
PAO

1
00:00:04,150 --> 00:00:02,790
hi thanks for joining us here in the

2
00:00:06,230 --> 00:00:04,160
international space station flight

3
00:00:08,629 --> 00:00:06,240
control room i'm here with

4
00:00:14,709 --> 00:00:08,639
capcom hal getzelman and we are excited

5
00:00:20,390 --> 00:00:17,910
hi i'm victoria and my question today is

6
00:00:24,390 --> 00:00:20,400
what jobs and duties do you perform in

7
00:00:31,910 --> 00:00:28,230
so i'm a capsule communicator and my job

8
00:00:34,389 --> 00:00:31,920
is to talk to the crew on orbit and what

9
00:00:36,310 --> 00:00:34,399
i do is i listen to all the

10
00:00:38,790 --> 00:00:36,320
conversations that the experts are

11
00:00:41,350 --> 00:00:38,800
having here on the ground and then i

12
00:00:43,590 --> 00:00:41,360
work together with the flight director

13
00:00:45,830 --> 00:00:43,600

and then explain it to the crew on orbit

14
00:00:47,830 --> 00:00:45,840
exactly what's going on and try to

15
00:00:49,590 --> 00:00:47,840
understand what they need to know and

16
00:01:03,349 --> 00:00:49,600
give that information in a way that's

17
00:01:06,950 --> 00:01:05,109
what tests are they performing on the

18
00:01:09,429 --> 00:01:06,960
international space station for sending

19
00:01:11,270 --> 00:01:09,439
people to mars

20
00:01:13,750 --> 00:01:11,280
well we're performing a lot of

21
00:01:17,109 --> 00:01:13,760
activities on board and a lot of those

22
00:01:19,429 --> 00:01:17,119
will help us learn the skills and

23
00:01:21,510 --> 00:01:19,439
and test the equipment that we'll need

24
00:01:24,230 --> 00:01:21,520
a good example is

25
00:01:27,350 --> 00:01:24,240
exposure to radiation our crews carry

26
00:01:30,550 --> 00:01:27,360
around dosimeters little devices that

27
00:01:32,550 --> 00:01:30,560
measure their radiation exposure and we

28
00:01:34,710 --> 00:01:32,560
track that throughout the mission

29
00:01:37,109 --> 00:01:34,720
also we have equipment on board that

30
00:01:39,270 --> 00:01:37,119
removes carbon dioxide

31
00:01:41,990 --> 00:01:39,280
we have equipment that takes water and

32
00:01:43,910 --> 00:01:42,000
separates it into hydrogen and oxygen so

33
00:01:45,670 --> 00:01:43,920
the crew will have something to breathe

34
00:01:47,910 --> 00:01:45,680
we also are

35
00:01:48,870 --> 00:01:47,920
obviously put on board provisions of

36
00:01:49,990 --> 00:01:48,880
food

37
00:01:51,749 --> 00:01:50,000
and

38
00:01:53,910 --> 00:01:51,759

clothing that they would of course need

39
00:01:57,350 --> 00:01:53,920
for their trip to mars so we are

40
00:01:59,429 --> 00:01:57,360
learning to live for uh six months at a

41
00:02:01,670 --> 00:01:59,439
time we're going to have one mission in

42
00:02:03,910 --> 00:02:01,680
the near future for one year

43
00:02:05,749 --> 00:02:03,920
on orbit and of course as you might

44
00:02:07,749 --> 00:02:05,759
suspect to go to mars is going to take

45
00:02:10,229 --> 00:02:07,759
us anywhere from a year to two and a

46
00:02:13,190 --> 00:02:10,239
half years a round trip so we need to

47
00:02:14,630 --> 00:02:13,200
get quite a bit of experience in this

48
00:02:23,110 --> 00:02:14,640
in this

49
00:02:27,510 --> 00:02:25,910
hi my name is my question today is how

50
00:02:29,190 --> 00:02:27,520
much does it cost to send a machine into

51
00:02:30,150 --> 00:02:29,200
space

52
00:02:33,030 --> 00:02:30,160
well it

53
00:02:34,949 --> 00:02:33,040
costs a lot of money uh when the space

54
00:02:37,110 --> 00:02:34,959
shuttle program was going on it was

55
00:02:40,070 --> 00:02:37,120
about four and a half billion dollars a

56
00:02:43,030 --> 00:02:40,080
year uh program itself

57
00:02:44,470 --> 00:02:43,040
but everything costs uh an extraordinary

58
00:02:47,270 --> 00:02:44,480
amount of money

59
00:02:48,150 --> 00:02:47,280
because we don't have the ability to go

60
00:02:50,390 --> 00:02:48,160
to the

61
00:02:53,030 --> 00:02:50,400
the the corner hardware store to get

62
00:02:55,509 --> 00:02:53,040
spare parts and so all of our equipment

63
00:02:58,229 --> 00:02:55,519

has to go through rigorous uh design and

64
00:03:00,149 --> 00:02:58,239
testing and uh a lot of people get

65
00:03:01,910 --> 00:03:00,159
involved with that and so therefore it's

66
00:03:04,550 --> 00:03:01,920
very expensive so

67
00:03:07,430 --> 00:03:04,560
um you're talking millions and billions

68
00:03:09,830 --> 00:03:07,440
of dollars to do things that uh on earth

69
00:03:12,630 --> 00:03:09,840
would cost much less but because we're

70
00:03:14,229 --> 00:03:12,640
in space they do cost a considerable

71
00:03:16,070 --> 00:03:14,239
amount of money

72
00:03:17,750 --> 00:03:16,080
but we should also add that we learn a

73
00:03:19,670 --> 00:03:17,760
lot from doing that and there's a lot of

74
00:03:21,750 --> 00:03:19,680
technologies that we use on earth in our

75
00:03:22,949 --> 00:03:21,760
everyday lives that have come from that

76
00:03:26,229 --> 00:03:22,959
investment in the things that we're

77
00:03:28,949 --> 00:03:26,239
developing for spaceflight

78
00:03:31,670 --> 00:03:28,959
absolutely a lot of the technologies of

79
00:03:33,830 --> 00:03:31,680
mineral miniaturization of taking very

80
00:03:36,630 --> 00:03:33,840
large computers and shrinking them down

81
00:03:39,270 --> 00:03:36,640
to where we see today that effort was

82
00:03:41,030 --> 00:03:39,280
all begun because we needed computers

83
00:03:43,509 --> 00:03:41,040
that were small enough to fit in our

84
00:03:45,270 --> 00:03:43,519
spacecraft to go to the moon

85
00:03:47,670 --> 00:03:45,280
and things like the cell phones that

86
00:03:49,190 --> 00:03:47,680
they use smartphones and even some of

87
00:03:51,509 --> 00:03:49,200
the sports equipment that probably some

88
00:03:56,309 --> 00:03:51,519

of you kids use have all sometimes have

89
00:03:59,750 --> 00:03:58,630
thank you

90
00:04:02,710 --> 00:03:59,760
all right so

91
00:04:05,270 --> 00:04:02,720
my name is jack and i was wondering

92
00:04:08,149 --> 00:04:05,280
what do you do for communication systems

93
00:04:10,309 --> 00:04:08,159
um with um permission tool too with the

94
00:04:13,030 --> 00:04:10,319
iss would you do if they fail in that

95
00:04:17,830 --> 00:04:15,350
okay so it's very important to us that

96
00:04:20,150 --> 00:04:17,840
we can communicate with the crew and we

97
00:04:22,310 --> 00:04:20,160
do that several different ways one way

98
00:04:25,350 --> 00:04:22,320
is of course voice communications where

99
00:04:27,670 --> 00:04:25,360
we are just talking back and forth

100
00:04:30,070 --> 00:04:27,680
another very important way is video

101
00:04:32,390 --> 00:04:30,080
where we actually see the crew and see

102
00:04:34,550 --> 00:04:32,400
what they're doing and we can observe

103
00:04:38,230 --> 00:04:34,560
where they're at in a particular like an

104
00:04:40,870 --> 00:04:38,240
extra vehicular activity a space walk

105
00:04:42,550 --> 00:04:40,880
and also we get a lot of telemetry data

106
00:04:43,830 --> 00:04:42,560
that's coming down from the space

107
00:04:46,070 --> 00:04:43,840
station

108
00:04:48,469 --> 00:04:46,080
so we can see the status of systems and

109
00:04:51,110 --> 00:04:48,479
all that all that communication is very

110
00:04:53,590 --> 00:04:51,120
important to us and so we have quite a

111
00:04:56,469 --> 00:04:53,600
bit of redundancy in the system so we

112
00:04:58,710 --> 00:04:56,479
have two separate strings of equipment

113
00:05:01,510 --> 00:04:58,720

for the voice we recently upgraded the

114
00:05:03,029 --> 00:05:01,520
communication system to allow voice

115
00:05:05,110 --> 00:05:03,039
through our

116
00:05:07,670 --> 00:05:05,120
a different frequency band than what we

117
00:05:09,749 --> 00:05:07,680
were using before so we actually have

118
00:05:11,990 --> 00:05:09,759
four different channels of

119
00:05:14,390 --> 00:05:12,000
communications we can talk to the crew

120
00:05:18,629 --> 00:05:14,400
the russian segment has its individual

121
00:05:20,469 --> 00:05:18,639
system of vhf communications

122
00:05:23,909 --> 00:05:20,479
so together we have quite a bit of

123
00:05:26,469 --> 00:05:23,919
redundancy so if one system should fail

124
00:05:29,189 --> 00:05:26,479
we can continue to talk to the crew

125
00:05:38,070 --> 00:05:29,199
in sort of a reduced effective way and

126
00:05:41,350 --> 00:05:40,629
hello my name is cherry and my question

127
00:05:44,150 --> 00:05:41,360
is

128
00:05:46,150 --> 00:05:44,160
what happens if an asteroid comes like

129
00:05:48,469 --> 00:05:46,160
shooting towards international space

130
00:05:50,070 --> 00:05:48,479
station

131
00:05:52,310 --> 00:05:50,080
well that's a very good question because

132
00:05:54,070 --> 00:05:52,320
i'm sure many of you have seen on

133
00:05:56,629 --> 00:05:54,080
television

134
00:05:58,469 --> 00:05:56,639
an asteroid that came into the

135
00:06:00,070 --> 00:05:58,479
atmosphere over

136
00:06:02,710 --> 00:06:00,080
a russian city

137
00:06:04,469 --> 00:06:02,720
and so it's getting a lot of thought

138
00:06:06,469 --> 00:06:04,479

in the space station

139
00:06:09,029 --> 00:06:06,479
we're able to track

140
00:06:11,830 --> 00:06:09,039
most large objects that are in orbit

141
00:06:14,469 --> 00:06:11,840
around the earth and any time

142
00:06:17,510 --> 00:06:14,479
that one of those knowned items

143
00:06:19,909 --> 00:06:17,520
is going to cl pass close to the space

144
00:06:22,230 --> 00:06:19,919
station we try to move the space station

145
00:06:25,510 --> 00:06:22,240
out of the way in other words a day or

146
00:06:27,830 --> 00:06:25,520
two prior we'll adjust the orbit by

147
00:06:30,309 --> 00:06:27,840
usually boosting it out of the way

148
00:06:33,270 --> 00:06:30,319
so that when that object passes it

149
00:06:34,390 --> 00:06:33,280
passes well clear now asteroids are a

150
00:06:36,870 --> 00:06:34,400
little different

151
00:06:39,029 --> 00:06:36,880
because they are not as well known and

152
00:06:41,430 --> 00:06:39,039
as well predicted but what if we did

153
00:06:42,790 --> 00:06:41,440
know one was coming close we could take

154
00:06:44,390 --> 00:06:42,800
actions to

155
00:06:55,670 --> 00:06:44,400
maneuver the space station out of the

156
00:06:59,749 --> 00:06:57,749
hi my name is ally and my question is

157
00:07:01,670 --> 00:06:59,759
how are the satellites powered so long

158
00:07:03,749 --> 00:07:01,680
without having any pores

159
00:07:06,629 --> 00:07:03,759
and do you control any satellites from

160
00:07:10,870 --> 00:07:09,189
okay well again that's a interesting

161
00:07:13,749 --> 00:07:10,880
question

162
00:07:15,189 --> 00:07:13,759
in most of our satellites that orbit

163
00:07:17,510 --> 00:07:15,199

around the earth

164
00:07:19,510 --> 00:07:17,520
they have solar panels solar collectors

165
00:07:21,189 --> 00:07:19,520
and that produces the electricity they

166
00:07:22,790 --> 00:07:21,199
need

167
00:07:25,430 --> 00:07:22,800
for further

168
00:07:27,670 --> 00:07:25,440
stability in that system they also have

169
00:07:30,150 --> 00:07:27,680
batteries and so the solar panels

170
00:07:33,029 --> 00:07:30,160
collect the electricity

171
00:07:34,469 --> 00:07:33,039
that's converted sunlight and charge up

172
00:07:37,749 --> 00:07:34,479
the batteries and even when the

173
00:07:40,230 --> 00:07:37,759
satellites go in the shade of the earth

174
00:07:42,309 --> 00:07:40,240
because remember as they are in orbit

175
00:07:44,869 --> 00:07:42,319
around the earth a lot of times and the

176
00:07:47,589 --> 00:07:44,879
same with our space station when we go

177
00:07:49,990 --> 00:07:47,599
on the side opposite the sun we're in

178
00:07:51,029 --> 00:07:50,000
the shade so we use the battery power

179
00:07:53,110 --> 00:07:51,039
for that

180
00:07:55,990 --> 00:07:53,120
some satellites uh

181
00:07:57,350 --> 00:07:56,000
like the rover on mars actually use

182
00:07:59,189 --> 00:07:57,360
nuclear power

183
00:08:02,790 --> 00:07:59,199
and they have a

184
00:08:05,670 --> 00:08:02,800
isotope that is fairly hot and they use

185
00:08:07,270 --> 00:08:05,680
a thermocouple device to harvest that

186
00:08:08,710 --> 00:08:07,280
heat energy and convert it into

187
00:08:10,469 --> 00:08:08,720
electricity

188
00:08:12,629 --> 00:08:10,479

so that's why they don't need the cords

189
00:08:15,749 --> 00:08:12,639
or anything and i think the second part

190
00:08:18,309 --> 00:08:15,759
of your question is we don't directly

191
00:08:21,110 --> 00:08:18,319
today control any satellites from the

192
00:08:23,029 --> 00:08:21,120
space station we have launched a few

193
00:08:25,350 --> 00:08:23,039
small satellites

194
00:08:27,430 --> 00:08:25,360
and the crew has released those from the

195
00:08:29,749 --> 00:08:27,440
space station and then just they're

196
00:08:39,029 --> 00:08:29,759
passive they just orbit until they

197
00:08:43,670 --> 00:08:41,430
hi my name is asha and my question for

198
00:08:45,590 --> 00:08:43,680
you today is what is your treatment and

199
00:08:48,710 --> 00:08:45,600
how many years does it give you become

200
00:08:53,990 --> 00:08:51,910
well um it starts way back when right

201
00:08:55,990 --> 00:08:54,000
when you guys are there

202
00:08:57,990 --> 00:08:56,000
all of our astronauts are excellent

203
00:08:59,430 --> 00:08:58,000
students they're excellent learners and

204
00:09:01,990 --> 00:08:59,440
they excel

205
00:09:03,110 --> 00:09:02,000
and thrive on learning and accumulating

206
00:09:04,310 --> 00:09:03,120
knowledge

207
00:09:07,750 --> 00:09:04,320
and

208
00:09:10,389 --> 00:09:07,760
they have done that their whole life

209
00:09:13,110 --> 00:09:10,399
most of our astronauts are in their 30s

210
00:09:15,030 --> 00:09:13,120
by the time they get selected to become

211
00:09:18,070 --> 00:09:15,040
astronauts they're picked from

212
00:09:19,509 --> 00:09:18,080
a large pool of volunteers

213
00:09:22,550 --> 00:09:19,519

and we're trying to pick the best

214
00:09:25,030 --> 00:09:22,560
candidates for those jobs

215
00:09:26,389 --> 00:09:25,040
and it doesn't we have a lot of

216
00:09:28,310 --> 00:09:26,399
different

217
00:09:31,430 --> 00:09:28,320
ideas they're not all

218
00:09:34,230 --> 00:09:31,440
test pilots some are doctors some are

219
00:09:35,829 --> 00:09:34,240
geologists some are oceanographers so

220
00:09:39,750 --> 00:09:35,839
they come from a lot of different

221
00:09:42,389 --> 00:09:39,760
scientific and technical backgrounds

222
00:09:44,389 --> 00:09:42,399
once they're picked to be an astronaut

223
00:09:46,310 --> 00:09:44,399
it takes about a year and a half to do

224
00:09:48,470 --> 00:09:46,320
the basic training

225
00:09:51,110 --> 00:09:48,480
and then they go on to advanced training

226
00:09:53,350 --> 00:09:51,120
which probably will take another year

227
00:09:55,110 --> 00:09:53,360
before they're assigned to a mission

228
00:09:57,509 --> 00:09:55,120
and once they're assigned to a mission

229
00:09:59,910 --> 00:09:57,519
it takes another two and a half years

230
00:10:02,470 --> 00:09:59,920
before they're actually

231
00:10:04,310 --> 00:10:02,480
on board the space station so

232
00:10:07,030 --> 00:10:04,320
actually you can see that's about five

233
00:10:08,949 --> 00:10:07,040
to six years of training uh once they're

234
00:10:11,269 --> 00:10:08,959
selected as astronauts

235
00:10:13,350 --> 00:10:11,279
some uh have been around as long as ten

236
00:10:15,190 --> 00:10:13,360
years before they fly

237
00:10:15,990 --> 00:10:15,200
and i think uh part of the question what

238
00:10:20,710 --> 00:10:16,000

what

239
00:10:22,310 --> 00:10:20,720
and a lot of that i think folks would be

240
00:10:25,030 --> 00:10:22,320
surprised they have a lot of classroom

241
00:10:26,470 --> 00:10:25,040
training too so just like you in school

242
00:10:27,990 --> 00:10:26,480
there are a lot of times studying in a

243
00:10:29,590 --> 00:10:28,000
classroom setting

244
00:10:31,190 --> 00:10:29,600
with book studying trying to learn the

245
00:10:33,509 --> 00:10:31,200
systems the space station systems how

246
00:10:35,269 --> 00:10:33,519
how all the different

247
00:10:37,509 --> 00:10:35,279
oxygen systems

248
00:10:38,949 --> 00:10:37,519
thermal systems all those things work so

249
00:10:41,350 --> 00:10:38,959
some of it's similar to what you do and

250
00:10:42,949 --> 00:10:41,360
then other times they're in a a mock-up

251
00:10:44,230 --> 00:10:42,959
which is kind of like a pretend space

252
00:10:45,910 --> 00:10:44,240
station and that's where they're

253
00:10:48,310 --> 00:10:45,920
rehearsing the procedures and learning

254
00:10:50,550 --> 00:10:48,320
how to work with the team

255
00:10:52,870 --> 00:10:50,560
other thoughts hell

256
00:10:54,710 --> 00:10:52,880
no that's uh that's quite true um and

257
00:10:57,110 --> 00:10:54,720
also they have to do a lot of language

258
00:10:59,350 --> 00:10:57,120
training since our astronauts are

259
00:11:01,829 --> 00:10:59,360
working with russian crew members and

260
00:11:03,829 --> 00:11:01,839
mission control in moscow often

261
00:11:06,949 --> 00:11:03,839
communicates in russian

262
00:11:08,710 --> 00:11:06,959
they need a to be competent russian

263
00:11:17,670 --> 00:11:08,720

speakers so

264
00:11:22,630 --> 00:11:20,069
hello my name is andy my questions for

265
00:11:25,829 --> 00:11:22,640
today is since all space shuttles have

266
00:11:28,630 --> 00:11:25,839
been decommissioned how do you get

267
00:11:31,190 --> 00:11:28,640
supplies food and people of the space

268
00:11:35,590 --> 00:11:33,030
okay well that's a good question because

269
00:11:36,949 --> 00:11:35,600
obviously the crew cannot get by without

270
00:11:38,630 --> 00:11:36,959
food and water

271
00:11:39,670 --> 00:11:38,640
and we have

272
00:11:42,949 --> 00:11:39,680
several

273
00:11:45,750 --> 00:11:42,959
resupply cargo ships we have the

274
00:11:47,190 --> 00:11:45,760
progress which is a russian

275
00:11:50,069 --> 00:11:47,200
cargo vehicle

276
00:11:52,470 --> 00:11:50,079
we have the atv the aryan transfer

277
00:11:55,350 --> 00:11:52,480
vehicle which one was just launched out

278
00:11:57,590 --> 00:11:55,360
of french guiana here yesterday it's a

279
00:12:00,310 --> 00:11:57,600
very large cargo vehicles bringing up a

280
00:12:03,590 --> 00:12:00,320
lot of food and water and spare parts

281
00:12:06,470 --> 00:12:03,600
we have the dragon space capsule

282
00:12:07,509 --> 00:12:06,480
from a private firm of spacex and the

283
00:12:09,990 --> 00:12:07,519
cygnus

284
00:12:13,350 --> 00:12:10,000
cargo vehicle will be coming up this

285
00:12:16,150 --> 00:12:13,360
fall sometime and also we have the htv

286
00:12:18,629 --> 00:12:16,160
which is a japanese cargo vehicle so we

287
00:12:21,269 --> 00:12:18,639
have several cargo vehicles available to

288
00:12:23,590 --> 00:12:21,279

us to bring up that food and water now

289
00:12:26,230 --> 00:12:23,600
that the space shuttle is retired our

290
00:12:28,470 --> 00:12:26,240
only vehicle to actually bring the crew

291
00:12:31,750 --> 00:12:28,480
up is a russian-built vehicle called the

292
00:12:34,230 --> 00:12:31,760
soyuz it carries a crew of three and

293
00:12:37,829 --> 00:12:34,240
we're hoping with commercial crew and

294
00:12:39,350 --> 00:12:37,839
with our orion program to develop a new

295
00:12:41,670 --> 00:12:39,360
launch vehicle

296
00:12:50,710 --> 00:12:41,680
an american-built vehicle that can also

297
00:12:55,430 --> 00:12:53,190
hi i'm annie um what has been the most

298
00:12:57,990 --> 00:12:55,440
memorable or exciting moment for you to

299
00:13:00,389 --> 00:12:58,000
in the control center

300
00:13:03,670 --> 00:13:00,399
well for me personally um

301
00:13:05,990 --> 00:13:03,680
you know we have uh sort of busy times

302
00:13:07,350 --> 00:13:06,000
and we have times that are not quite so

303
00:13:10,710 --> 00:13:07,360
busy so

304
00:13:14,550 --> 00:13:10,720
i think of myself the most exciting time

305
00:13:16,069 --> 00:13:14,560
for me was when we brought up node 3

306
00:13:17,509 --> 00:13:16,079
and the cupola

307
00:13:20,069 --> 00:13:17,519
and we attached that to the

308
00:13:22,629 --> 00:13:20,079
international space station that was the

309
00:13:25,269 --> 00:13:22,639
last major um

310
00:13:27,190 --> 00:13:25,279
item that was going to be attached to

311
00:13:30,550 --> 00:13:27,200
the space station there was a few other

312
00:13:32,310 --> 00:13:30,560
experiments and a a sort of big closet

313
00:13:35,190 --> 00:13:32,320

that we brought up later but this was

314
00:13:37,829 --> 00:13:35,200
the last big module and to be part of

315
00:13:39,350 --> 00:13:37,839
that mission and see that this face

316
00:13:41,990 --> 00:13:39,360
space station would

317
00:13:44,629 --> 00:13:42,000
finally be completed was a very exciting

318
00:13:45,670 --> 00:13:44,639
moment for me it was kind of like seeing

319
00:13:52,710 --> 00:13:45,680
the

320
00:13:55,189 --> 00:13:52,720
first become operational finally finish

321
00:13:57,030 --> 00:13:55,199
its initial construction and be cleared

322
00:13:58,470 --> 00:13:57,040
operational so that was a very exciting

323
00:14:00,790 --> 00:13:58,480
time for me

324
00:14:02,949 --> 00:14:00,800
yeah i'm sure that michael has told you

325
00:14:05,030 --> 00:14:02,959
guys the space station is as big as a

326
00:14:07,110 --> 00:14:05,040
football field it's really really huge

327
00:14:08,230 --> 00:14:07,120
and hard to imagine in space but it had

328
00:14:10,310 --> 00:14:08,240
to be built

329
00:14:12,150 --> 00:14:10,320
piece by piece with different modules

330
00:14:14,150 --> 00:14:12,160
being flown up some of those modules

331
00:14:15,829 --> 00:14:14,160
were built in other countries and they

332
00:14:17,670 --> 00:14:15,839
were all brought up there individually

333
00:14:19,430 --> 00:14:17,680
and pieced together so

334
00:14:21,030 --> 00:14:19,440
for people like hal who've worked on it

335
00:14:23,509 --> 00:14:21,040
for a long time and been a part of it to

336
00:14:24,870 --> 00:14:23,519
see it being built over years it was

337
00:14:27,189 --> 00:14:24,880
probably a big deal to see it come

338
00:14:29,030 --> 00:14:27,199

together and the cupola of course is a

339
00:14:31,670 --> 00:14:29,040
special piece because it has all the

340
00:14:33,110 --> 00:14:31,680
windows so that's a favorite spot for

341
00:14:35,829 --> 00:14:33,120
the astronauts on the space station

342
00:14:37,829 --> 00:14:35,839
where they go and and literally

343
00:14:39,590 --> 00:14:37,839
it's almost like going into a bay window

344
00:14:40,870 --> 00:14:39,600
where there's windows on every surface

345
00:14:41,990 --> 00:14:40,880
and they can look out and just see a

346
00:14:44,150 --> 00:14:42,000
wide wide

347
00:14:47,269 --> 00:14:44,160
panoramic view of the earth so it's a

348
00:14:50,629 --> 00:14:48,629
yeah i think uh

349
00:14:53,509 --> 00:14:50,639
back one of the books that they had us

350
00:14:56,389 --> 00:14:53,519
read when we were young was uh jules

351
00:14:58,550 --> 00:14:56,399
verne 20 000 leagues under the sea

352
00:15:00,790 --> 00:14:58,560
and his submarine had a big picture

353
00:15:02,790 --> 00:15:00,800
window in the front of the submarine and

354
00:15:04,790 --> 00:15:02,800
and so the cupola is kind of this big

355
00:15:06,230 --> 00:15:04,800
window that you get to look out at the

356
00:15:08,710 --> 00:15:06,240
earth below

357
00:15:11,430 --> 00:15:08,720
and uh i've had crew members tell me

358
00:15:14,150 --> 00:15:11,440
that uh it has such an impact on them

359
00:15:19,030 --> 00:15:14,160
that it actually brings them to tears to

360
00:15:23,990 --> 00:15:22,150
hi my name is jordan and my question is

361
00:15:27,509 --> 00:15:24,000
what is everyday life in the command

362
00:15:30,230 --> 00:15:27,519
center and the space station

363
00:15:31,990 --> 00:15:30,240

well every day is a little different as

364
00:15:33,910 --> 00:15:32,000
you might imagine

365
00:15:35,990 --> 00:15:33,920
but let me give you a thumbnail uh

366
00:15:38,870 --> 00:15:36,000
sketch of what it's like

367
00:15:41,189 --> 00:15:38,880
we operate on greenwich mean time and

368
00:15:42,949 --> 00:15:41,199
the crew gets up at about six o'clock

369
00:15:44,870 --> 00:15:42,959
greenwich mean time

370
00:15:47,910 --> 00:15:44,880
uh for us that's about

371
00:15:50,389 --> 00:15:47,920
one o'clock or midnight here in houston

372
00:15:52,389 --> 00:15:50,399
so we bring in a control team there's

373
00:15:54,150 --> 00:15:52,399
three control teams we each work about

374
00:15:56,790 --> 00:15:54,160
eight hour shifts

375
00:15:59,269 --> 00:15:56,800
and hand over to the next shift the crew

376
00:16:01,189 --> 00:15:59,279
gets up uh you know does their normal

377
00:16:03,350 --> 00:16:01,199
things awaken up and getting dressed and

378
00:16:05,030 --> 00:16:03,360
having breakfast and all that we talk to

379
00:16:07,509 --> 00:16:05,040
them first thing in the morning kind of

380
00:16:09,030 --> 00:16:07,519
tell them what's going on and and any uh

381
00:16:11,110 --> 00:16:09,040
important developments that may have

382
00:16:14,710 --> 00:16:11,120
happened while they were sleeping and

383
00:16:16,629 --> 00:16:14,720
then they start into their uh routine um

384
00:16:19,350 --> 00:16:16,639
we work really hard to keep the crew

385
00:16:22,310 --> 00:16:19,360
busy and we have them assigned tasks uh

386
00:16:24,949 --> 00:16:22,320
a basically a flow chart

387
00:16:25,910 --> 00:16:24,959
of the activities for the day and the

388
00:16:27,430 --> 00:16:25,920

crew

389
00:16:29,350 --> 00:16:27,440
works through those

390
00:16:31,509 --> 00:16:29,360
we help them with that

391
00:16:33,590 --> 00:16:31,519
we take actions on the ground to maybe

392
00:16:35,990 --> 00:16:33,600
save some equipment turn it off before

393
00:16:38,150 --> 00:16:36,000
they change out a part or something like

394
00:16:40,550 --> 00:16:38,160
that and they work through till about

395
00:16:42,870 --> 00:16:40,560
lunchtime while this is going on the

396
00:16:46,150 --> 00:16:42,880
crew actually has about two and a half

397
00:16:48,310 --> 00:16:46,160
hours of exercise during the day they do

398
00:16:50,550 --> 00:16:48,320
half of their exercise would be aerobic

399
00:16:53,590 --> 00:16:50,560
that's like running or pedaling a

400
00:16:55,670 --> 00:16:53,600
bicycle the other half is strength

401
00:16:59,189 --> 00:16:55,680
training and they do that on our

402
00:17:01,590 --> 00:16:59,199
resistive exercise device and so they

403
00:17:04,470 --> 00:17:01,600
they work that into their schedule after

404
00:17:07,909 --> 00:17:04,480
lunch they have more activities

405
00:17:10,150 --> 00:17:07,919
around about 3 30 in the afternoon we

406
00:17:11,029 --> 00:17:10,160
kind of wrap up the the work day for the

407
00:17:11,990 --> 00:17:11,039
crew

408
00:17:13,189 --> 00:17:12,000
and

409
00:17:15,029 --> 00:17:13,199
then they have a

410
00:17:17,189 --> 00:17:15,039
about an hour and a half to kind of have

411
00:17:18,710 --> 00:17:17,199
supper get settled down

412
00:17:20,710 --> 00:17:18,720
take care of their own

413
00:17:22,549 --> 00:17:20,720

sort of interests and then they go to

414
00:17:23,750 --> 00:17:22,559
bed for eight hours and get up and do it

415
00:17:25,990 --> 00:17:23,760
again

416
00:17:27,909 --> 00:17:26,000
on the weekends

417
00:17:30,070 --> 00:17:27,919
saturday morning they do a lot of house

418
00:17:33,510 --> 00:17:30,080
cleaning vacuuming

419
00:17:35,190 --> 00:17:33,520
swabbing down areas of the of the uh the

420
00:17:38,310 --> 00:17:35,200
uh the hull

421
00:17:38,950 --> 00:17:38,320
and uh inspecting things um the rest of

422
00:17:41,590 --> 00:17:38,960
the

423
00:17:42,950 --> 00:17:41,600
saturday is usually uh free time for

424
00:17:44,549 --> 00:17:42,960
what they want to do

425
00:17:46,870 --> 00:17:44,559
sunday uh

426
00:17:49,029 --> 00:17:46,880
again is another uh kind of off day for

427
00:17:51,750 --> 00:17:49,039
them where they can spend some of their

428
00:17:54,630 --> 00:17:51,760
own time and then we talk to them sunday

429
00:17:56,230 --> 00:17:54,640
night and give them uh some updates on

430
00:17:59,510 --> 00:17:56,240
what will be happening the following

431
00:18:01,669 --> 00:17:59,520
week so that's kind of a typical day um

432
00:18:04,549 --> 00:18:01,679
you know there are atypical days where

433
00:18:06,950 --> 00:18:04,559
we're doing space walks or we're having

434
00:18:08,789 --> 00:18:06,960
visited vehicles come

435
00:18:10,710 --> 00:18:08,799
and they'll reach out and grab them and

436
00:18:13,110 --> 00:18:10,720
pull them in so those are kind of the

437
00:18:22,390 --> 00:18:13,120
special days but

438
00:18:28,470 --> 00:18:25,909

hi my name is hazel and how often do the

439
00:18:31,110 --> 00:18:28,480
astronauts support iss reach out and get

440
00:18:36,710 --> 00:18:34,470
well currently our uh average duration

441
00:18:38,549 --> 00:18:36,720
of the crew is about six months you know

442
00:18:41,750 --> 00:18:38,559
a few days less a few days more

443
00:18:44,950 --> 00:18:41,760
depending on a few factors

444
00:18:47,110 --> 00:18:44,960
we will have a crew coming up

445
00:18:50,549 --> 00:18:47,120
uh next year that will be up for a full

446
00:18:53,350 --> 00:18:50,559
year and that's just part of our uh data

447
00:18:55,830 --> 00:18:53,360
gathering to see the effects on the crew

448
00:19:09,990 --> 00:18:55,840
uh being in waitlist for a full year but

449
00:19:17,270 --> 00:19:12,870
have you ever had an emergency on before

450
00:19:21,909 --> 00:19:19,350
well that's a good question because as

451
00:19:24,470 --> 00:19:21,919
you might imagine we have very well

452
00:19:26,150 --> 00:19:24,480
developed procedures and actions and we

453
00:19:27,430 --> 00:19:26,160
practice quite a bit for those

454
00:19:30,230 --> 00:19:27,440
occurrences

455
00:19:32,950 --> 00:19:30,240
we've had quite a few false alarms in

456
00:19:35,909 --> 00:19:32,960
other words a smoke detector

457
00:19:38,390 --> 00:19:35,919
you know will go off and we'll analyze

458
00:19:40,870 --> 00:19:38,400
the condition and decide that it was a

459
00:19:43,350 --> 00:19:40,880
faulty sensor or something like that

460
00:19:46,070 --> 00:19:43,360
we've also had what we thought was a

461
00:19:49,430 --> 00:19:46,080
contaminated atmosphere

462
00:19:52,710 --> 00:19:49,440
which was simply baking out of a

463
00:19:54,310 --> 00:19:52,720

absorbing material that had some gunk in

464
00:19:56,310 --> 00:19:54,320
it so to speak

465
00:19:59,270 --> 00:19:56,320
that smelled bad but it turned out it

466
00:20:02,149 --> 00:19:59,280
was not really harmful to the crew so no

467
00:20:04,230 --> 00:20:02,159
i've not actually been on when we've had

468
00:20:07,270 --> 00:20:04,240
a actual emergency

469
00:20:16,710 --> 00:20:07,280
and so far we haven't had any true

470
00:20:20,950 --> 00:20:18,950
hi my name is joe and my question is

471
00:20:24,710 --> 00:20:20,960
what inspired you to do your job and

472
00:20:29,110 --> 00:20:26,470
okay well when i was

473
00:20:31,190 --> 00:20:29,120
in junior high school

474
00:20:34,470 --> 00:20:31,200
the first apollo mission

475
00:20:38,310 --> 00:20:34,480
was going to the moon and it was apollo

476
00:20:41,029 --> 00:20:38,320
8 and they flew a

477
00:20:43,190 --> 00:20:41,039
racetrack around the moon they didn't

478
00:20:44,870 --> 00:20:43,200
actually land but they just flew around

479
00:20:45,750 --> 00:20:44,880
the moon and they did that

480
00:20:47,430 --> 00:20:45,760
on

481
00:20:49,510 --> 00:20:47,440
christmas eve

482
00:20:51,430 --> 00:20:49,520
and so i can remember

483
00:20:54,630 --> 00:20:51,440
being with my family

484
00:20:56,950 --> 00:20:54,640
at a christmas party at night

485
00:20:59,430 --> 00:20:56,960
watching that on tv

486
00:21:02,070 --> 00:20:59,440
and hearing from

487
00:21:03,270 --> 00:21:02,080
astronauts talking from the far side of

488
00:21:05,750 --> 00:21:03,280

the moon

489
00:21:07,270 --> 00:21:05,760
about their experiencing and reading

490
00:21:10,310 --> 00:21:07,280
from the bible

491
00:21:12,070 --> 00:21:10,320
and i thought boy that's something i'd

492
00:21:13,270 --> 00:21:12,080
really like to do

493
00:21:16,789 --> 00:21:13,280
and

494
00:21:18,470 --> 00:21:16,799
around

495
00:21:22,070 --> 00:21:18,480
preparing myself

496
00:21:24,230 --> 00:21:22,080
studying taking the courses

497
00:21:27,190 --> 00:21:24,240
learning as much as i could

498
00:21:30,549 --> 00:21:27,200
so someday i could be picked i never was

499
00:21:39,270 --> 00:21:30,559
picked but i i really enjoy working in

500
00:21:43,909 --> 00:21:40,830
hi my name

501
00:21:45,270 --> 00:21:43,919
is how hard is the training to work at

502
00:21:46,470 --> 00:21:45,280
mission control

503
00:21:47,990 --> 00:21:46,480
what schools

504
00:21:52,149 --> 00:21:48,000
did you have to go to and what was your

505
00:21:56,950 --> 00:21:54,710
well fortunate for for me

506
00:21:59,190 --> 00:21:56,960
i had a lot of experience

507
00:22:01,669 --> 00:21:59,200
in other jobs

508
00:22:03,990 --> 00:22:01,679
i was a fighter pilot in the united

509
00:22:09,909 --> 00:22:04,000
states air force for 20 years

510
00:22:14,390 --> 00:22:10,830
so

511
00:22:16,230 --> 00:22:14,400
i i was well prepared for the job now a

512
00:22:18,710 --> 00:22:16,240
lot of our folks who come and work in

513
00:22:20,070 --> 00:22:18,720

mission control are right out of college

514
00:22:20,870 --> 00:22:20,080
and so

515
00:22:23,110 --> 00:22:20,880
um

516
00:22:24,870 --> 00:22:23,120
it's a challenge

517
00:22:27,750 --> 00:22:24,880
to

518
00:22:29,750 --> 00:22:27,760
learn the precision of the business in

519
00:22:31,590 --> 00:22:29,760
other words

520
00:22:33,990 --> 00:22:31,600
sloppy work

521
00:22:36,070 --> 00:22:34,000
doesn't count for much here

522
00:22:37,110 --> 00:22:36,080
you don't get partial credit

523
00:22:39,430 --> 00:22:37,120
for

524
00:22:42,149 --> 00:22:39,440
making a good try what we really want is

525
00:22:43,270 --> 00:22:42,159
results and we want people who are

526
00:22:45,110 --> 00:22:43,280
really

527
00:22:46,070 --> 00:22:45,120
focused on the important things of the

528
00:22:48,230 --> 00:22:46,080
job

529
00:22:50,710 --> 00:22:48,240
so in that sense

530
00:22:51,990 --> 00:22:50,720
if you're well prepared it's not that

531
00:22:54,310 --> 00:22:52,000
difficult

532
00:22:57,510 --> 00:22:54,320
but it is a challenging program there's

533
00:23:00,390 --> 00:22:57,520
a lot of information to learn a lot of

534
00:23:01,750 --> 00:23:00,400
facts and figures that you must be uh

535
00:23:04,230 --> 00:23:01,760
comfortable with

536
00:23:15,350 --> 00:23:04,240
so it is a challenge for most of our

537
00:23:19,510 --> 00:23:17,270
hi my name is kendall

538
00:23:21,590 --> 00:23:19,520

my question is communication hanging so

539
00:23:26,310 --> 00:23:21,600
far away is it always easy to connect

540
00:23:31,029 --> 00:23:28,630
well this is an excellent question and

541
00:23:34,230 --> 00:23:31,039
uh i just want to say that like right

542
00:23:35,590 --> 00:23:34,240
now we're having a period of time where

543
00:23:38,230 --> 00:23:35,600
the sun is

544
00:23:40,310 --> 00:23:38,240
at a very high angle over the station

545
00:23:43,350 --> 00:23:40,320
and we're having some thermal problems

546
00:23:45,350 --> 00:23:43,360
with our ku antenna big dish antenna

547
00:23:47,750 --> 00:23:45,360
that you'd like to see

548
00:23:49,909 --> 00:23:47,760
out on the outside of your house and

549
00:23:52,310 --> 00:23:49,919
that antenna is getting too cold so we

550
00:23:55,350 --> 00:23:52,320
can't use it right now so we've not

551
00:23:58,149 --> 00:23:55,360
we're not able to get video down and

552
00:24:01,430 --> 00:23:58,159
data up to the crew so that's kind of a

553
00:24:04,390 --> 00:24:01,440
glitch um every now and then we'll have

554
00:24:06,710 --> 00:24:04,400
the com will break up and we have to

555
00:24:08,789 --> 00:24:06,720
say things twice and all that but

556
00:24:11,750 --> 00:24:08,799
normally our communications is very

557
00:24:17,029 --> 00:24:11,760
clear and very reliable but from time to

558
00:24:20,070 --> 00:24:18,630
all right and i understand that's our

559
00:24:21,990 --> 00:24:20,080
last question but we want to thank you

560
00:24:23,269 --> 00:24:22,000
guys again for taking the time to ask

561
00:24:24,950 --> 00:24:23,279
some questions and learn a little bit

562
00:24:28,070 --> 00:24:24,960
more about the space station and thank

563
00:24:29,830 --> 00:24:28,080

hal for uh joining us thanks guys hey

564
00:24:31,990 --> 00:24:29,840
thanks very much i'm sorry for the folks