
MISSION CONTROL CENTER
PAO

1
00:00:05,749 --> 00:00:04,390
hi thanks for joining us here in the

2
00:00:07,829 --> 00:00:05,759
international space station flight

3
00:00:10,230 --> 00:00:07,839
control room i'm here with

4
00:00:16,150 --> 00:00:10,240
capcom hal getzelman and we are excited

5
00:00:21,910 --> 00:00:19,510
hi i'm victoria and my question today is

6
00:00:25,910 --> 00:00:21,920
what jobs and duties do you perform in

7
00:00:32,709 --> 00:00:29,750
so i'm a capsule communicator and my job

8
00:00:35,910 --> 00:00:32,719
is to talk to the crew on orbit

9
00:00:37,830 --> 00:00:35,920
and what i do is i listen to all the

10
00:00:40,310 --> 00:00:37,840
conversations that the experts are

11
00:00:42,869 --> 00:00:40,320
having here on the ground and then i

12
00:00:45,190 --> 00:00:42,879
work together with the flight director

13
00:00:47,430 --> 00:00:45,200

and then explain it to the crew on orbit

14
00:00:49,350 --> 00:00:47,440
exactly what's going on and try to

15
00:00:51,189 --> 00:00:49,360
understand what they need to know and

16
00:01:04,950 --> 00:00:51,199
give that information in a way that's

17
00:01:08,550 --> 00:01:06,710
what tests are they performing on the

18
00:01:10,950 --> 00:01:08,560
international space station for sending

19
00:01:12,870 --> 00:01:10,960
people to mars

20
00:01:15,350 --> 00:01:12,880
well we're performing a lot of

21
00:01:18,710 --> 00:01:15,360
activities on board and a lot of those

22
00:01:21,030 --> 00:01:18,720
will help us learn the skills and

23
00:01:23,109 --> 00:01:21,040
and test the equipment that we'll need

24
00:01:25,749 --> 00:01:23,119
a good example is

25
00:01:28,950 --> 00:01:25,759
exposure to radiation our crews carry

26
00:01:32,069 --> 00:01:28,960
around dosimeters little devices that

27
00:01:34,149 --> 00:01:32,079
measure their radiation exposure and we

28
00:01:36,310 --> 00:01:34,159
track that throughout the mission

29
00:01:38,630 --> 00:01:36,320
also we have equipment on board that

30
00:01:40,870 --> 00:01:38,640
removes carbon dioxide

31
00:01:43,590 --> 00:01:40,880
we have equipment that takes water and

32
00:01:45,510 --> 00:01:43,600
separates it into hydrogen and oxygen so

33
00:01:47,270 --> 00:01:45,520
the crew will have something to breathe

34
00:01:49,510 --> 00:01:47,280
we also are

35
00:01:50,469 --> 00:01:49,520
obviously put on board provisions of

36
00:01:51,590 --> 00:01:50,479
food

37
00:01:53,350 --> 00:01:51,600
and

38
00:01:55,510 --> 00:01:53,360

clothing that they would of course need

39
00:01:57,670 --> 00:01:55,520
for their trip to mars so we are

40
00:01:59,590 --> 00:01:57,680
learning to live for

41
00:02:02,069 --> 00:01:59,600
uh six months at a time we're going to

42
00:02:03,270 --> 00:02:02,079
have one mission in the near future for

43
00:02:05,510 --> 00:02:03,280
one year

44
00:02:07,350 --> 00:02:05,520
on orbit and of course as you might

45
00:02:09,430 --> 00:02:07,360
suspect to go to mars is going to take

46
00:02:11,830 --> 00:02:09,440
us anywhere from a year to two and a

47
00:02:14,790 --> 00:02:11,840
half years a round trip so we need to

48
00:02:16,229 --> 00:02:14,800
get quite a bit of experience in this uh

49
00:02:24,710 --> 00:02:16,239
in this uh

50
00:02:29,110 --> 00:02:27,430
hi my name is my question today is how

51
00:02:30,710 --> 00:02:29,120
much does it cost to send a machine into

52
00:02:31,750 --> 00:02:30,720
space

53
00:02:34,550 --> 00:02:31,760
well it

54
00:02:36,550 --> 00:02:34,560
costs a lot of money when the space

55
00:02:38,710 --> 00:02:36,560
shuttle program was going on it was

56
00:02:41,670 --> 00:02:38,720
about four and a half billion dollars a

57
00:02:44,630 --> 00:02:41,680
year uh program itself

58
00:02:46,070 --> 00:02:44,640
but everything costs uh an extraordinary

59
00:02:48,869 --> 00:02:46,080
amount of money

60
00:02:51,750 --> 00:02:48,879
because we don't have the ability to go

61
00:02:53,589 --> 00:02:51,760
to the the the corner hardware store to

62
00:02:56,309 --> 00:02:53,599
get spare parts and so all of our

63
00:02:59,589 --> 00:02:56,319

equipment has to go through rigorous uh

64
00:03:01,589 --> 00:02:59,599
design and testing and a lot of people

65
00:03:04,949 --> 00:03:01,599
get involved with that and so therefore

66
00:03:07,110 --> 00:03:04,959
it's very expensive so um you're talking

67
00:03:09,910 --> 00:03:07,120
millions and billions of dollars to do

68
00:03:12,630 --> 00:03:09,920
things that uh on earth would cost much

69
00:03:15,750 --> 00:03:12,640
less but because we're in space they do

70
00:03:17,670 --> 00:03:15,760
cost a considerable amount of money

71
00:03:19,270 --> 00:03:17,680
but we should also add that we learn a

72
00:03:21,190 --> 00:03:19,280
lot from doing that and there's a lot of

73
00:03:23,350 --> 00:03:21,200
technologies that we use on earth in our

74
00:03:24,550 --> 00:03:23,360
everyday lives that have come from that

75
00:03:27,830 --> 00:03:24,560
investment and the things that we're

76
00:03:30,550 --> 00:03:27,840
developing for spaceflight

77
00:03:33,270 --> 00:03:30,560
absolutely a lot of the technologies of

78
00:03:35,430 --> 00:03:33,280
mineral miniaturization of taking very

79
00:03:38,229 --> 00:03:35,440
large computers and shrinking them down

80
00:03:40,789 --> 00:03:38,239
to where we see today that effort was

81
00:03:42,630 --> 00:03:40,799
all begun because we needed computers

82
00:03:45,110 --> 00:03:42,640
that were small enough to fit in our

83
00:03:46,869 --> 00:03:45,120
spacecraft to go to the moon

84
00:03:48,710 --> 00:03:46,879
and things like the cell phones that

85
00:03:50,070 --> 00:03:48,720
they use smartphones

86
00:03:51,830 --> 00:03:50,080
and even some of the sports equipment

87
00:03:54,149 --> 00:03:51,840
that probably some of you kids use have

88
00:04:00,229 --> 00:03:54,159

all sometimes have derived from space

89
00:04:04,229 --> 00:04:01,350
all right so

90
00:04:06,070 --> 00:04:04,239
my name is jack and i was wondering

91
00:04:08,309 --> 00:04:06,080
what do you do from communication

92
00:04:10,630 --> 00:04:08,319
systems um with

93
00:04:14,630 --> 00:04:10,640
clinician control to the iss would you

94
00:04:19,430 --> 00:04:16,949
okay so it's very important to us that

95
00:04:21,749 --> 00:04:19,440
we can communicate with the crew and we

96
00:04:23,909 --> 00:04:21,759
do that several different ways one way

97
00:04:26,870 --> 00:04:23,919
is of course voice communications where

98
00:04:29,270 --> 00:04:26,880
we are just talking back and forth

99
00:04:31,670 --> 00:04:29,280
another very important way is video

100
00:04:33,909 --> 00:04:31,680
where we actually see the crew and see

101
00:04:36,150 --> 00:04:33,919
what they're doing and we can observe

102
00:04:39,830 --> 00:04:36,160
where they're at in a particular like an

103
00:04:42,390 --> 00:04:39,840
extra vehicular activity a spacewalk

104
00:04:44,150 --> 00:04:42,400
and also we get a lot of telemetry data

105
00:04:45,430 --> 00:04:44,160
that's coming down from the space

106
00:04:47,670 --> 00:04:45,440
station

107
00:04:50,070 --> 00:04:47,680
so we can see the status of systems and

108
00:04:52,710 --> 00:04:50,080
all that all that communication is very

109
00:04:55,189 --> 00:04:52,720
important to us and so we have quite a

110
00:04:57,430 --> 00:04:55,199
bit of redundancy in the system so we

111
00:04:59,670 --> 00:04:57,440
have two separate strings of

112
00:05:02,230 --> 00:04:59,680
equipment for the voice we recently

113
00:05:04,629 --> 00:05:02,240

upgraded the communication system to

114
00:05:06,710 --> 00:05:04,639
allow voice through our

115
00:05:09,270 --> 00:05:06,720
a different frequency band than what we

116
00:05:11,350 --> 00:05:09,280
were using before so we actually have

117
00:05:13,510 --> 00:05:11,360
four different channels of

118
00:05:15,990 --> 00:05:13,520
communications we can talk to the crew

119
00:05:20,230 --> 00:05:16,000
the russian segment has its individual

120
00:05:21,990 --> 00:05:20,240
system of vhf communications

121
00:05:25,510 --> 00:05:22,000
so together we have quite a bit of

122
00:05:28,230 --> 00:05:25,520
redundancy so if one system should fail

123
00:05:30,950 --> 00:05:28,240
we can continue to talk to the crew in

124
00:05:39,670 --> 00:05:30,960
sort of a reduced effective way and then

125
00:05:42,950 --> 00:05:42,230
hello my name is cherry and my question

126
00:05:45,670 --> 00:05:42,960
is

127
00:05:47,749 --> 00:05:45,680
what happens if an asteroid comes like

128
00:05:50,070 --> 00:05:47,759
shooting towards international space

129
00:05:51,670 --> 00:05:50,080
station

130
00:05:53,909 --> 00:05:51,680
well that's a very good question because

131
00:05:58,070 --> 00:05:53,919
i'm sure many of you have seen on

132
00:06:00,070 --> 00:05:58,080
television um an asteroid that came into

133
00:06:02,790 --> 00:06:00,080
the atmosphere over

134
00:06:06,390 --> 00:06:02,800
a russian city and so it's getting a lot

135
00:06:08,070 --> 00:06:06,400
of thought um in the space station we're

136
00:06:10,629 --> 00:06:08,080
able to track

137
00:06:13,430 --> 00:06:10,639
most large objects that are in orbit

138
00:06:16,070 --> 00:06:13,440

around the earth and any time

139
00:06:19,110 --> 00:06:16,080
that one of those knowned items

140
00:06:21,510 --> 00:06:19,120
is going to cl pass close to the space

141
00:06:23,830 --> 00:06:21,520
station we try to move the space station

142
00:06:27,029 --> 00:06:23,840
out of the way in other words a day or

143
00:06:29,430 --> 00:06:27,039
two prior we'll adjust the orbit by

144
00:06:31,830 --> 00:06:29,440
usually boosting it out of the way

145
00:06:34,870 --> 00:06:31,840
so that when that object passes it

146
00:06:35,990 --> 00:06:34,880
passes well clear now asteroids are a

147
00:06:38,469 --> 00:06:36,000
little different

148
00:06:40,629 --> 00:06:38,479
because they are not as well known and

149
00:06:43,029 --> 00:06:40,639
as well predicted but what if we did

150
00:06:44,390 --> 00:06:43,039
know one was coming close we could take

151
00:06:45,990 --> 00:06:44,400
actions to

152
00:06:57,270 --> 00:06:46,000
maneuver the space station out of the

153
00:07:03,189 --> 00:07:00,469
hi my name is how are the satellites

154
00:07:05,270 --> 00:07:03,199
powered so long without having any pores

155
00:07:08,230 --> 00:07:05,280
and do you control any satellites from

156
00:07:12,390 --> 00:07:10,710
okay well again that's a interesting

157
00:07:15,270 --> 00:07:12,400
question um

158
00:07:16,790 --> 00:07:15,280
in most of our satellites that orbit

159
00:07:19,110 --> 00:07:16,800
around the earth

160
00:07:21,110 --> 00:07:19,120
they have solar panels solar collectors

161
00:07:22,790 --> 00:07:21,120
and that produces the electricity they

162
00:07:24,309 --> 00:07:22,800
need

163
00:07:26,950 --> 00:07:24,319

for further

164
00:07:29,270 --> 00:07:26,960
stability in that system they also have

165
00:07:31,749 --> 00:07:29,280
batteries and so the solar panels

166
00:07:34,629 --> 00:07:31,759
collect the electricity

167
00:07:36,070 --> 00:07:34,639
that's converted sunlight and charge up

168
00:07:39,350 --> 00:07:36,080
the batteries and even when the

169
00:07:41,749 --> 00:07:39,360
satellites go in the shade of the earth

170
00:07:43,830 --> 00:07:41,759
because remember as they are in orbit

171
00:07:46,469 --> 00:07:43,840
around the earth a lot of times and the

172
00:07:49,189 --> 00:07:46,479
same with our space station when we go

173
00:07:51,589 --> 00:07:49,199
on the side opposite the sun we're in

174
00:07:52,629 --> 00:07:51,599
the shade so we use the battery power

175
00:07:54,629 --> 00:07:52,639
for that

176
00:07:57,510 --> 00:07:54,639
some satellites

177
00:08:00,790 --> 00:07:57,520
like the rover on mars actually use

178
00:08:04,390 --> 00:08:00,800
nuclear power and they have a

179
00:08:07,270 --> 00:08:04,400
isotope that is fairly hot and they use

180
00:08:08,869 --> 00:08:07,280
a thermocouple device to harvest that

181
00:08:10,309 --> 00:08:08,879
heat energy and convert it into

182
00:08:11,990 --> 00:08:10,319
electricity

183
00:08:14,230 --> 00:08:12,000
so that's why they don't need the cords

184
00:08:17,350 --> 00:08:14,240
or anything and i think the second part

185
00:08:19,830 --> 00:08:17,360
of your question is we don't directly

186
00:08:22,629 --> 00:08:19,840
today control any satellites from the

187
00:08:24,629 --> 00:08:22,639
space station we have launched a few

188
00:08:26,950 --> 00:08:24,639

small satellites

189
00:08:29,029 --> 00:08:26,960
and the crew has released those from the

190
00:08:31,350 --> 00:08:29,039
space station and then just they're

191
00:08:40,630 --> 00:08:31,360
passive they just orbit until they

192
00:08:44,389 --> 00:08:42,149
hi my name is

193
00:08:46,310 --> 00:08:44,399
and my question for you today is what is

194
00:08:50,310 --> 00:08:46,320
your dream and how many years did you

195
00:08:55,590 --> 00:08:53,430
well um it starts way back when right

196
00:08:57,509 --> 00:08:55,600
when you guys are there

197
00:08:59,590 --> 00:08:57,519
all of our astronauts are excellent

198
00:09:01,030 --> 00:08:59,600
students they're excellent learners and

199
00:09:03,590 --> 00:09:01,040
they excel

200
00:09:04,630 --> 00:09:03,600
and thrive on learning and accumulating

201
00:09:05,910 --> 00:09:04,640
knowledge

202
00:09:09,350 --> 00:09:05,920
and

203
00:09:11,990 --> 00:09:09,360
they have done that their whole life

204
00:09:14,710 --> 00:09:12,000
most of our astronauts are in their 30s

205
00:09:16,630 --> 00:09:14,720
by the time they get selected to become

206
00:09:19,670 --> 00:09:16,640
astronauts they're picked from

207
00:09:21,110 --> 00:09:19,680
a large pool of volunteers

208
00:09:24,150 --> 00:09:21,120
and we're trying to pick the best

209
00:09:24,949 --> 00:09:24,160
candidates for those jobs

210
00:09:27,990 --> 00:09:24,959
and

211
00:09:29,910 --> 00:09:28,000
it doesn't we have a lot of different

212
00:09:33,030 --> 00:09:29,920
ideas they're not all

213
00:09:35,829 --> 00:09:33,040

test pilots some are doctors some are

214
00:09:37,350 --> 00:09:35,839
geologists some are oceanographers so

215
00:09:41,350 --> 00:09:37,360
they come from a lot of different

216
00:09:43,990 --> 00:09:41,360
scientific and technical backgrounds

217
00:09:45,990 --> 00:09:44,000
once they're picked to be an astronaut

218
00:09:47,910 --> 00:09:46,000
it takes about a year and a half to do

219
00:09:50,070 --> 00:09:47,920
the basic training

220
00:09:52,389 --> 00:09:50,080
and then they go on to advanced training

221
00:09:54,870 --> 00:09:52,399
which probably will take another year

222
00:09:56,630 --> 00:09:54,880
uh before they're assigned to a mission

223
00:09:59,030 --> 00:09:56,640
and once they're assigned to a mission

224
00:10:01,509 --> 00:09:59,040
it takes another two and a half years

225
00:10:04,470 --> 00:10:01,519
before they're actually uh

226
00:10:06,310 --> 00:10:04,480
on board the space station so actually

227
00:10:08,630 --> 00:10:06,320
you can see that's about five to six

228
00:10:10,550 --> 00:10:08,640
years of training uh once they're

229
00:10:12,870 --> 00:10:10,560
selected as astronauts

230
00:10:14,949 --> 00:10:12,880
some uh have been around as long as ten

231
00:10:16,790 --> 00:10:14,959
years before they fly

232
00:10:17,590 --> 00:10:16,800
and i think uh part of the question what

233
00:10:22,310 --> 00:10:17,600
what

234
00:10:23,910 --> 00:10:22,320
and a lot of that i think folks would be

235
00:10:26,630 --> 00:10:23,920
surprised they have a lot of classroom

236
00:10:28,069 --> 00:10:26,640
training too so just like you in school

237
00:10:29,590 --> 00:10:28,079
there are a lot of times studying in a

238
00:10:31,110 --> 00:10:29,600

classroom setting

239
00:10:33,430 --> 00:10:31,120
with book studying trying to learn the

240
00:10:35,110 --> 00:10:33,440
systems the space station systems how

241
00:10:36,870 --> 00:10:35,120
how all the different

242
00:10:39,030 --> 00:10:36,880
oxygen systems

243
00:10:40,550 --> 00:10:39,040
thermal systems all those things work so

244
00:10:42,949 --> 00:10:40,560
some of it's similar to what you do and

245
00:10:44,550 --> 00:10:42,959
then other times they're in a a mock-up

246
00:10:45,829 --> 00:10:44,560
which is kind of like a pretend space

247
00:10:47,509 --> 00:10:45,839
station and that's where they're

248
00:10:49,910 --> 00:10:47,519
rehearsing the procedures and learning

249
00:10:52,150 --> 00:10:49,920
how to work with the team

250
00:10:54,790 --> 00:10:52,160
other thoughts hell

251
00:10:56,310 --> 00:10:54,800
no that's a that's quite true and also

252
00:10:58,710 --> 00:10:56,320
they have to do a lot of language

253
00:11:00,949 --> 00:10:58,720
training since our astronauts are

254
00:11:03,430 --> 00:11:00,959
working with russian crew members and

255
00:11:05,430 --> 00:11:03,440
mission control in moscow often

256
00:11:08,550 --> 00:11:05,440
communicates in russian

257
00:11:10,230 --> 00:11:08,560
they need a to be competent russian

258
00:11:19,190 --> 00:11:10,240
speakers so

259
00:11:23,110 --> 00:11:21,670
hello my name is andy my questions for

260
00:11:24,389 --> 00:11:23,120
today is since

261
00:11:25,590 --> 00:11:24,399
all space shuttles have been

262
00:11:28,870 --> 00:11:25,600
decommissioned

263
00:11:32,790 --> 00:11:28,880

how do you get some supplies food and

264
00:11:37,110 --> 00:11:34,630
okay well that's a good question because

265
00:11:38,470 --> 00:11:37,120
obviously the crew cannot get by without

266
00:11:41,190 --> 00:11:38,480
food and water

267
00:11:43,829 --> 00:11:41,200
and we have several

268
00:11:46,949 --> 00:11:43,839
resupply cargo ships

269
00:11:48,790 --> 00:11:46,959
we have the progress which is a russian

270
00:11:51,670 --> 00:11:48,800
uh cargo vehicle

271
00:11:54,069 --> 00:11:51,680
we have the atv the aryan transfer

272
00:11:56,949 --> 00:11:54,079
vehicle which one was just launched out

273
00:11:59,190 --> 00:11:56,959
of french guiana here yesterday it's a

274
00:12:01,910 --> 00:11:59,200
very large cargo vehicles bringing up a

275
00:12:05,110 --> 00:12:01,920
lot of food and water and spare parts

276
00:12:08,069 --> 00:12:05,120
we have the dragon space capsule

277
00:12:09,030 --> 00:12:08,079
from a private firm of spacex and the

278
00:12:11,590 --> 00:12:09,040
cygnus

279
00:12:14,949 --> 00:12:11,600
cargo vehicle will be coming up this

280
00:12:17,670 --> 00:12:14,959
fall sometime and also we have the htv

281
00:12:20,150 --> 00:12:17,680
which is a japanese cargo vehicle so we

282
00:12:22,870 --> 00:12:20,160
have several cargo vehicles available to

283
00:12:25,190 --> 00:12:22,880
us to bring up that food and water now

284
00:12:27,829 --> 00:12:25,200
that the space shuttle is retired our

285
00:12:29,990 --> 00:12:27,839
only vehicle to actually bring the crew

286
00:12:33,269 --> 00:12:30,000
up is a russian-built vehicle called the

287
00:12:35,829 --> 00:12:33,279
soyuz it carries a crew of three and

288
00:12:39,430 --> 00:12:35,839

we're hoping with commercial crew and

289
00:12:40,870 --> 00:12:39,440
with our orion program to develop a new

290
00:12:43,269 --> 00:12:40,880
launch vehicle

291
00:12:52,230 --> 00:12:43,279
an american-built vehicle that can also

292
00:12:56,949 --> 00:12:54,710
hi i'm annie um what has been the most

293
00:12:59,590 --> 00:12:56,959
memorable or exciting moment for you too

294
00:13:01,910 --> 00:12:59,600
in the control center

295
00:13:05,190 --> 00:13:01,920
well for me personally um

296
00:13:07,509 --> 00:13:05,200
you know we have uh sort of busy times

297
00:13:08,870 --> 00:13:07,519
and we have times that are not quite so

298
00:13:12,230 --> 00:13:08,880
busy so

299
00:13:13,190 --> 00:13:12,240
i think of myself the most exciting time

300
00:13:16,150 --> 00:13:13,200
for me

301
00:13:17,670 --> 00:13:16,160
was when we brought up node 3

302
00:13:19,110 --> 00:13:17,680
and the cupola

303
00:13:21,670 --> 00:13:19,120
and we attached that to the

304
00:13:24,150 --> 00:13:21,680
international space station that was the

305
00:13:26,870 --> 00:13:24,160
last major

306
00:13:28,790 --> 00:13:26,880
item that was going to be attached to

307
00:13:32,150 --> 00:13:28,800
the space station there was a few other

308
00:13:33,910 --> 00:13:32,160
experiments and a a sort of big closet

309
00:13:36,790 --> 00:13:33,920
that we brought up later but this was

310
00:13:39,430 --> 00:13:36,800
the last big module and to be part of

311
00:13:40,949 --> 00:13:39,440
that mission and see that this face

312
00:13:43,509 --> 00:13:40,959
space station would

313
00:13:46,230 --> 00:13:43,519

finally be completed was a very exciting

314
00:13:47,269 --> 00:13:46,240
moment for me it was kind of like seeing

315
00:13:54,230 --> 00:13:47,279
the

316
00:13:56,710 --> 00:13:54,240
first become operational finally finish

317
00:13:58,550 --> 00:13:56,720
its initial construction and be cleared

318
00:14:00,069 --> 00:13:58,560
operational so that was a very exciting

319
00:14:02,389 --> 00:14:00,079
time for me

320
00:14:04,550 --> 00:14:02,399
yeah i'm sure that michael has told you

321
00:14:06,550 --> 00:14:04,560
guys the space station is as big as a

322
00:14:08,710 --> 00:14:06,560
football field it's really really huge

323
00:14:09,829 --> 00:14:08,720
and hard to imagine in space but it had

324
00:14:11,829 --> 00:14:09,839
to be built

325
00:14:13,670 --> 00:14:11,839
piece by piece with different modules

326
00:14:15,750 --> 00:14:13,680
being flown up some of those modules

327
00:14:17,430 --> 00:14:15,760
were built in other countries and they

328
00:14:19,189 --> 00:14:17,440
were all brought up there individually

329
00:14:20,949 --> 00:14:19,199
and pieced together so

330
00:14:22,550 --> 00:14:20,959
for people like hal who've worked on it

331
00:14:25,110 --> 00:14:22,560
for a long time and been a part of it to

332
00:14:26,389 --> 00:14:25,120
see it being built over years it was

333
00:14:28,710 --> 00:14:26,399
probably a big deal to see it come

334
00:14:30,550 --> 00:14:28,720
together and the cupola of course is a

335
00:14:33,189 --> 00:14:30,560
special piece because it has all the

336
00:14:34,629 --> 00:14:33,199
windows so that's a favorite spot for

337
00:14:37,590 --> 00:14:34,639
the astronauts on the space station

338
00:14:39,430 --> 00:14:37,600

where they go and and literally it's

339
00:14:41,189 --> 00:14:39,440
almost like going into a bay window

340
00:14:42,470 --> 00:14:41,199
where there's windows on every surface

341
00:14:43,509 --> 00:14:42,480
and they can look out and just see a

342
00:14:45,750 --> 00:14:43,519
wide wide

343
00:14:48,870 --> 00:14:45,760
panoramic view of the earth so it's a

344
00:14:52,230 --> 00:14:50,150
yeah i think

345
00:14:55,030 --> 00:14:52,240
back one of the books that they had us

346
00:14:58,150 --> 00:14:55,040
read when we were young was uh jules

347
00:15:00,470 --> 00:14:58,160
verne 20 000 leagues under the sea and

348
00:15:02,710 --> 00:15:00,480
his submarine had a big picture window

349
00:15:04,790 --> 00:15:02,720
in the front of the submarine and and so

350
00:15:06,790 --> 00:15:04,800
the cupola is kind of this big window

351
00:15:10,069 --> 00:15:06,800
that you get to look out at the earth

352
00:15:11,189 --> 00:15:10,079
below and uh i've had crew members tell

353
00:15:13,590 --> 00:15:11,199
me that

354
00:15:15,910 --> 00:15:13,600
it has such an impact on them that it

355
00:15:20,629 --> 00:15:15,920
actually brings them to tears to look

356
00:15:25,509 --> 00:15:23,670
hi my name is jordan and my question is

357
00:15:29,030 --> 00:15:25,519
what is everyday life in the command

358
00:15:30,790 --> 00:15:29,040
center and the space station

359
00:15:33,590 --> 00:15:30,800
well every day is

360
00:15:35,509 --> 00:15:33,600
a little different as you might imagine

361
00:15:37,590 --> 00:15:35,519
but let me give you a thumbnail uh

362
00:15:40,470 --> 00:15:37,600
sketch of what it's like

363
00:15:42,790 --> 00:15:40,480

we operate on greenwich mean time and

364
00:15:44,870 --> 00:15:42,800
the crew gets up at about six o'clock

365
00:15:46,470 --> 00:15:44,880
greenwich mean time

366
00:15:49,430 --> 00:15:46,480
for us that's about

367
00:15:51,990 --> 00:15:49,440
one o'clock or midnight here in houston

368
00:15:53,990 --> 00:15:52,000
so we bring in a control team there's

369
00:15:56,629 --> 00:15:54,000
three control teams we each work about

370
00:15:59,829 --> 00:15:56,639
eight hour shifts uh and hand over to

371
00:16:01,829 --> 00:15:59,839
the next shift the crew gets up uh you

372
00:16:03,749 --> 00:16:01,839
know does their normal things awaken up

373
00:16:05,829 --> 00:16:03,759
and getting dressed and having breakfast

374
00:16:07,189 --> 00:16:05,839
and all that we talk to them first thing

375
00:16:09,509 --> 00:16:07,199
in the morning kind of tell them what's

376
00:16:11,030 --> 00:16:09,519
going on and and any uh important

377
00:16:13,110 --> 00:16:11,040
developments that may have happened

378
00:16:16,790 --> 00:16:13,120
while they were sleeping and then they

379
00:16:18,870 --> 00:16:16,800
start into their uh routine um we work

380
00:16:20,870 --> 00:16:18,880
really hard to keep the crew busy and we

381
00:16:23,829 --> 00:16:20,880
have them a signed task

382
00:16:26,470 --> 00:16:23,839
a basically a flow chart

383
00:16:27,430 --> 00:16:26,480
of the activities for the day and the

384
00:16:29,030 --> 00:16:27,440
crew

385
00:16:30,949 --> 00:16:29,040
works through those

386
00:16:33,110 --> 00:16:30,959
we help them with that

387
00:16:35,110 --> 00:16:33,120
we take actions on the ground to maybe

388
00:16:37,590 --> 00:16:35,120

save some equipment turn it off before

389
00:16:39,749 --> 00:16:37,600
they change out a part or something like

390
00:16:42,150 --> 00:16:39,759
that and they work through till about

391
00:16:44,470 --> 00:16:42,160
lunch time while this is going on the

392
00:16:46,949 --> 00:16:44,480
crew actually has about two and a half

393
00:16:49,110 --> 00:16:46,959
hours of exercise during the day

394
00:16:51,590 --> 00:16:49,120
they do uh half of their exercise would

395
00:16:54,710 --> 00:16:51,600
be aerobic that's like running or

396
00:16:57,030 --> 00:16:54,720
peddling a bicycle the other half is

397
00:17:00,470 --> 00:16:57,040
strength training and they do that on

398
00:17:02,790 --> 00:17:00,480
our resistive exercise device and so

399
00:17:06,069 --> 00:17:02,800
they they work that into their schedule

400
00:17:09,510 --> 00:17:06,079
after lunch they have more activities

401
00:17:11,669 --> 00:17:09,520
around about 3 30 in the afternoon we

402
00:17:12,630 --> 00:17:11,679
kind of wrap up the the work day for the

403
00:17:13,590 --> 00:17:12,640
crew

404
00:17:17,829 --> 00:17:13,600
and

405
00:17:18,710 --> 00:17:17,839
half to kind of have supper get settled

406
00:17:21,590 --> 00:17:18,720
down

407
00:17:23,270 --> 00:17:21,600
take care of their own sort of interests

408
00:17:25,350 --> 00:17:23,280
and then they go to bed for eight hours

409
00:17:27,590 --> 00:17:25,360
and get up and do it again

410
00:17:29,430 --> 00:17:27,600
on the weekends

411
00:17:32,710 --> 00:17:29,440
saturday morning they do a lot of house

412
00:17:36,710 --> 00:17:32,720
cleaning vacuuming uh swabbing down

413
00:17:39,830 --> 00:17:36,720

areas of the of the uh the uh the hull

414
00:17:40,470 --> 00:17:39,840
and uh inspecting things um the rest of

415
00:17:43,110 --> 00:17:40,480
the

416
00:17:44,549 --> 00:17:43,120
saturday is usually uh free time for

417
00:17:47,669 --> 00:17:44,559
what they want to do

418
00:17:50,070 --> 00:17:47,679
sunday uh again is another uh kind of

419
00:17:52,310 --> 00:17:50,080
off day for them where they can spend

420
00:17:55,110 --> 00:17:52,320
some of their own time and then we talk

421
00:17:57,110 --> 00:17:55,120
to them sunday night and give them uh

422
00:17:59,350 --> 00:17:57,120
some updates on what will be happening

423
00:18:01,990 --> 00:17:59,360
the following week so that's kind of a

424
00:18:04,150 --> 00:18:02,000
typical day um you know there are

425
00:18:07,270 --> 00:18:04,160
atypical days where we're doing space

426
00:18:10,070 --> 00:18:07,280
walks or we're having visited vehicles

427
00:18:12,070 --> 00:18:10,080
come uh and they'll reach out and grab

428
00:18:14,630 --> 00:18:12,080
them and pull them in so those are kind

429
00:18:23,909 --> 00:18:14,640
of the special days but

430
00:18:23,919 --> 00:18:27,270
hi my name

431
00:18:32,710 --> 00:18:30,230
the is aboard iss switch out and get to

432
00:18:37,029 --> 00:18:34,950
well currently our

433
00:18:39,350 --> 00:18:37,039
average duration of the crew is about

434
00:18:41,510 --> 00:18:39,360
six months you know a few days less a

435
00:18:43,430 --> 00:18:41,520
few days more depending on

436
00:18:46,789 --> 00:18:43,440
a few factors

437
00:18:48,710 --> 00:18:46,799
we will have a crew coming up

438
00:18:51,750 --> 00:18:48,720

next year that will be up for a full

439
00:18:54,150 --> 00:18:51,760
year and that's just part of our

440
00:18:55,270 --> 00:18:54,160
data gathering to see the effects on the

441
00:18:57,430 --> 00:18:55,280
crew

442
00:19:08,830 --> 00:18:57,440
being in waitlist for a full year but

443
00:19:14,390 --> 00:19:11,590
months my name is kelsey

444
00:19:18,789 --> 00:19:14,400
have you ever had an emergency on before

445
00:19:23,510 --> 00:19:20,950
well that's a good question because as

446
00:19:26,070 --> 00:19:23,520
you might imagine we have very well

447
00:19:27,750 --> 00:19:26,080
developed procedures and actions and we

448
00:19:29,029 --> 00:19:27,760
practice quite a bit for those

449
00:19:31,750 --> 00:19:29,039
occurrences

450
00:19:34,549 --> 00:19:31,760
we've had quite a few false alarms in

451
00:19:37,510 --> 00:19:34,559
other words a smoke detector

452
00:19:39,990 --> 00:19:37,520
you know will go off and we'll analyze

453
00:19:42,470 --> 00:19:40,000
the condition and decide that it was a

454
00:19:44,950 --> 00:19:42,480
faulty sensor or something like that

455
00:19:47,669 --> 00:19:44,960
we've also had what we thought was a

456
00:19:51,029 --> 00:19:47,679
contaminated atmosphere

457
00:19:54,310 --> 00:19:51,039
which was simply baking out of a

458
00:19:55,909 --> 00:19:54,320
absorbing material that had some gunk in

459
00:19:57,909 --> 00:19:55,919
it so to speak

460
00:20:00,870 --> 00:19:57,919
that smelled bad but it turned out it

461
00:20:03,669 --> 00:20:00,880
was not really harmful to the crew so no

462
00:20:08,070 --> 00:20:03,679
i've not actually been on when we've had

463
00:20:09,990 --> 00:20:08,080

a actual emergency and so far we haven't

464
00:20:18,310 --> 00:20:10,000
had any true emergencies on space

465
00:20:22,549 --> 00:20:20,549
hi my name is joe and my question is

466
00:20:26,230 --> 00:20:22,559
what inspired you to do your job and

467
00:20:30,630 --> 00:20:28,070
okay well when i was

468
00:20:32,789 --> 00:20:30,640
in junior high school

469
00:20:35,990 --> 00:20:32,799
the first apollo mission

470
00:20:38,710 --> 00:20:36,000
was going to the moon and it was apollo

471
00:20:39,909 --> 00:20:38,720
8 and they flew a

472
00:20:42,549 --> 00:20:39,919
uh

473
00:20:44,789 --> 00:20:42,559
race track around the moon they didn't

474
00:20:46,470 --> 00:20:44,799
actually land but they just flew around

475
00:20:47,350 --> 00:20:46,480
the moon and they did that

476
00:20:49,029 --> 00:20:47,360
on

477
00:20:51,110 --> 00:20:49,039
christmas eve

478
00:20:53,029 --> 00:20:51,120
and so i can remember

479
00:20:56,230 --> 00:20:53,039
being with my family

480
00:20:58,549 --> 00:20:56,240
at a christmas party at night

481
00:20:59,430 --> 00:20:58,559
watching that on tv

482
00:21:01,029 --> 00:20:59,440
and

483
00:21:03,669 --> 00:21:01,039
hearing from

484
00:21:04,870 --> 00:21:03,679
astronauts talking from the far side of

485
00:21:07,350 --> 00:21:04,880
the moon

486
00:21:08,870 --> 00:21:07,360
about their experiencing and reading

487
00:21:11,830 --> 00:21:08,880
from the bible

488
00:21:13,669 --> 00:21:11,840

and i thought boy that's something i'd

489
00:21:14,789 --> 00:21:13,679
really like to do

490
00:21:17,750 --> 00:21:14,799
and

491
00:21:20,070 --> 00:21:17,760
around

492
00:21:22,310 --> 00:21:20,080
um preparing myself

493
00:21:23,190 --> 00:21:22,320
studying taking the courses

494
00:21:28,789 --> 00:21:23,200
uh

495
00:21:30,470 --> 00:21:28,799
someday i i could be picked i never was

496
00:21:32,710 --> 00:21:30,480
picked but i

497
00:21:40,789 --> 00:21:32,720
i really enjoy working in the space

498
00:21:45,510 --> 00:21:42,830
hi my name

499
00:21:46,870 --> 00:21:45,520
is how hard is the training to work at

500
00:21:48,549 --> 00:21:46,880
mission control

501
00:21:53,669 --> 00:21:48,559
what schools and places did you have to

502
00:21:58,549 --> 00:21:56,310
well fortunate for for me

503
00:22:00,789 --> 00:21:58,559
i had a lot of experience

504
00:22:03,190 --> 00:22:00,799
in other jobs

505
00:22:05,590 --> 00:22:03,200
i was a fighter pilot in the united

506
00:22:11,430 --> 00:22:05,600
states air force for 20 years

507
00:22:15,909 --> 00:22:13,510
so um i uh

508
00:22:17,830 --> 00:22:15,919
i was well prepared for the job now a

509
00:22:20,310 --> 00:22:17,840
lot of our folks who come and work in

510
00:22:21,590 --> 00:22:20,320
mission control are right out of college

511
00:22:22,390 --> 00:22:21,600
and so

512
00:22:24,830 --> 00:22:22,400
um

513
00:22:26,390 --> 00:22:24,840

it's a challenge

514
00:22:29,270 --> 00:22:26,400
to

515
00:22:31,350 --> 00:22:29,280
learn the precision of the business in

516
00:22:33,110 --> 00:22:31,360
other words

517
00:22:35,590 --> 00:22:33,120
sloppy work

518
00:22:38,630 --> 00:22:35,600
doesn't count for much here

519
00:22:41,029 --> 00:22:38,640
you don't get partial credit for

520
00:22:43,750 --> 00:22:41,039
making a good try what we really want is

521
00:22:44,789 --> 00:22:43,760
results and we want people who are

522
00:22:46,710 --> 00:22:44,799
really

523
00:22:47,590 --> 00:22:46,720
focused on the important things of the

524
00:22:49,830 --> 00:22:47,600
job

525
00:22:52,310 --> 00:22:49,840
so in that sense

526
00:22:53,510 --> 00:22:52,320
if you're well prepared it's not that

527
00:22:55,909 --> 00:22:53,520
difficult

528
00:22:59,110 --> 00:22:55,919
but it is a challenging program there's

529
00:23:01,909 --> 00:22:59,120
a lot of information to learn a lot of

530
00:23:03,350 --> 00:23:01,919
facts and figures that you must be

531
00:23:05,830 --> 00:23:03,360
comfortable with

532
00:23:16,950 --> 00:23:05,840
so it is a challenge for most of our

533
00:23:21,110 --> 00:23:18,789
hi my name is kendall

534
00:23:23,190 --> 00:23:21,120
my question is communication hanging so

535
00:23:27,909 --> 00:23:23,200
far away is it always easy to connect

536
00:23:32,950 --> 00:23:30,710
well this is an excellent question and i

537
00:23:35,990 --> 00:23:32,960
just want to say that like right now

538
00:23:38,710 --> 00:23:36,000

we're having a period of time where the

539
00:23:41,350 --> 00:23:38,720
sun is uh at a very high angle over the

540
00:23:44,390 --> 00:23:41,360
station and we're having some thermal

541
00:23:46,310 --> 00:23:44,400
problems with our ku antenna big dish

542
00:23:49,029 --> 00:23:46,320
antenna that you'd like see

543
00:23:51,350 --> 00:23:49,039
um out on the outside of your house

544
00:23:53,909 --> 00:23:51,360
and that antenna is getting too cold so

545
00:23:56,950 --> 00:23:53,919
we can't use it right now so we've not

546
00:23:59,750 --> 00:23:56,960
we're not able to get video down and

547
00:24:03,029 --> 00:23:59,760
data up to the crew so that's kind of a

548
00:24:06,230 --> 00:24:03,039
glitch um every now and then we'll have

549
00:24:08,789 --> 00:24:06,240
the com will break up and we have to say

550
00:24:11,269 --> 00:24:08,799
things twice and all that but normally

551
00:24:13,669 --> 00:24:11,279
our communications is very clear and

552
00:24:18,630 --> 00:24:13,679
very reliable but from time to time we

553
00:24:21,669 --> 00:24:20,230
all right and i understand that's our

554
00:24:23,590 --> 00:24:21,679
last question but we want to thank you

555
00:24:24,789 --> 00:24:23,600
guys again for uh taking the time to ask

556
00:24:26,470 --> 00:24:24,799
some questions and learn a little bit

557
00:24:29,590 --> 00:24:26,480
more about the space station and thank

558
00:24:31,430 --> 00:24:29,600
hal for uh joining us thanks guys hey

559
00:24:33,669 --> 00:24:31,440
thanks very much i'm sorry for the folks