
PAO

1
00:00:06,309 --> 00:00:04,390
hey everybody uh welcome inside of

2
00:00:08,150 --> 00:00:06,319
mission control houston i'm dan hewitt

3
00:00:10,549 --> 00:00:08,160
one of our nasa public affairs officers

4
00:00:11,990 --> 00:00:10,559
i'm joined by senator chulan and real

5
00:00:13,509 --> 00:00:12,000
excited to take a bunch of questions for

6
00:00:15,350 --> 00:00:13,519
you real quick about the room that we're

7
00:00:17,510 --> 00:00:15,360
in you can see great big ground map

8
00:00:19,590 --> 00:00:17,520
behind us a bunch of screens things like

9
00:00:20,870 --> 00:00:19,600
that this is the nerve center this is

10
00:00:22,470 --> 00:00:20,880
where the international space station

11
00:00:24,950 --> 00:00:22,480
flight control room is actually flown

12
00:00:26,870 --> 00:00:24,960
from we have flight controllers a bunch

13
00:00:29,750 --> 00:00:26,880

of different consoles monitoring things

14
00:00:31,429 --> 00:00:29,760
like life support systems the cruise day

15
00:00:33,030 --> 00:00:31,439
you name it they're watching it from

16
00:00:34,870 --> 00:00:33,040
right here in this room

17
00:00:36,229 --> 00:00:34,880
uh but with that you know we're really

18
00:00:39,190 --> 00:00:36,239
excited to get to your questions so why

19
00:00:41,670 --> 00:00:39,200
don't we go ahead and get started

20
00:00:44,229 --> 00:00:41,680
okay um what language is spoken at the

21
00:00:46,310 --> 00:00:44,239
international space station well there's

22
00:00:48,950 --> 00:00:46,320
various languages spoke

23
00:00:50,709 --> 00:00:48,960
and in the space station because it's a

24
00:00:52,950 --> 00:00:50,719
multi-cultural

25
00:00:55,189 --> 00:00:52,960
environment we have

26
00:00:55,990 --> 00:00:55,199
multiple different astronauts that go

27
00:00:56,709 --> 00:00:56,000
there

28
00:01:00,630 --> 00:00:56,719
and

29
00:01:02,229 --> 00:01:00,640
times depending upon the astronauts

30
00:01:04,229 --> 00:01:02,239
that's there we could actually be

31
00:01:06,469 --> 00:01:04,239
speaking the language that they have

32
00:01:08,950 --> 00:01:06,479
yeah i mean we have right now we have

33
00:01:10,550 --> 00:01:08,960
three russians on board so a lot of

34
00:01:12,789 --> 00:01:10,560
russian and pretty much half the

35
00:01:14,230 --> 00:01:12,799
international space station is russian

36
00:01:15,910 --> 00:01:14,240
and all of our american astronauts

37
00:01:17,749 --> 00:01:15,920
launch on russian vehicles so they all

38
00:01:19,190 --> 00:01:17,759

get pretty proficient in speaking

39
00:01:20,710 --> 00:01:19,200
russian but i mean you also have

40
00:01:22,789 --> 00:01:20,720
japanese astronauts up there all the

41
00:01:25,109 --> 00:01:22,799
time we'll have an italian launching

42
00:01:27,670 --> 00:01:25,119
later this month so you know quite a few

43
00:01:29,910 --> 00:01:27,680
languages going on great question

44
00:01:31,830 --> 00:01:29,920
yes

45
00:01:33,190 --> 00:01:31,840
um how extreme is the weight training

46
00:01:35,270 --> 00:01:33,200
that prepares an astronaut to go into

47
00:01:36,789 --> 00:01:35,280
space and i know the other guy was

48
00:01:38,069 --> 00:01:36,799
talking about how you lose muscle mass

49
00:01:40,789 --> 00:01:38,079
in space

50
00:01:43,429 --> 00:01:40,799
well um the astronauts have a training

51
00:01:45,109 --> 00:01:43,439
facility that they actually train in um

52
00:01:47,350 --> 00:01:45,119
it's kind of like a gym that you would

53
00:01:50,550 --> 00:01:47,360
go to but it's we've set it aside just

54
00:01:52,550 --> 00:01:50,560
for the astronauts um i teach

55
00:01:54,630 --> 00:01:52,560
exercise myself

56
00:01:57,109 --> 00:01:54,640
i'm actually in the process of learning

57
00:01:59,990 --> 00:01:57,119
taekwondo from dr stan love which is an

58
00:02:02,630 --> 00:02:00,000
astronaut so he uses taekwondo to keep

59
00:02:05,190 --> 00:02:02,640
himself in shape and they also do

60
00:02:08,070 --> 00:02:05,200
different techniques to hone certain

61
00:02:09,910 --> 00:02:08,080
skills that they may need for example

62
00:02:11,589 --> 00:02:09,920
there was just an announcement that was

63
00:02:13,750 --> 00:02:11,599

made that

64
00:02:16,070 --> 00:02:13,760
all of our astronauts are need to be

65
00:02:18,309 --> 00:02:16,080
trained to do an extra vehicular

66
00:02:20,470 --> 00:02:18,319
activity so if that's the case they have

67
00:02:22,390 --> 00:02:20,480
to be super fit to do that that's a very

68
00:02:24,070 --> 00:02:22,400
difficult task to do to be in the suit

69
00:02:27,110 --> 00:02:24,080
and to work and operate

70
00:02:28,710 --> 00:02:27,120
and so there's they do weight training a

71
00:02:31,190 --> 00:02:28,720
lot of them jog

72
00:02:34,070 --> 00:02:31,200
they do very specific training with them

73
00:02:35,589 --> 00:02:34,080
at this gym facility and then they can

74
00:02:37,030 --> 00:02:35,599
pick their own things to do like

75
00:02:39,350 --> 00:02:37,040
taekwondo

76
00:02:40,949 --> 00:02:39,360
yeah and like you had mentioned losing

77
00:02:42,309 --> 00:02:40,959
muscle mass on orbit is actually a

78
00:02:44,550 --> 00:02:42,319
pretty serious problem for the

79
00:02:45,910 --> 00:02:44,560
astronauts when they're up there

80
00:02:47,509 --> 00:02:45,920
i mean when you're up there for six

81
00:02:49,990 --> 00:02:47,519
months at a time you're floating around

82
00:02:52,070 --> 00:02:50,000
you don't use your legs you lose muscle

83
00:02:54,070 --> 00:02:52,080
bone mass these astronauts actually work

84
00:02:56,949 --> 00:02:54,080
out for about two and a half hours every

85
00:02:58,869 --> 00:02:56,959
single day so we have a number of

86
00:03:00,470 --> 00:02:58,879
weight lifting simulation devices on

87
00:03:02,070 --> 00:03:00,480
board you can't really pick something up

88
00:03:03,110 --> 00:03:02,080

and lift it because it'll just float

89
00:03:05,670 --> 00:03:03,120
away

90
00:03:07,509 --> 00:03:05,680
so they will actually

91
00:03:09,910 --> 00:03:07,519
get strapped into harnesses to run on

92
00:03:11,110 --> 00:03:09,920
treadmills we have a device called a red

93
00:03:13,190 --> 00:03:11,120
which

94
00:03:14,470 --> 00:03:13,200
kind of simulates like a squat rack and

95
00:03:16,790 --> 00:03:14,480
a number of different devices it

96
00:03:18,630 --> 00:03:16,800
actually uses pneumatic tubes to

97
00:03:20,390 --> 00:03:18,640
simulate weight so

98
00:03:21,350 --> 00:03:20,400
they have a lot of options to them but

99
00:03:23,190 --> 00:03:21,360
they

100
00:03:24,630 --> 00:03:23,200
literally work out every single day just

101
00:03:26,070 --> 00:03:24,640
to combat

102
00:03:27,990 --> 00:03:26,080
what happens when you float around in

103
00:03:30,550 --> 00:03:28,000
microgravity right

104
00:03:31,350 --> 00:03:30,560
next question

105
00:03:32,789 --> 00:03:31,360
uh

106
00:03:36,229 --> 00:03:32,799
what is the coolest thing you've ever

107
00:03:40,149 --> 00:03:38,149
coolest thing well unfortunately neither

108
00:03:42,710 --> 00:03:40,159
of us have been responsible

109
00:03:44,789 --> 00:03:42,720
we have not but to me i'm a spacesuit

110
00:03:47,589 --> 00:03:44,799
engineer so to me the coolest thing i've

111
00:03:50,149 --> 00:03:47,599
ever seen in space is an astronaut going

112
00:03:53,110 --> 00:03:50,159
on eva that's what we call it a

113
00:03:56,229 --> 00:03:53,120

spacewalk so whenever they go out and do

114
00:03:59,190 --> 00:03:56,239
a spacewalk in their spacesuit it's cool

115
00:04:01,750 --> 00:03:59,200
to me because i know that it's hardware

116
00:04:03,589 --> 00:04:01,760
that i've worked on and when i see them

117
00:04:04,789 --> 00:04:03,599
doing the ebas and they're successful

118
00:04:06,949 --> 00:04:04,799
then that knows

119
00:04:08,470 --> 00:04:06,959
that makes me feel successful as well as

120
00:04:09,990 --> 00:04:08,480
an engineer

121
00:04:13,350 --> 00:04:10,000
and i know a lot of the astronauts will

122
00:04:15,270 --> 00:04:13,360
talk about it and you can actually see

123
00:04:17,509 --> 00:04:15,280
over the past couple of over the past

124
00:04:19,189 --> 00:04:17,519
year or so we've gotten some spectacular

125
00:04:21,270 --> 00:04:19,199
videos of the northern lights and the

126
00:04:23,110 --> 00:04:21,280
southern lights from the international

127
00:04:24,550 --> 00:04:23,120
space station and i mean they look

128
00:04:26,550 --> 00:04:24,560
spectacular from the ground they look

129
00:04:27,990 --> 00:04:26,560
even better from space if you actually

130
00:04:30,310 --> 00:04:28,000
if you search for those online you can

131
00:04:32,550 --> 00:04:30,320
find them they're fantastic videos you

132
00:04:34,150 --> 00:04:32,560
can even see hurricanes

133
00:04:36,629 --> 00:04:34,160
so the biggest hurricane we had in

134
00:04:39,189 --> 00:04:36,639
houston was uh hurricane ike

135
00:04:41,350 --> 00:04:39,199
and you they said that they could see it

136
00:04:43,030 --> 00:04:41,360
in space so basically everything that

137
00:04:45,030 --> 00:04:43,040
looks cool down here looks even cooler

138
00:04:47,430 --> 00:04:45,040

from space yes

139
00:04:49,030 --> 00:04:47,440
next question guys

140
00:04:52,790 --> 00:04:49,040
um what is the hardest part about

141
00:04:56,629 --> 00:04:53,990
hardest part about working in mission

142
00:04:58,710 --> 00:04:56,639
control yes i don't actually work in

143
00:05:01,029 --> 00:04:58,720
mission control but i've actually

144
00:05:03,350 --> 00:05:01,039
supported mission control in

145
00:05:05,909 --> 00:05:03,360
what we call a mission evaluation room

146
00:05:08,070 --> 00:05:05,919
and that's where we sit on console as a

147
00:05:10,550 --> 00:05:08,080
technical expert so that if there's

148
00:05:13,189 --> 00:05:10,560
problems occurring with the hardware

149
00:05:15,830 --> 00:05:13,199
then we can be retrieved to

150
00:05:17,510 --> 00:05:15,840
be observant and try to understand

151
00:05:18,469 --> 00:05:17,520
what's going on and help solve the

152
00:05:20,310 --> 00:05:18,479
problem

153
00:05:23,189 --> 00:05:20,320
in addition to that of sitting on

154
00:05:26,629 --> 00:05:23,199
console when we do a space walk for

155
00:05:29,029 --> 00:05:26,639
example we have a whole team of people

156
00:05:31,110 --> 00:05:29,039
who support

157
00:05:31,909 --> 00:05:31,120
the person on in the mission evaluation

158
00:05:34,070 --> 00:05:31,919
room

159
00:05:36,230 --> 00:05:34,080
in case there's anomalies we have

160
00:05:38,870 --> 00:05:36,240
experts all the way from

161
00:05:41,749 --> 00:05:38,880
we have glove experts we have life

162
00:05:43,670 --> 00:05:41,759
support experts and those people

163
00:05:46,150 --> 00:05:43,680

have to be on call

164
00:05:48,629 --> 00:05:46,160
when we do a spacewalk so

165
00:05:51,029 --> 00:05:48,639
mission control is not just the people

166
00:05:52,469 --> 00:05:51,039
who sit in the mission control room but

167
00:05:54,230 --> 00:05:52,479
it's a whole

168
00:05:56,629 --> 00:05:54,240
cadre of people

169
00:05:58,629 --> 00:05:56,639
that support them with the technical

170
00:06:00,710 --> 00:05:58,639
expertise to help solve problems if

171
00:06:02,629 --> 00:06:00,720
there's if there are any

172
00:06:04,390 --> 00:06:02,639
and i know one other thing just to throw

173
00:06:05,590 --> 00:06:04,400
in probably the

174
00:06:07,270 --> 00:06:05,600
most difficult thing when you're first

175
00:06:09,430 --> 00:06:07,280
getting used to it is if you can look

176
00:06:11,189 --> 00:06:09,440
just behind me here we have these and

177
00:06:14,070 --> 00:06:11,199
these are our communication devices that

178
00:06:16,309 --> 00:06:14,080
kind of get everybody uh locked in and

179
00:06:18,230 --> 00:06:16,319
we call them loops and at any one time

180
00:06:19,749 --> 00:06:18,240
you could have four or five six loops

181
00:06:21,350 --> 00:06:19,759
punched up and have four or five

182
00:06:23,430 --> 00:06:21,360
conversations going on in your head at

183
00:06:25,110 --> 00:06:23,440
the same time so just being able to kind

184
00:06:26,550 --> 00:06:25,120
of keep track of that and think through

185
00:06:28,870 --> 00:06:26,560
everything can be really tough right off

186
00:06:31,110 --> 00:06:28,880
the bat but i mean once you're at it for

187
00:06:32,629 --> 00:06:31,120
a little while it gets a lot easier

188
00:06:35,670 --> 00:06:32,639

right you have to wear headsets like

189
00:06:36,550 --> 00:06:35,680
we're wearing today to listen to those

190
00:06:39,029 --> 00:06:36,560
um

191
00:06:41,510 --> 00:06:39,039
those uh lectures or the information

192
00:06:44,309 --> 00:06:41,520
that's coming across the console

193
00:06:46,390 --> 00:06:44,319
all right next question

194
00:06:49,029 --> 00:06:46,400
can you describe what a day in your life

195
00:06:51,270 --> 00:06:49,039
is like with the careers that you had

196
00:06:52,230 --> 00:06:51,280
a day in life of the career yeah that i

197
00:06:53,909 --> 00:06:52,240
have

198
00:06:57,270 --> 00:06:53,919
well like i said i'm a spacesuit

199
00:06:59,749 --> 00:06:57,280
engineer and as a matter of fact i am

200
00:07:02,629 --> 00:06:59,759
i specialize in life support and my

201
00:07:04,950 --> 00:07:02,639
specific responsibility is i'm in charge

202
00:07:06,230 --> 00:07:04,960
of the hardware to remove the carbon

203
00:07:07,350 --> 00:07:06,240
dioxide

204
00:07:09,909 --> 00:07:07,360
from

205
00:07:12,390 --> 00:07:09,919
the spacesuit so when you're breathing

206
00:07:13,909 --> 00:07:12,400
you're expiring carbon dioxide and that

207
00:07:15,749 --> 00:07:13,919
chemical is

208
00:07:18,309 --> 00:07:15,759
hazardous to your health you cannot

209
00:07:20,390 --> 00:07:18,319
sustain life with it in your suit and

210
00:07:22,230 --> 00:07:20,400
you probably learn that in chemistry

211
00:07:25,110 --> 00:07:22,240
so what we have to do is supply the

212
00:07:28,390 --> 00:07:25,120
oxygen and remove the carbon dioxide and

213
00:07:31,189 --> 00:07:28,400

so the coolest thing is that

214
00:07:33,270 --> 00:07:31,199
for me as an engineer working on a life

215
00:07:37,189 --> 00:07:33,280
support system is that for the first

216
00:07:39,430 --> 00:07:37,199
time in over nearly 40 years

217
00:07:42,870 --> 00:07:39,440
we are building a portable life support

218
00:07:44,469 --> 00:07:42,880
system in our laboratory and i i

219
00:07:46,869 --> 00:07:44,479
work in that laboratory

220
00:07:48,869 --> 00:07:46,879
to help assemble the hardware and we're

221
00:07:50,469 --> 00:07:48,879
doing it all in house

222
00:07:51,589 --> 00:07:50,479
in the past we've

223
00:07:53,189 --> 00:07:51,599
the nasa

224
00:07:55,110 --> 00:07:53,199
experts have written the requirements

225
00:07:57,189 --> 00:07:55,120
and we've hired a contractor to actually

226
00:08:00,150 --> 00:07:57,199
build and assemble the hardware

227
00:08:02,629 --> 00:08:00,160
this go around our advanced spacesuit we

228
00:08:06,230 --> 00:08:02,639
are assembling the prototype hardware in

229
00:08:09,189 --> 00:08:06,240
our laboratories and just this past week

230
00:08:11,990 --> 00:08:09,199
we did the final assembly of our very

231
00:08:14,150 --> 00:08:12,000
first prototype packaged portable life

232
00:08:17,909 --> 00:08:14,160
support system we call it a plist and so

233
00:08:19,110 --> 00:08:17,919
the whole team was extremely excited but

234
00:08:23,189 --> 00:08:19,120
my job

235
00:08:25,029 --> 00:08:23,199
i do all kinds of things i help

236
00:08:27,189 --> 00:08:25,039
we can't do everything so we do have

237
00:08:29,430 --> 00:08:27,199
contractors that support us

238
00:08:31,350 --> 00:08:29,440

those are skills that maybe we don't

239
00:08:34,070 --> 00:08:31,360
have and we help we buy some hardware

240
00:08:36,550 --> 00:08:34,080
from them we bring it in we build some

241
00:08:39,190 --> 00:08:36,560
and design some hardware ourselves and

242
00:08:42,230 --> 00:08:39,200
then we integrate it so we do systems

243
00:08:45,030 --> 00:08:42,240
engineering we do design engineering and

244
00:08:47,269 --> 00:08:45,040
so we have a whole cadre so i i have a

245
00:08:48,870 --> 00:08:47,279
really cool job

246
00:08:51,110 --> 00:08:48,880
my job is to hear about cool jobs and

247
00:08:52,550 --> 00:08:51,120
then talk about space so really cool

248
00:08:54,150 --> 00:08:52,560
stuff if you guys are ever going to be

249
00:08:55,750 --> 00:08:54,160
interested in you know building space

250
00:08:58,310 --> 00:08:55,760
equipment building the space and stuff

251
00:09:01,110 --> 00:08:58,320
like that think about coming to nasa yes

252
00:09:03,430 --> 00:09:01,120
it's great all right next question

253
00:09:05,670 --> 00:09:03,440
uh what were there any missions that you

254
00:09:11,110 --> 00:09:05,680
failed

255
00:09:12,949 --> 00:09:11,120
um yes there have been um one of the

256
00:09:14,550 --> 00:09:12,959
things with space flight is it's

257
00:09:16,470 --> 00:09:14,560
inherently dangerous

258
00:09:18,150 --> 00:09:16,480
i mean when you talk about just a space

259
00:09:20,150 --> 00:09:18,160
launcher talking about strapping human

260
00:09:22,150 --> 00:09:20,160
beings to a controlled explosion sending

261
00:09:24,550 --> 00:09:22,160
the miles up into the air into an

262
00:09:26,230 --> 00:09:24,560
environment that if you were to expose

263
00:09:28,470 --> 00:09:26,240

to it for even a short period of time

264
00:09:29,990 --> 00:09:28,480
you would die so it's inherently one of

265
00:09:31,030 --> 00:09:30,000
the most dangerous things humanity has

266
00:09:32,870 --> 00:09:31,040
ever done

267
00:09:35,509 --> 00:09:32,880
and with that you have to take certain

268
00:09:37,110 --> 00:09:35,519
risks and sometimes things have failed

269
00:09:39,590 --> 00:09:37,120
there were two space shuttle missions

270
00:09:41,110 --> 00:09:39,600
which resulted in a loss of the crew

271
00:09:43,750 --> 00:09:41,120
and then there was a fire back in the

272
00:09:46,150 --> 00:09:43,760
apollo days where a crew was lost during

273
00:09:48,070 --> 00:09:46,160
a testing of the apollo 1 capsule

274
00:09:49,750 --> 00:09:48,080
so it does occur but again that's just

275
00:09:52,070 --> 00:09:49,760
kind of part of what space flight is

276
00:09:54,790 --> 00:09:52,080
it's always going to be dangerous but

277
00:09:56,630 --> 00:09:54,800
the risks always are worth it you know

278
00:09:58,389 --> 00:09:56,640
we're moving humanity out we're

279
00:09:59,829 --> 00:09:58,399
developing amazing technologies we're

280
00:10:02,310 --> 00:09:59,839
doing things that have never been done

281
00:10:03,990 --> 00:10:02,320
before so you have to be willing to kind

282
00:10:05,910 --> 00:10:04,000
of take that

283
00:10:07,430 --> 00:10:05,920
precarious step in that direction if

284
00:10:10,069 --> 00:10:07,440
you're going to be able to accomplish

285
00:10:11,910 --> 00:10:10,079
everything that we've accomplished

286
00:10:13,509 --> 00:10:11,920
yes and i would say

287
00:10:15,590 --> 00:10:13,519
failure for us is

288
00:10:18,870 --> 00:10:15,600

you know we have to always be cognizant

289
00:10:20,150 --> 00:10:18,880
of the spacewalks and monitoring every

290
00:10:23,269 --> 00:10:20,160
detail

291
00:10:24,949 --> 00:10:23,279
we've had failures in components on our

292
00:10:26,790 --> 00:10:24,959
portable life support system and in the

293
00:10:29,430 --> 00:10:26,800
suit and we have

294
00:10:31,190 --> 00:10:29,440
like i said a cadre of people that help

295
00:10:33,430 --> 00:10:31,200
try to resolve that on orbit we have

296
00:10:35,750 --> 00:10:33,440
resolved failures on orbit

297
00:10:38,550 --> 00:10:35,760
we have resolved failures while we're

298
00:10:40,870 --> 00:10:38,560
doing spacewalks and so that's why it's

299
00:10:43,030 --> 00:10:40,880
very good to have these experts there to

300
00:10:44,870 --> 00:10:43,040
to help solve the problems we've had

301
00:10:46,790 --> 00:10:44,880
failures where we've had to

302
00:10:48,870 --> 00:10:46,800
terminate the spacewalk and bring the

303
00:10:51,190 --> 00:10:48,880
hardware inside

304
00:10:54,310 --> 00:10:51,200
and then bring it home to

305
00:10:55,509 --> 00:10:54,320
repair it so that we can use it again

306
00:10:57,990 --> 00:10:55,519
yeah

307
00:10:59,509 --> 00:10:58,000
so failures just bring opportunities to

308
00:11:00,389 --> 00:10:59,519
work through it and learn something new

309
00:11:06,870 --> 00:11:00,399
right

310
00:11:10,230 --> 00:11:06,880
what was the hardest part about the

311
00:11:13,030 --> 00:11:11,910
hardest part about marketing sure i can

312
00:11:14,870 --> 00:11:13,040
answer that

313
00:11:17,670 --> 00:11:14,880

well i think one of the things is we

314
00:11:20,310 --> 00:11:17,680
were really just getting started in the

315
00:11:22,470 --> 00:11:20,320
space program um especially for the

316
00:11:24,310 --> 00:11:22,480
suits for the spacesuits it was the

317
00:11:26,949 --> 00:11:24,320
early phases of the spacesuits and we

318
00:11:29,509 --> 00:11:26,959
were transitioning from the the

319
00:11:31,990 --> 00:11:29,519
development of the spacesuits originated

320
00:11:34,630 --> 00:11:32,000
from high altitude aircraft from the air

321
00:11:37,829 --> 00:11:34,640
force and so we took those and in the

322
00:11:39,110 --> 00:11:37,839
mercury program we did some

323
00:11:40,949 --> 00:11:39,120
some

324
00:11:43,269 --> 00:11:40,959
development that

325
00:11:46,389 --> 00:11:43,279
integrated the work that was done in the

326
00:11:49,509 --> 00:11:46,399
high altitude suits and so i think that

327
00:11:52,150 --> 00:11:49,519
um that was for us that was a monumental

328
00:11:54,629 --> 00:11:52,160
of phase for space flight because we

329
00:11:57,030 --> 00:11:54,639
started looking at what we could do

330
00:11:59,190 --> 00:11:57,040
with high altitude suits to integrate it

331
00:12:00,790 --> 00:11:59,200
into spacesuits and i mean really that

332
00:12:02,150 --> 00:12:00,800
kind of applied to the whole program in

333
00:12:04,790 --> 00:12:02,160
general as you said we were just kind of

334
00:12:06,710 --> 00:12:04,800
getting started so i mean at first you

335
00:12:08,629 --> 00:12:06,720
were launching humans on rockets which

336
00:12:11,030 --> 00:12:08,639
up until that point had only launched

337
00:12:13,269 --> 00:12:11,040
missiles and i mean it was really the

338
00:12:15,509 --> 00:12:13,279

first steps that we had ever taken

339
00:12:17,350 --> 00:12:15,519
towards putting human beings in space so

340
00:12:18,870 --> 00:12:17,360
you really want to talk about starting

341
00:12:21,110 --> 00:12:18,880
from scratch you had to figure out how

342
00:12:23,430 --> 00:12:21,120
to do everything so it was really a

343
00:12:26,550 --> 00:12:23,440
great learning learning step for nasa

344
00:12:31,829 --> 00:12:26,560
and just human space flight as a whole

345
00:12:31,839 --> 00:12:36,310
oh are there any plans to explain to iss

346
00:12:41,910 --> 00:12:38,710
i'm sorry we didn't quite catch that

347
00:12:43,829 --> 00:12:41,920
are there any plans to expand the iss

348
00:12:44,790 --> 00:12:43,839
international space station

349
00:12:47,350 --> 00:12:44,800
uh

350
00:12:50,069 --> 00:12:47,360
on the u.s side of everything we're

351
00:12:56,310 --> 00:12:50,079
done uh constructing it uh it's in its

352
00:12:59,350 --> 00:12:57,670
and then but the russians though were

353
00:13:00,389 --> 00:12:59,360
planning on launching a new laboratory

354
00:13:02,069 --> 00:13:00,399
module

355
00:13:03,829 --> 00:13:02,079
later this year i think in december

356
00:13:05,910 --> 00:13:03,839
right now they're targeting it

357
00:13:08,230 --> 00:13:05,920
but as of right now it's pretty much

358
00:13:10,790 --> 00:13:08,240
construction complete the station right

359
00:13:12,949 --> 00:13:10,800
now weighs almost a million pounds uh

360
00:13:15,670 --> 00:13:12,959
has enough room inside to equate to

361
00:13:17,430 --> 00:13:15,680
basically being a three-bedroom house so

362
00:13:19,190 --> 00:13:17,440
it's very large if you laid it down on a

363
00:13:20,870 --> 00:13:19,200

football field end zone to end zone it

364
00:13:22,550 --> 00:13:20,880
would fill up the whole thing

365
00:13:24,550 --> 00:13:22,560
so it's it's a pretty big spaceship

366
00:13:27,670 --> 00:13:24,560
right now one of the things i would add

367
00:13:30,470 --> 00:13:27,680
is that they have come to us to evaluate

368
00:13:33,829 --> 00:13:30,480
how long the spacesuit would last on to

369
00:13:35,990 --> 00:13:33,839
support this space station and we have

370
00:13:39,030 --> 00:13:36,000
you know good faith that the that the

371
00:13:40,949 --> 00:13:39,040
suit will support it to 2020. but

372
00:13:43,629 --> 00:13:40,959
they've also asked us to look at what

373
00:13:46,069 --> 00:13:43,639
would it be to support it all the way to

374
00:13:48,389 --> 00:13:46,079
2028. and so

375
00:13:50,870 --> 00:13:48,399
we have done those calculations and

376
00:13:52,710 --> 00:13:50,880
looked at the hardware and so

377
00:13:55,269 --> 00:13:52,720
i think space station is looking at

378
00:13:58,310 --> 00:13:55,279
really trying to build a brand new

379
00:14:00,790 --> 00:13:58,320
spacesuit and we're funded by advanced

380
00:14:02,790 --> 00:14:00,800
development to do exploration and so we

381
00:14:05,269 --> 00:14:02,800
are just now really collaborating with

382
00:14:07,430 --> 00:14:05,279
station on an advanced suit that they

383
00:14:09,430 --> 00:14:07,440
may be able to synergize some of the

384
00:14:11,269 --> 00:14:09,440
learning that we've had on the advanced

385
00:14:13,990 --> 00:14:11,279
development suit that might be able to

386
00:14:18,150 --> 00:14:14,000
carry over into a space station suit in

387
00:14:21,189 --> 00:14:18,160
case we do extend the station longer

388
00:14:23,350 --> 00:14:21,199

all right great question

389
00:14:27,350 --> 00:14:23,360
uh what has been the most failed mission

390
00:14:32,710 --> 00:14:29,269
most failed mission mission control is

391
00:14:37,030 --> 00:14:34,389
um i mean

392
00:14:38,710 --> 00:14:37,040
you could almost say

393
00:14:40,069 --> 00:14:38,720
i'm sorry was it the most failed mission

394
00:14:42,949 --> 00:14:40,079
that mission control has experienced

395
00:14:45,910 --> 00:14:42,959
just want to clarify

396
00:14:49,030 --> 00:14:45,920
okay um well you could probably talk

397
00:14:50,389 --> 00:14:49,040
about apollo 13 which i mean that was

398
00:14:52,310 --> 00:14:50,399
not only of

399
00:14:53,750 --> 00:14:52,320
what started off as a failure but

400
00:14:56,230 --> 00:14:53,760
eventually turned into one of nasa's

401
00:14:57,990 --> 00:14:56,240
finest moments i mean you had astronauts

402
00:15:00,150 --> 00:14:58,000
being sent on their way to the moon a

403
00:15:01,990 --> 00:15:00,160
quarter of a million miles away an

404
00:15:03,910 --> 00:15:02,000
explosion happened in one of the oxygen

405
00:15:06,069 --> 00:15:03,920
tanks you literally had a huge chunk of

406
00:15:07,990 --> 00:15:06,079
the spacecraft blow off into space while

407
00:15:10,389 --> 00:15:08,000
they're traveling almost 20 000 miles

408
00:15:12,389 --> 00:15:10,399
away from earth and then mission control

409
00:15:14,470 --> 00:15:12,399
worked through to come up with

410
00:15:16,790 --> 00:15:14,480
a number of um

411
00:15:18,230 --> 00:15:16,800
workarounds to do things like removing

412
00:15:20,389 --> 00:15:18,240
carbon dioxide from the breathing

413
00:15:22,230 --> 00:15:20,399

atmosphere which is so important i mean

414
00:15:24,230 --> 00:15:22,240
they really had to work to basically

415
00:15:25,350 --> 00:15:24,240
bring these astronauts home

416
00:15:27,829 --> 00:15:25,360
on

417
00:15:28,790 --> 00:15:27,839
no power no breathing air no resupply no

418
00:15:31,030 --> 00:15:28,800
anything

419
00:15:32,870 --> 00:15:31,040
and so that was a very very difficult

420
00:15:34,790 --> 00:15:32,880
mission but it ended up being again one

421
00:15:35,670 --> 00:15:34,800
of nasa's finest hours

422
00:15:41,110 --> 00:15:35,680
yes

423
00:15:44,790 --> 00:15:43,110
what has been the most important mission

424
00:15:46,710 --> 00:15:44,800
over the years on the international

425
00:15:49,189 --> 00:15:46,720
space station

426
00:15:51,829 --> 00:15:49,199
poor most important mission on board the

427
00:15:53,430 --> 00:15:51,839
international space station

428
00:15:55,430 --> 00:15:53,440
i mean that stuff

429
00:15:56,790 --> 00:15:55,440
basically the the whole assembly of the

430
00:15:58,069 --> 00:15:56,800
international space station yeah like

431
00:16:00,629 --> 00:15:58,079
you uh just

432
00:16:02,389 --> 00:16:00,639
mentioned was probably up there uh this

433
00:16:04,230 --> 00:16:02,399
is something that again has never been

434
00:16:06,069 --> 00:16:04,240
accomplished in the history of mankind

435
00:16:08,629 --> 00:16:06,079
we built the space station piece by

436
00:16:10,870 --> 00:16:08,639
piece uh over a decade

437
00:16:12,470 --> 00:16:10,880
i mean you're launching parts that are

438
00:16:14,870 --> 00:16:12,480

that were constructed

439
00:16:16,310 --> 00:16:14,880
all across the globe by different space

440
00:16:17,829 --> 00:16:16,320
agencies from different companies and

441
00:16:19,990 --> 00:16:17,839
you managed to work

442
00:16:22,150 --> 00:16:20,000
with all of those various national

443
00:16:24,629 --> 00:16:22,160
governments and contractors and

444
00:16:27,829 --> 00:16:24,639
companies things like that to build this

445
00:16:31,350 --> 00:16:27,839
massive space complex which is manned

446
00:16:32,870 --> 00:16:31,360
24 7 365 by astronauts a crew from all

447
00:16:35,110 --> 00:16:32,880
over the world

448
00:16:37,590 --> 00:16:35,120
so i would basically say assembly

449
00:16:39,590 --> 00:16:37,600
and that was kind of an amalgamation of

450
00:16:41,670 --> 00:16:39,600
a bunch of different missions

451
00:16:42,629 --> 00:16:41,680
but that the assembly as a mission as a

452
00:16:44,389 --> 00:16:42,639
whole

453
00:16:46,150 --> 00:16:44,399
was probably the most difficult and it

454
00:16:48,310 --> 00:16:46,160
was very complicated at the beginning

455
00:16:51,269 --> 00:16:48,320
because the configurations

456
00:16:52,949 --> 00:16:51,279
changed over the years in the planning

457
00:16:54,790 --> 00:16:52,959
and so to get it going was very

458
00:16:56,550 --> 00:16:54,800
difficult too

459
00:16:58,629 --> 00:16:56,560
and then once we got it assembled

460
00:17:00,870 --> 00:16:58,639
everyone's very proud of that what we

461
00:17:05,590 --> 00:17:00,880
have in space right now

462
00:17:08,949 --> 00:17:06,789
um

463
00:17:11,110 --> 00:17:08,959

what is the future of the international

464
00:17:13,029 --> 00:17:11,120
space station and how long will it be

465
00:17:15,510 --> 00:17:13,039
functioning

466
00:17:17,510 --> 00:17:15,520
i think i mentioned that a little bit

467
00:17:20,069 --> 00:17:17,520
i don't think that they

468
00:17:21,990 --> 00:17:20,079
they are assessing it right now how long

469
00:17:24,069 --> 00:17:22,000
that it could potentially last and

470
00:17:25,990 --> 00:17:24,079
they're evaluating all the different

471
00:17:29,510 --> 00:17:26,000
components that help make it operate

472
00:17:31,909 --> 00:17:29,520
properly like for example the spacesuits

473
00:17:33,350 --> 00:17:31,919
like i said we were we're evaluating how

474
00:17:36,230 --> 00:17:33,360
long the spacesuit could last because

475
00:17:38,549 --> 00:17:36,240
it's a it's a critical component in

476
00:17:40,070 --> 00:17:38,559
keeping the space station alive in case

477
00:17:41,350 --> 00:17:40,080
they have problems that they have to go

478
00:17:44,549 --> 00:17:41,360
out and fix

479
00:17:46,310 --> 00:17:44,559
so they have to evaluate every

480
00:17:47,190 --> 00:17:46,320
and they're really an evaluation of that

481
00:17:50,070 --> 00:17:47,200
now

482
00:17:52,549 --> 00:17:50,080
so trying to make a decision on how long

483
00:17:54,630 --> 00:17:52,559
it really can go yeah right now we know

484
00:17:56,310 --> 00:17:54,640
at least until 2020 but like you were

485
00:17:58,950 --> 00:17:56,320
saying a lot of the systems on board are

486
00:18:01,110 --> 00:17:58,960
certified to last until 2028 and even

487
00:18:03,190 --> 00:18:01,120
some even longer so it could be up there

488
00:18:06,150 --> 00:18:03,200

for quite some time

489
00:18:08,950 --> 00:18:07,190
uh

490
00:18:10,789 --> 00:18:08,960
will the new spacesuits be easier to put

491
00:18:13,190 --> 00:18:10,799
on and take off

492
00:18:16,549 --> 00:18:13,200
well new spacesuits be easier to take on

493
00:18:19,190 --> 00:18:16,559
and or put on and take off i think so

494
00:18:22,230 --> 00:18:19,200
the new spacesuits we have them designed

495
00:18:25,270 --> 00:18:22,240
so they can open up in the back

496
00:18:26,950 --> 00:18:25,280
versus opening up in the

497
00:18:29,750 --> 00:18:26,960
where you climb in

498
00:18:32,230 --> 00:18:29,760
like put a shirt on you climb in you you

499
00:18:33,909 --> 00:18:32,240
get into it you put a shirt on and then

500
00:18:36,630 --> 00:18:33,919
you pull up your

501
00:18:38,470 --> 00:18:36,640
your we call them the upper torso for

502
00:18:40,710 --> 00:18:38,480
the top and the lower torso for the

503
00:18:43,990 --> 00:18:40,720
bottom and the hard part about that is

504
00:18:46,710 --> 00:18:44,000
you actually have to have another

505
00:18:49,190 --> 00:18:46,720
astronaut to actually help you assemble

506
00:18:50,630 --> 00:18:49,200
the hardware when you're in space so you

507
00:18:52,710 --> 00:18:50,640
always have to have the person getting

508
00:18:54,870 --> 00:18:52,720
in it and the person helping the new

509
00:18:58,150 --> 00:18:54,880
spacesuit will work a lot different than

510
00:19:00,789 --> 00:18:58,160
that it will be a contiguous suit

511
00:19:02,390 --> 00:19:00,799
on the on the soft side of the suit and

512
00:19:04,230 --> 00:19:02,400
then the portable life support system

513
00:19:06,870 --> 00:19:04,240

will still be on the back

514
00:19:10,230 --> 00:19:06,880
like the system like the spacesuit we

515
00:19:11,270 --> 00:19:10,240
have today but the hatch will open from

516
00:19:13,990 --> 00:19:11,280
you know

517
00:19:15,990 --> 00:19:14,000
it'll be on your back and it will open

518
00:19:17,510 --> 00:19:16,000
up just like a door

519
00:19:19,510 --> 00:19:17,520
and the portable life support system

520
00:19:22,150 --> 00:19:19,520
will be in that door

521
00:19:24,950 --> 00:19:22,160
and you can actually crawl into the

522
00:19:27,510 --> 00:19:24,960
spacesuit yourself now there will be

523
00:19:29,990 --> 00:19:27,520
some manipulation that someone will have

524
00:19:32,549 --> 00:19:30,000
to do on an astronaut will have to do on

525
00:19:34,950 --> 00:19:32,559
the inside but it won't be as as

526
00:19:36,549 --> 00:19:34,960
rigorous as it is today so it should be

527
00:19:38,470 --> 00:19:36,559
a lot easier

528
00:19:40,630 --> 00:19:38,480
great question yeah and i have some i

529
00:19:42,549 --> 00:19:40,640
have examples of some spacesuits if you

530
00:19:45,029 --> 00:19:42,559
want to if you'd like to take a look at

531
00:19:47,029 --> 00:19:45,039
them um since we're on the topic of

532
00:19:49,669 --> 00:19:47,039
spacesuits i brought some things with me

533
00:19:52,470 --> 00:19:49,679
today this is my the coolest piece of

534
00:19:54,950 --> 00:19:52,480
hardware that we use in space

535
00:19:56,710 --> 00:19:54,960
and i like it because i can say it's the

536
00:19:59,750 --> 00:19:56,720
astronauts underwear

537
00:20:02,710 --> 00:19:59,760
so it is a if you can take if you can

538
00:20:07,350 --> 00:20:04,789

and then you if you

539
00:20:09,750 --> 00:20:07,360
you can't see it probably from your

540
00:20:11,510 --> 00:20:09,760
you see there's a crisscross in the back

541
00:20:13,990 --> 00:20:11,520
that's a ventilation

542
00:20:15,990 --> 00:20:14,000
tree and that ventilation tree allows

543
00:20:18,630 --> 00:20:16,000
ventilation to go through the suit to

544
00:20:21,270 --> 00:20:18,640
help keep the astronaut cool but also we

545
00:20:24,470 --> 00:20:21,280
have tubes if you see these tubes right

546
00:20:26,710 --> 00:20:24,480
here they run in little lines that are

547
00:20:29,029 --> 00:20:26,720
threaded throughout the entire

548
00:20:31,669 --> 00:20:29,039
structure of the undergarment we call it

549
00:20:34,230 --> 00:20:31,679
the lcvg the liquid cooling and

550
00:20:36,149 --> 00:20:34,240
ventilation garment and water actually

551
00:20:38,310 --> 00:20:36,159
goes through these tubes to help keep

552
00:20:40,149 --> 00:20:38,320
the astronaut cool because it's very can

553
00:20:41,510 --> 00:20:40,159
get very warm in the suit when you're

554
00:20:44,390 --> 00:20:41,520
doing work

555
00:20:47,029 --> 00:20:44,400
say out on space station and that water

556
00:20:49,510 --> 00:20:47,039
circulates in these tubes and it helps

557
00:20:50,630 --> 00:20:49,520
keep the skin of the astronaut

558
00:20:54,390 --> 00:20:50,640
cool

559
00:20:56,470 --> 00:20:54,400
and i have some let me see i have a

560
00:21:02,950 --> 00:20:56,480
glove

561
00:21:05,029 --> 00:21:02,960
it actually

562
00:21:07,750 --> 00:21:05,039
is woven

563
00:21:10,630 --> 00:21:07,760

to help size it for each of the

564
00:21:11,990 --> 00:21:10,640
astronauts so you can see that

565
00:21:14,390 --> 00:21:12,000
and there's also

566
00:21:16,549 --> 00:21:14,400
there's also some configurations in it

567
00:21:18,710 --> 00:21:16,559
that help keep the strength of it up as

568
00:21:21,190 --> 00:21:18,720
the astronaut works

569
00:21:24,870 --> 00:21:21,200
so it's very very uniquely it the the

570
00:21:28,390 --> 00:21:24,880
glove is the only piece of the suit that

571
00:21:31,110 --> 00:21:28,400
is specifically sized for the astronaut

572
00:21:33,669 --> 00:21:31,120
and and if you ask a lot of our

573
00:21:36,149 --> 00:21:33,679
engineers they might say the glove is

574
00:21:38,870 --> 00:21:36,159
the most important part because they're

575
00:21:41,909 --> 00:21:38,880
always using their hands and the gloved

576
00:21:43,590 --> 00:21:41,919
hand to do work in space

577
00:21:45,190 --> 00:21:43,600
very cool stuff and i mean that's all

578
00:21:47,110 --> 00:21:45,200
the inside you never really get to see

579
00:21:50,149 --> 00:21:47,120
the inside of these spaces right

580
00:21:52,310 --> 00:21:50,159
all right next question

581
00:21:54,870 --> 00:21:52,320
okay what rockets are presently being

582
00:21:57,029 --> 00:21:54,880
developed by nasa

583
00:21:59,190 --> 00:21:57,039
well nasa is currently developing what's

584
00:22:00,870 --> 00:21:59,200
known as the space launch system it's

585
00:22:03,830 --> 00:22:00,880
going to be the largest most powerful

586
00:22:06,070 --> 00:22:03,840
rocket ever built by humanity

587
00:22:08,950 --> 00:22:06,080
that's being built so and it's good it's

588
00:22:10,789 --> 00:22:08,960

what's categorized as a heavy lift so

589
00:22:13,270 --> 00:22:10,799
when you want to send

590
00:22:15,270 --> 00:22:13,280
people large payloads

591
00:22:18,310 --> 00:22:15,280
things like a habitat to a place like

592
00:22:19,510 --> 00:22:18,320
mars you need a lot more power to escape

593
00:22:21,110 --> 00:22:19,520
what's known as the gravity well

594
00:22:23,029 --> 00:22:21,120
basically gravity pulling you back into

595
00:22:24,710 --> 00:22:23,039
earth and so the more weight you want to

596
00:22:27,110 --> 00:22:24,720
send the more powerful your rocket has

597
00:22:29,190 --> 00:22:27,120
to be so nasa's developing the space

598
00:22:31,029 --> 00:22:29,200
launch system we call it sls because we

599
00:22:33,029 --> 00:22:31,039
love acronyms

600
00:22:35,029 --> 00:22:33,039
we're developing that to be able to

601
00:22:36,789 --> 00:22:35,039
basically send anything we want we can

602
00:22:38,070 --> 00:22:36,799
send it to mars and i mean that's going

603
00:22:39,350 --> 00:22:38,080
to be the rocket that's going to send

604
00:22:41,510 --> 00:22:39,360
astronauts

605
00:22:42,950 --> 00:22:41,520
once we start moving out beyond low

606
00:22:44,470 --> 00:22:42,960
earth orbit again it's going to be

607
00:22:47,270 --> 00:22:44,480
sending astronauts farther than we've

608
00:22:48,310 --> 00:22:47,280
ever gone before

609
00:22:50,470 --> 00:22:48,320
great question all right looks like

610
00:22:55,350 --> 00:22:50,480
we've got time for one final question

611
00:22:57,510 --> 00:22:56,630
all right

612
00:23:02,070 --> 00:22:57,520
uh

613
00:23:03,190 --> 00:23:02,080

the apollo missions

614
00:23:05,110 --> 00:23:03,200
it's actually changed pretty

615
00:23:07,270 --> 00:23:05,120
significantly i mean if you look behind

616
00:23:08,950 --> 00:23:07,280
me you'll notice the computer screen is

617
00:23:10,630 --> 00:23:08,960
just kind of like a regular

618
00:23:12,950 --> 00:23:10,640
lcd monitor

619
00:23:15,430 --> 00:23:12,960
back in the apollo days you had these

620
00:23:18,710 --> 00:23:15,440
massive massive console systems that

621
00:23:21,990 --> 00:23:18,720
used cathode ray tubes and mccanna and

622
00:23:24,149 --> 00:23:22,000
they actually had their email system uh

623
00:23:25,510 --> 00:23:24,159
was literally just a tube that you stuck

624
00:23:27,590 --> 00:23:25,520
through went down to a mailroom and they

625
00:23:29,590 --> 00:23:27,600
would send that to each other so it's

626
00:23:32,630 --> 00:23:29,600
changed drastically as we get better

627
00:23:35,110 --> 00:23:32,640
computers you know we get better systems

628
00:23:36,630 --> 00:23:35,120
but it's it's changed quite a bit and

629
00:23:39,029 --> 00:23:36,640
actually we're building a new mission

630
00:23:40,390 --> 00:23:39,039
control center which will look even

631
00:23:42,470 --> 00:23:40,400
more different than this one they're

632
00:23:43,669 --> 00:23:42,480
doing away with the great big consoles

633
00:23:45,190 --> 00:23:43,679
and it's basically just going to be a

634
00:23:47,669 --> 00:23:45,200
bunch of computer screens that are going

635
00:23:48,870 --> 00:23:47,679
to be running all of our vehicles

636
00:23:50,470 --> 00:23:48,880
all right well

637
00:23:52,070 --> 00:23:50,480
i think that's all the time that we have

638
00:23:53,590 --> 00:23:52,080

you guys had some great questions i hope

639
00:23:54,390 --> 00:23:53,600
we uh we're able to teach you a little

640
00:23:55,990 --> 00:23:54,400
bit

641
00:23:58,149 --> 00:23:56,000
uh but thanks for stopping by mission

642
00:24:00,789 --> 00:23:58,159
control and um hope to see some of you

643
00:24:02,789 --> 00:24:00,799
as astronauts in the future absolutely

644
00:24:05,830 --> 00:24:02,799
so good to hear from you guys from

645
00:24:09,350 --> 00:24:05,840
naperville i'm a illinoisian myself i

646
00:24:11,990 --> 00:24:09,360
went to siu and so i volunteer for this

647
00:24:14,390 --> 00:24:12,000
effort today because you guys from were

648
00:24:17,430 --> 00:24:14,400
from illinois and hope to see you guys

649
00:24:20,149 --> 00:24:17,440
pursue engineering or scientific degrees