronaut

564
00:20:52,789 --> 00:20:49,039
cool

565
00:20:54,870 --> 00:20:52,799
and i have some let me see i have a

566
00:21:01,350 --> 00:20:54,880
glove

567
00:21:03,430 --> 00:21:01,360
it actually

568
00:21:06,149 --> 00:21:03,440
is woven

569
00:21:09,029 --> 00:21:06,159
to help size it for each of the

570
00:21:10,390 --> 00:21:09,039
astronauts so you can see that

571
00:21:12,710 --> 00:21:10,400
and there's also

572
00:21:14,950 --> 00:21:12,720
there's also some configurations in it

573
00:21:17,110 --> 00:21:14,960
that help keep the strength of it up as

574
00:21:19,590 --> 00:21:17,120
the astronaut works

575
00:21:23,270 --> 00:21:19,600
so it's very very uniquely it the the

576
00:21:26,710 --> 00:21:23,280
glove is the only piece of the suit that

577
00:21:28,630 --> 00:21:26,720
is specifically sized for the astronaut

578
00:21:30,710 --> 00:21:28,640
and and if you ask

579
00:21:33,830 --> 00:21:30,720
a lot of our engineers they might say

580
00:21:36,390 --> 00:21:33,840
the glove is the most important part

581
00:21:40,310 --> 00:21:36,400
because they're always using their hands

582
00:21:41,990 --> 00:21:40,320
and the gloved hand to do work in space

583
00:21:43,590 --> 00:21:42,000
very cool stuff and i mean that's all

584
00:21:45,510 --> 00:21:43,600
the inside you never really get to see

585
00:21:48,549 --> 00:21:45,520
the inside of these spaces right

586
00:21:50,630 --> 00:21:48,559
all right next question

587
00:21:53,190 --> 00:21:50,640
okay what rockets are presently being

588
00:21:55,430 --> 00:21:53,200

developed by nasa

589
00:21:57,510 --> 00:21:55,440
well nasa is currently developing what's

590
00:21:59,270 --> 00:21:57,520
known as the space launch system it's

591
00:22:02,230 --> 00:21:59,280
going to be the largest most powerful

592
00:22:04,470 --> 00:22:02,240
rocket ever built by humanity

593
00:22:07,270 --> 00:22:04,480
that's being built so and it's good it's

594
00:22:09,110 --> 00:22:07,280
what's categorized as a heavy lift so

595
00:22:11,669 --> 00:22:09,120
when you want to send

596
00:22:13,669 --> 00:22:11,679
people large payloads

597
00:22:16,710 --> 00:22:13,679
things like a habitat to a place like

598
00:22:17,909 --> 00:22:16,720
mars you need a lot more power to escape

599
00:22:19,510 --> 00:22:17,919
what's known as the gravity well

600
00:22:21,430 --> 00:22:19,520
basically gravity pulling you back into

601
00:22:23,110 --> 00:22:21,440
earth and so the more weight you want to

602
00:22:25,430 --> 00:22:23,120
send the more powerful your rocket has

603
00:22:27,590 --> 00:22:25,440
to be so nasa is developing this space

604
00:22:29,430 --> 00:22:27,600
launch system we call it sls because we

605
00:22:31,430 --> 00:22:29,440
love acronyms

606
00:22:33,430 --> 00:22:31,440
we're developing that to be able to

607
00:22:35,190 --> 00:22:33,440
basically send anything we want we can

608
00:22:36,470 --> 00:22:35,200
send it to mars and i mean that's going

609
00:22:37,750 --> 00:22:36,480
to be the rocket that's going to send

610
00:22:39,830 --> 00:22:37,760
astronauts

611
00:22:41,350 --> 00:22:39,840
once we start moving out beyond low

612
00:22:42,870 --> 00:22:41,360
earth orbit again it's going to be

613
00:22:45,669 --> 00:22:42,880

sending astronauts farther than we've

614
00:22:46,630 --> 00:22:45,679
ever gone before

615
00:22:52,830 --> 00:22:46,640
great question all right looks like

616
00:22:55,909 --> 00:22:55,029
okay right

617
00:23:00,470 --> 00:22:55,919
uh

618
00:23:01,590 --> 00:23:00,480
the apollo missions

619
00:23:03,430 --> 00:23:01,600
it's actually changed pretty

620
00:23:05,669 --> 00:23:03,440
significantly i mean if you look behind

621
00:23:07,350 --> 00:23:05,679
me you'll notice the computer screen is

622
00:23:09,029 --> 00:23:07,360
just kind of like a regular

623
00:23:11,270 --> 00:23:09,039
lcd monitor

624
00:23:13,830 --> 00:23:11,280
back in the apollo days you had these

625
00:23:17,110 --> 00:23:13,840
massive massive console systems that

626
00:23:20,149 --> 00:23:17,120
used cathode ray tubes and mccanna and

627
00:23:22,310 --> 00:23:20,159
they actually had their email system

628
00:23:23,669 --> 00:23:22,320
i was literally just a tube that you

629
00:23:25,430 --> 00:23:23,679
stuck through went down to a mail room

630
00:23:27,750 --> 00:23:25,440
and they would send that to each other

631
00:23:29,590 --> 00:23:27,760
so it's changed drastically as we get

632
00:23:31,029 --> 00:23:29,600
better computers you know we get better

633
00:23:33,510 --> 00:23:31,039
systems

634
00:23:35,029 --> 00:23:33,520
but it's it's changed quite a bit and

635
00:23:37,430 --> 00:23:35,039
actually we're building a new mission

636
00:23:38,710 --> 00:23:37,440
control center which will look even

637
00:23:40,870 --> 00:23:38,720
more different than this one they're

638
00:23:42,070 --> 00:23:40,880

doing away with the great big consoles

639
00:23:43,590 --> 00:23:42,080
and it's basically just going to be a

640
00:23:45,990 --> 00:23:43,600
bunch of computer screens that are going

641
00:23:48,070 --> 00:23:46,000
to be running all of our vehicles

642
00:23:49,510 --> 00:23:48,080
all right well i think that's all the

643
00:23:51,350 --> 00:23:49,520
time that we have you guys had some

644
00:23:52,710 --> 00:23:51,360
great questions i hope we were able to

645
00:23:54,390 --> 00:23:52,720
teach you a little bit

646
00:23:56,470 --> 00:23:54,400
uh but thanks for stopping by mission

647
00:23:59,190 --> 00:23:56,480
control and um hope to see some of you

648
00:24:01,190 --> 00:23:59,200
as astronauts in the future absolutely

649
00:24:04,149 --> 00:24:01,200
so good to hear from you guys from

650
00:24:07,750 --> 00:24:04,159
naperville i'm a illinoisian myself i

651
00:24:10,310 --> 00:24:07,760
went to siu and so i volunteer for this

652
00:24:12,789 --> 00:24:10,320
effort today because you guys from were

653
00:24:15,830 --> 00:24:12,799
from illinois and hope to see you guys

654
00:24:18,549 --> 00:24:15,840
pursue engineering or scientific degrees