
PAO

1
00:00:04,710 --> 00:00:02,550
well welcome to a mission control in

2
00:00:07,030 --> 00:00:04,720
houston my name is pat ryan i'm the

3
00:00:09,270 --> 00:00:07,040
public affairs officer on the orbit two

4
00:00:11,669 --> 00:00:09,280
shift here in mission control today and

5
00:00:13,110 --> 00:00:11,679
we've just finished up our live update

6
00:00:15,749 --> 00:00:13,120
on the activities on board the

7
00:00:17,670 --> 00:00:15,759
international space station and uh happy

8
00:00:19,590 --> 00:00:17,680
to join you and get to tell you more

9
00:00:21,590 --> 00:00:19,600
about nasa and about the space station

10
00:00:23,109 --> 00:00:21,600
what's going on i've invited along

11
00:00:26,150 --> 00:00:23,119
another one of our flight controllers

12
00:00:27,269 --> 00:00:26,160
who works here uh ken niece is a cronus

13
00:00:29,269 --> 00:00:27,279

specialist

14
00:00:31,189 --> 00:00:29,279
and we're going to find out what that is

15
00:00:33,350 --> 00:00:31,199
after we first find out about you what

16
00:00:36,069 --> 00:00:33,360
is it your professional background how

17
00:00:37,750 --> 00:00:36,079
did you end up at nasa okay um well i

18
00:00:39,990 --> 00:00:37,760
grew up in the philadelphia area

19
00:00:40,950 --> 00:00:40,000
philadelphia pennsylvania suburbs i was

20
00:00:43,830 --> 00:00:40,960
always

21
00:00:46,389 --> 00:00:43,840
proficient at taking things apart to my

22
00:00:49,270 --> 00:00:46,399
parents dismay they've labeled that

23
00:00:50,790 --> 00:00:49,280
breaking things but i always wanted to

24
00:00:52,790 --> 00:00:50,800
see how things worked

25
00:00:55,830 --> 00:00:52,800
and along the way i

26
00:00:58,310 --> 00:00:55,840
had was very good at math and sciences

27
00:01:00,389 --> 00:00:58,320
so i pursued the field of engineering

28
00:01:01,830 --> 00:01:00,399
when i went into college i went to penn

29
00:01:03,510 --> 00:01:01,840
state university

30
00:01:05,670 --> 00:01:03,520
got my graduate

31
00:01:07,350 --> 00:01:05,680
undergraduate and my graduate degree at

32
00:01:08,870 --> 00:01:07,360
penn state and

33
00:01:11,190 --> 00:01:08,880
at that point

34
00:01:13,350 --> 00:01:11,200
i got recruited by nasa at one of the

35
00:01:14,230 --> 00:01:13,360
college fairs career fairs

36
00:01:17,190 --> 00:01:14,240
and

37
00:01:17,990 --> 00:01:17,200
i've been working here ever since

38
00:01:19,590 --> 00:01:18,000

let's

39
00:01:21,190 --> 00:01:19,600
find out as i said we're going to find

40
00:01:22,710 --> 00:01:21,200
out what a cronus does because i imagine

41
00:01:24,149 --> 00:01:22,720
that that's one of the first questions

42
00:01:25,510 --> 00:01:24,159
that we're going to hear we're ready to

43
00:01:32,870 --> 00:01:25,520
hear what the kids in little rock have

44
00:01:39,270 --> 00:01:35,350
good morning my name is daniel ray and

45
00:01:43,510 --> 00:01:41,830
and i have a question for you

46
00:01:45,670 --> 00:01:43,520
there

47
00:01:49,270 --> 00:01:45,680
could you name one or two conditions

48
00:01:52,389 --> 00:01:49,280
that could negatively affect operations

49
00:01:54,710 --> 00:01:52,399
for the flight control team

50
00:01:56,230 --> 00:01:54,720
that is a really good question uh there

51
00:01:58,389 --> 00:01:56,240
are a couple things

52
00:01:59,270 --> 00:01:58,399
that could negatively affect us down

53
00:02:00,789 --> 00:01:59,280
here

54
00:02:03,030 --> 00:02:00,799
the first is

55
00:02:06,069 --> 00:02:03,040
loss of communications

56
00:02:08,070 --> 00:02:06,079
one of our main ways to

57
00:02:11,190 --> 00:02:08,080
figure out how things are going on on

58
00:02:13,990 --> 00:02:11,200
the space station is via the telemetry

59
00:02:17,030 --> 00:02:14,000
and data rece receive on the ground and

60
00:02:19,830 --> 00:02:17,040
by actually talking to the crew if

61
00:02:22,710 --> 00:02:19,840
we don't have those links

62
00:02:24,150 --> 00:02:22,720
then we don't have a way to

63
00:02:26,070 --> 00:02:24,160

talk to the crew to figure out what's

64
00:02:28,150 --> 00:02:26,080
going on or to

65
00:02:31,190 --> 00:02:28,160
interact intervene

66
00:02:33,350 --> 00:02:31,200
from the ground fix anything so it's

67
00:02:34,830 --> 00:02:33,360
really important for us to try to

68
00:02:37,589 --> 00:02:34,840
utilize our

69
00:02:38,309 --> 00:02:37,599
communication time frames as best as we

70
00:02:40,470 --> 00:02:38,319
can

71
00:02:42,630 --> 00:02:40,480
another thing that could negatively

72
00:02:46,710 --> 00:02:42,640
affect affect us is

73
00:02:48,309 --> 00:02:46,720
a malfunction if something does go wrong

74
00:02:51,509 --> 00:02:48,319
everything that's scheduled for the day

75
00:02:53,830 --> 00:02:51,519
depending on how big the malfunction is

76
00:02:55,430 --> 00:02:53,840
the whole day could be wiped out so it

77
00:02:58,149 --> 00:02:55,440
really depends on what the malfunction

78
00:02:59,830 --> 00:02:58,159
is but

79
00:03:01,670 --> 00:02:59,840
those are some of the big things that

80
00:03:04,550 --> 00:03:01,680
can really

81
00:03:07,110 --> 00:03:04,560
affect the ground controllers us here on

82
00:03:08,949 --> 00:03:07,120
the ground the flight controller team

83
00:03:11,509 --> 00:03:08,959
and particularly for for you for a

84
00:03:14,149 --> 00:03:11,519
cronus officer explain what it is what

85
00:03:16,710 --> 00:03:14,159
systems you guys are charged with

86
00:03:19,750 --> 00:03:16,720
maintaining as acronis we are in charge

87
00:03:21,430 --> 00:03:19,760
of those communication pathways so

88
00:03:24,309 --> 00:03:21,440

the voice

89
00:03:26,710 --> 00:03:24,319
that commands the data we get from the

90
00:03:28,710 --> 00:03:26,720
space station

91
00:03:31,350 --> 00:03:28,720
the video that we get down from the

92
00:03:34,229 --> 00:03:31,360
space station all the status health and

93
00:03:36,550 --> 00:03:34,239
status of our systems of our

94
00:03:39,190 --> 00:03:36,560
payload data our science data comes down

95
00:03:41,830 --> 00:03:39,200
through the systems that i manage

96
00:03:44,869 --> 00:03:41,840
so that's what we're in control of

97
00:03:51,509 --> 00:03:44,879
and and it's a really fun job

98
00:03:55,830 --> 00:03:53,750
my name is kyle holmes and i'm in the

99
00:03:59,589 --> 00:03:55,840
eighth grade

100
00:04:01,670 --> 00:03:59,599
about one with the flight controller

101
00:04:02,710 --> 00:04:01,680
command history logs

102
00:04:05,830 --> 00:04:02,720
daily

103
00:04:07,750 --> 00:04:05,840
weekly monthly or win

104
00:04:10,070 --> 00:04:07,760
that's another very specific yeah that's

105
00:04:12,149 --> 00:04:10,080
a very good question um

106
00:04:14,869 --> 00:04:12,159
part of my discipline were responsible

107
00:04:17,430 --> 00:04:14,879
for the computers and downlinking those

108
00:04:20,629 --> 00:04:17,440
logs like you talked about

109
00:04:22,790 --> 00:04:20,639
we don't we downlink uh detailed data

110
00:04:25,189 --> 00:04:22,800
from the main computer about once a week

111
00:04:27,270 --> 00:04:25,199
on a sunday afternoon

112
00:04:29,110 --> 00:04:27,280
we get more detailed data from the

113
00:04:30,870 --> 00:04:29,120

crew's personal computers personal

114
00:04:33,030 --> 00:04:30,880
computers they use to command and

115
00:04:36,629 --> 00:04:33,040
receive data from the systems we

116
00:04:40,070 --> 00:04:36,639
downlink that about once every month

117
00:04:42,790 --> 00:04:40,080
behind me in the background we do get

118
00:04:44,310 --> 00:04:42,800
real-time command history data basically

119
00:04:48,390 --> 00:04:44,320
all the commands that we send from the

120
00:04:50,550 --> 00:04:48,400
ground we get a log of that and we we

121
00:04:52,950 --> 00:04:50,560
are constantly saving that so for

122
00:04:55,189 --> 00:04:52,960
historical purposes and to see what is

123
00:04:56,469 --> 00:04:55,199
what has happened

124
00:05:01,830 --> 00:04:56,479
good

125
00:05:06,469 --> 00:05:04,390
hi my name is jonathan jordan and i'm

126
00:05:08,230 --> 00:05:06,479
currently in the eighth grade

127
00:05:11,670 --> 00:05:08,240
i have two questions i would like to ask

128
00:05:14,390 --> 00:05:11,680
you the first one where exactly are the

129
00:05:17,110 --> 00:05:14,400
multiplexer computers located on the

130
00:05:18,870 --> 00:05:17,120
international spaceship or also known as

131
00:05:19,749 --> 00:05:18,880
iss

132
00:05:20,629 --> 00:05:19,759
okay

133
00:05:24,390 --> 00:05:20,639
um

134
00:05:26,310 --> 00:05:24,400
the the multiplexer demonstration

135
00:05:27,749 --> 00:05:26,320
sorry it's a hard word basically our

136
00:05:29,110 --> 00:05:27,759
main computers are located all

137
00:05:30,629 --> 00:05:29,120
throughout the space because there are

138
00:05:32,790 --> 00:05:30,639

very many of them there are there are

139
00:05:35,909 --> 00:05:32,800
over 40 of them um

140
00:05:38,230 --> 00:05:35,919
so we have three tiers of of

141
00:05:39,189 --> 00:05:38,240
these main computers

142
00:05:40,950 --> 00:05:39,199
and

143
00:05:42,790 --> 00:05:40,960
some of them located inside some are

144
00:05:44,790 --> 00:05:42,800
outside some are inside the lab module

145
00:05:46,870 --> 00:05:44,800
in various racks

146
00:05:49,110 --> 00:05:46,880
some are in end cones

147
00:05:51,189 --> 00:05:49,120
some in the like i said the lab node 2

148
00:05:52,469 --> 00:05:51,199
node 3 air lock

149
00:05:54,550 --> 00:05:52,479
the pmm

150
00:05:56,710 --> 00:05:54,560
and then there's a whole bunch outside

151
00:05:58,070 --> 00:05:56,720
on the external trusses so they're

152
00:06:00,390 --> 00:05:58,080
everywhere and they need to be

153
00:06:02,070 --> 00:06:00,400
everywhere to do all the jobs that

154
00:06:04,550 --> 00:06:02,080
they're responsible for and the

155
00:06:06,550 --> 00:06:04,560
multiplexer demultiplexer computers is

156
00:06:08,309 --> 00:06:06,560
there a way to characterize the

157
00:06:10,550 --> 00:06:08,319
the level where they are they're not

158
00:06:12,629 --> 00:06:10,560
just the standard laptops

159
00:06:14,550 --> 00:06:12,639
that the crew interact with all the time

160
00:06:17,670 --> 00:06:14,560
these are the computers that any that

161
00:06:20,230 --> 00:06:17,680
range from uh directly directing uh

162
00:06:22,550 --> 00:06:20,240
traffic from the sensors and effectors

163
00:06:25,029 --> 00:06:22,560

for the data we're trying to gather to

164
00:06:27,189 --> 00:06:25,039
passing it up and interfacing with other

165
00:06:28,230 --> 00:06:27,199
mod other modules or other international

166
00:06:30,070 --> 00:06:28,240
partners

167
00:06:31,270 --> 00:06:30,080
all the way up to our prime computer

168
00:06:33,189 --> 00:06:31,280
which is responsible for putting

169
00:06:35,189 --> 00:06:33,199
together all the data being the cruise

170
00:06:36,950 --> 00:06:35,199
interface and shipping that data where

171
00:06:39,830 --> 00:06:36,960
it needs to be such as the ground or the

172
00:06:41,990 --> 00:06:39,840
cruise laptops

173
00:06:44,390 --> 00:06:42,000
next one

174
00:06:47,110 --> 00:06:44,400
and my second question is how many

175
00:06:49,589 --> 00:06:47,120
channels does the q band communication

176
00:06:52,150 --> 00:06:49,599
systems have

177
00:06:54,790 --> 00:06:52,160
the kuben system uh right now we were

178
00:06:55,909 --> 00:06:54,800
able to get six downlink channels six

179
00:06:57,350 --> 00:06:55,919
downlink

180
00:07:00,230 --> 00:06:57,360
video

181
00:07:03,189 --> 00:07:00,240
either hd or standard definition in

182
00:07:05,670 --> 00:07:03,199
addition to uh ability to talk

183
00:07:07,909 --> 00:07:05,680
via ip phone internet protocol phone to

184
00:07:10,870 --> 00:07:07,919
the crew we can even send email through

185
00:07:13,670 --> 00:07:10,880
it we can ship live video for for the

186
00:07:15,670 --> 00:07:13,680
crew to use and also bring down payload

187
00:07:18,629 --> 00:07:15,680
science data through that

188
00:07:21,189 --> 00:07:18,639

ku band link and the six channels is is

189
00:07:23,990 --> 00:07:21,199
a fairly new development it is uh over

190
00:07:26,150 --> 00:07:24,000
the past uh less than a year

191
00:07:27,909 --> 00:07:26,160
early early this year i should say march

192
00:07:29,350 --> 00:07:27,919
april time frame we expanded our

193
00:07:32,230 --> 00:07:29,360
capabilities from four standard

194
00:07:36,790 --> 00:07:32,240
definition downlinks to six combination

195
00:07:36,800 --> 00:07:42,070
thank you you're welcome

196
00:07:47,510 --> 00:07:44,150
hi my name is nicara floyd and i want to

197
00:07:51,670 --> 00:07:47,520
ask you how many tracking and data relay

198
00:07:57,189 --> 00:07:54,309
so the us has uh i believe eight of

199
00:07:59,589 --> 00:07:57,199
these satellites that we can use

200
00:08:02,070 --> 00:07:59,599
what the international space station

201
00:08:04,950 --> 00:08:02,080
uses for communications is only five of

202
00:08:07,110 --> 00:08:04,960
them so we have the options to use five

203
00:08:09,430 --> 00:08:07,120
which are located in various

204
00:08:19,270 --> 00:08:09,440
parts in relation to the earth

205
00:08:22,309 --> 00:08:20,790
and my question is

206
00:08:24,550 --> 00:08:22,319
why does the antenna have to move to

207
00:08:27,110 --> 00:08:24,560
click data

208
00:08:28,629 --> 00:08:27,120
good question um

209
00:08:31,510 --> 00:08:28,639
are they studied up for you yeah they

210
00:08:32,550 --> 00:08:31,520
did they're trying to trying to stump me

211
00:08:35,430 --> 00:08:32,560
um

212
00:08:37,829 --> 00:08:35,440
the antenna has to move because of the

213
00:08:39,430 --> 00:08:37,839

design of the systems basically

214
00:08:40,310 --> 00:08:39,440
we need to get

215
00:08:43,509 --> 00:08:40,320
high

216
00:08:45,030 --> 00:08:43,519
information down

217
00:08:47,110 --> 00:08:45,040
and

218
00:08:49,829 --> 00:08:47,120
the easiest way to explain that is the

219
00:08:52,630 --> 00:08:49,839
higher the information the smaller

220
00:08:53,509 --> 00:08:52,640
the beam width the antenna

221
00:08:58,389 --> 00:08:53,519
can

222
00:08:59,430 --> 00:08:58,399
we have a small beam width a small area

223
00:09:00,790 --> 00:08:59,440
where you can

224
00:09:03,430 --> 00:09:00,800
actually see

225
00:09:05,670 --> 00:09:03,440
uh or transmit the data then you have to

226
00:09:09,030 --> 00:09:05,680
be able to move that small distance to

227
00:09:11,030 --> 00:09:09,040
track the antenna the satellite if we

228
00:09:13,030 --> 00:09:11,040
don't need as big

229
00:09:14,070 --> 00:09:13,040
or if we don't need a high amount of

230
00:09:16,710 --> 00:09:14,080
traffic

231
00:09:19,269 --> 00:09:16,720
we don't need as big of a beam width or

232
00:09:22,070 --> 00:09:19,279
so we can have a bigger beam width

233
00:09:24,949 --> 00:09:22,080
and not have to tr uh move for the

234
00:09:26,310 --> 00:09:24,959
gimbals for our antennas and

235
00:09:27,990 --> 00:09:26,320
i believe part of the reason that the

236
00:09:29,829 --> 00:09:28,000
antennas move too has to do with the

237
00:09:32,630 --> 00:09:29,839
tdrs satellites because you have to

238
00:09:35,190 --> 00:09:32,640

point the antenna at the satellite

239
00:09:37,350 --> 00:09:35,200
the station is moving but the satellites

240
00:09:39,990 --> 00:09:37,360
are not relative exactly

241
00:09:43,829 --> 00:09:40,000
as the tdrs is moving the station is

242
00:09:46,710 --> 00:09:43,839
moving and it all has to be in sync to

243
00:09:48,710 --> 00:09:46,720
lock up to each other we do have some

244
00:09:51,110 --> 00:09:48,720
parts of antennas that we can fail over

245
00:09:54,070 --> 00:09:51,120
to that are considered low rate

246
00:09:56,470 --> 00:09:54,080
that don't move they're they're

247
00:09:58,710 --> 00:09:56,480
par they're like omnidirectional almost

248
00:10:00,310 --> 00:09:58,720
omnidirectional and it gets

249
00:10:02,150 --> 00:10:00,320
part of the sky

250
00:10:03,670 --> 00:10:02,160
but other than that if you want to

251
00:10:05,509 --> 00:10:03,680
transmit about higher amount of data

252
00:10:07,829 --> 00:10:05,519
you're going to have to track the

253
00:10:12,790 --> 00:10:07,839
satellites

254
00:10:17,269 --> 00:10:14,870
hi my name is zachary

255
00:10:18,790 --> 00:10:17,279
i have one question for you

256
00:10:21,269 --> 00:10:18,800
how do you know when airstrikes are

257
00:10:23,190 --> 00:10:21,279
coming to the iss

258
00:10:25,829 --> 00:10:23,200
wow um

259
00:10:28,470 --> 00:10:25,839
yeah the asteroids are our tough one uh

260
00:10:30,550 --> 00:10:28,480
we have uh a specific flight controller

261
00:10:32,550 --> 00:10:30,560
in the room called topo they're in

262
00:10:35,990 --> 00:10:32,560
charge of all the monitoring and the

263
00:10:38,310 --> 00:10:36,000

trajectories of any types of debris or

264
00:10:40,870 --> 00:10:38,320
objects that could impact the space

265
00:10:42,230 --> 00:10:40,880
station and they talk to one of their

266
00:10:44,710 --> 00:10:42,240
counterparts

267
00:10:47,750 --> 00:10:44,720
called stratcom and there

268
00:10:50,150 --> 00:10:47,760
those two positions monitor all the time

269
00:10:51,750 --> 00:10:50,160
whatever is available to see they've got

270
00:10:53,990 --> 00:10:51,760
lots of radar and satellites that they

271
00:10:56,949 --> 00:10:54,000
can monitor this information

272
00:10:59,110 --> 00:10:56,959
and hopefully alert us if we have any

273
00:11:01,430 --> 00:10:59,120
potential asteroids coming now the

274
00:11:04,310 --> 00:11:01,440
smaller the asteroids the harder it is

275
00:11:06,550 --> 00:11:04,320
to monitor and the less notice we get

276
00:11:08,710 --> 00:11:06,560
the harder to see the bigger they are

277
00:11:09,430 --> 00:11:08,720
hopefully we get enough notice to watch

278
00:11:10,630 --> 00:11:09,440
out

279
00:11:12,470 --> 00:11:10,640
and they're watching not just for

280
00:11:13,509 --> 00:11:12,480
asteroids but they're keeping track of

281
00:11:16,230 --> 00:11:13,519
all of the

282
00:11:17,590 --> 00:11:16,240
the junk that's in space there's uh over

283
00:11:20,310 --> 00:11:17,600
the course of

284
00:11:22,310 --> 00:11:20,320
50 years or more as as people have flown

285
00:11:24,710 --> 00:11:22,320
in space and they have left garbage up

286
00:11:26,790 --> 00:11:24,720
there there's more things that are up

287
00:11:29,190 --> 00:11:26,800
there and so we have to keep track of of

288
00:11:30,870 --> 00:11:29,200

even small objects because if they were

289
00:11:32,310 --> 00:11:30,880
to collide with the station they could

290
00:11:33,990 --> 00:11:32,320
cause some damage

291
00:11:35,750 --> 00:11:34,000
yeah you got to understand that all

292
00:11:38,230 --> 00:11:35,760
those objects have a trajectory and a

293
00:11:39,910 --> 00:11:38,240
speed of velocity so

294
00:11:41,910 --> 00:11:39,920
it if we're going in a different

295
00:11:43,750 --> 00:11:41,920
direction than that it could have a real

296
00:11:45,430 --> 00:11:43,760
dire effect and we're traveling really

297
00:11:52,949 --> 00:11:45,440
fast

298
00:11:52,959 --> 00:11:59,829
hi my name is seventh grade

299
00:12:06,710 --> 00:12:03,990
have you ever sent a video to space

300
00:12:09,509 --> 00:12:06,720
have i ever sent a video to space

301
00:12:10,629 --> 00:12:09,519
i can't say that i have sent a video to

302
00:12:12,949 --> 00:12:10,639
space

303
00:12:14,230 --> 00:12:12,959
we ship the astronauts video all the

304
00:12:16,069 --> 00:12:14,240
time

305
00:12:18,310 --> 00:12:16,079
me personally know

306
00:12:20,310 --> 00:12:18,320
we are probably shipping them

307
00:12:22,230 --> 00:12:20,320
video as we speak right now

308
00:12:24,790 --> 00:12:22,240
during the crew off duty day we can ship

309
00:12:26,870 --> 00:12:24,800
them live tv as long as we have that

310
00:12:30,069 --> 00:12:26,880
that link that we talked about between

311
00:12:32,470 --> 00:12:30,079
the satellite and the space station

312
00:12:34,550 --> 00:12:32,480
but no i have never sent video the

313
00:12:36,710 --> 00:12:34,560

closest i've gotten to sending video is

314
00:12:39,269 --> 00:12:36,720
sending a picture up to the astronauts

315
00:12:41,509 --> 00:12:39,279
when my daughter was born in december

316
00:12:43,030 --> 00:12:41,519
and they were pretty stoked about seeing

317
00:12:44,470 --> 00:12:43,040
that and they gave me some

318
00:12:46,949 --> 00:12:44,480
congratulations

319
00:12:48,470 --> 00:12:46,959
but we do send video to the crew all the

320
00:12:51,350 --> 00:12:48,480
time as ken says

321
00:12:53,590 --> 00:12:51,360
they get video that is is training video

322
00:12:54,710 --> 00:12:53,600
that that helps teach them how to do

323
00:12:57,750 --> 00:12:54,720
things

324
00:12:59,430 --> 00:12:57,760
they get video live video from their

325
00:13:01,910 --> 00:12:59,440
families they get a chance to have

326
00:13:04,629 --> 00:13:01,920
weekly video conferences with their

327
00:13:07,590 --> 00:13:04,639
families that usually on the weekends

328
00:13:09,509 --> 00:13:07,600
they can get video from in this room

329
00:13:12,550 --> 00:13:09,519
sometimes of events that happen in this

330
00:13:17,430 --> 00:13:12,560
room that gets sent up to them so uh it

331
00:13:17,440 --> 00:13:23,509
thank you

332
00:13:27,829 --> 00:13:25,590
hello my name is sergey williams and the

333
00:13:30,710 --> 00:13:27,839
question i have for you today is

334
00:13:33,590 --> 00:13:30,720
what would happen if

335
00:13:36,150 --> 00:13:33,600
there was a malfunction in the ia

336
00:13:39,590 --> 00:13:36,160
is internal audio

337
00:13:42,069 --> 00:13:39,600
system during an emergency

338
00:13:45,030 --> 00:13:42,079

and you said that during the internal

339
00:13:46,389 --> 00:13:45,040
audio system during emergency

340
00:13:49,110 --> 00:13:46,399
yeah

341
00:13:51,430 --> 00:13:49,120
interesting question so uh

342
00:13:53,110 --> 00:13:51,440
what would happen during an emergency if

343
00:13:55,030 --> 00:13:53,120
it would depend on the malfunction of

344
00:13:57,670 --> 00:13:55,040
the audio system normally during an

345
00:13:59,350 --> 00:13:57,680
emergency we alert uh

346
00:14:00,870 --> 00:13:59,360
the crew that there is an emergency if

347
00:14:03,990 --> 00:14:00,880
they weren't the ones that detected it

348
00:14:06,069 --> 00:14:04,000
via the tones that are produced by the

349
00:14:07,750 --> 00:14:06,079
audio system

350
00:14:10,470 --> 00:14:07,760
to let them know hey there's emergency

351
00:14:12,230 --> 00:14:10,480
need to take some actions uh if there's

352
00:14:14,230 --> 00:14:12,240
no emergency

353
00:14:16,710 --> 00:14:14,240
and they know about it and there's an

354
00:14:19,590 --> 00:14:16,720
audio malfunction they're trained on the

355
00:14:22,629 --> 00:14:19,600
responses it's almost ingrained we train

356
00:14:26,629 --> 00:14:22,639
their emergency response very hard and

357
00:14:28,069 --> 00:14:26,639
and very often so they'll just go on

358
00:14:29,990 --> 00:14:28,079
muscle memory they'll go to their

359
00:14:31,350 --> 00:14:30,000
procedures and they'll just go perform

360
00:14:32,949 --> 00:14:31,360
the actions

361
00:14:34,550 --> 00:14:32,959
if we don't have a link if we don't have

362
00:14:36,949 --> 00:14:34,560
audio with the crew

363
00:14:38,389 --> 00:14:36,959

hopefully the the failure would be one

364
00:14:40,389 --> 00:14:38,399
where we still

365
00:14:43,350 --> 00:14:40,399
have audio with the crew and we're audit

366
00:14:46,389 --> 00:14:43,360
audited tones but it would impact the

367
00:14:48,870 --> 00:14:46,399
ability for the team on the ground to be

368
00:14:50,550 --> 00:14:48,880
able to follow the crew and for the crew

369
00:14:52,150 --> 00:14:50,560
to be alerted with all their normal

370
00:14:54,790 --> 00:14:52,160
signatures

371
00:14:56,949 --> 00:14:54,800
to rely on the data that's still coming

372
00:14:59,110 --> 00:14:56,959
down but without the ability to talk

373
00:15:01,030 --> 00:14:59,120
exactly

374
00:15:02,150 --> 00:15:01,040
okay

375
00:15:04,949 --> 00:15:02,160
thank you

376
00:15:08,550 --> 00:15:06,949
my name is isaiah perry and i am in the

377
00:15:10,710 --> 00:15:08,560
7th grade

378
00:15:12,790 --> 00:15:10,720
we know that nasa suffered budget cuts

379
00:15:15,030 --> 00:15:12,800
in the past will promise to be affected

380
00:15:16,790 --> 00:15:15,040
by those budget cuts

381
00:15:19,350 --> 00:15:16,800
will kronos be affected by the budget

382
00:15:21,269 --> 00:15:19,360
cuts um

383
00:15:24,230 --> 00:15:21,279
probably in some ways

384
00:15:24,949 --> 00:15:24,240
we've we have already merged with uh

385
00:15:25,829 --> 00:15:24,959
some

386
00:15:30,310 --> 00:15:25,839
we

387
00:15:32,629 --> 00:15:30,320
communication systems and one discipline

388
00:15:34,550 --> 00:15:32,639

and computer and data systems is another

389
00:15:37,749 --> 00:15:34,560
discipline we have since merged into

390
00:15:40,150 --> 00:15:37,759
cronus to combine that i don't foresee

391
00:15:42,470 --> 00:15:40,160
any additional impacts the budget cuts

392
00:15:45,030 --> 00:15:42,480
but it's it's too early to tell i think

393
00:15:51,590 --> 00:15:45,040
i think we're pretty stable

394
00:15:58,629 --> 00:15:54,470
hello my name is gabriela and my

395
00:16:01,829 --> 00:15:58,639
question to you is what is the

396
00:16:05,749 --> 00:16:01,839
what is the machinery you use to send

397
00:16:07,990 --> 00:16:05,759
important information to iss

398
00:16:10,150 --> 00:16:08,000
you said the machinery used to point and

399
00:16:13,030 --> 00:16:10,160
for transmit information i'm not sure

400
00:16:16,150 --> 00:16:13,040
can you repeat the question

401
00:16:19,350 --> 00:16:17,350
what is the

402
00:16:20,629 --> 00:16:19,360
machinery you use

403
00:16:23,990 --> 00:16:20,639
to send

404
00:16:24,790 --> 00:16:24,000
important information to iss

405
00:16:26,870 --> 00:16:24,800
okay

406
00:16:29,110 --> 00:16:26,880
to transmit and receive information

407
00:16:30,710 --> 00:16:29,120
that's that's a good question we use

408
00:16:32,790 --> 00:16:30,720
various pieces of equipment on the

409
00:16:35,509 --> 00:16:32,800
ground our main interface as a flight

410
00:16:37,030 --> 00:16:35,519
controller is our linux workstations you

411
00:16:40,629 --> 00:16:37,040
can kind of see one in the background

412
00:16:43,030 --> 00:16:40,639
here it has command interfaces and

413
00:16:46,069 --> 00:16:43,040

data interfaces and interfaces with the

414
00:16:48,230 --> 00:16:46,079
ground systems so it

415
00:16:51,030 --> 00:16:48,240
puts together what we want to do it

416
00:16:53,509 --> 00:16:51,040
sends it off and puts it into the data

417
00:16:54,790 --> 00:16:53,519
stream and the command stream and at

418
00:16:57,509 --> 00:16:54,800
some point it

419
00:16:59,670 --> 00:16:57,519
it adds the audio information from the

420
00:17:01,590 --> 00:16:59,680
voice channels that we talk to the crew

421
00:17:04,870 --> 00:17:01,600
and then it gets

422
00:17:06,949 --> 00:17:04,880
encrypted and combined and shipped up to

423
00:17:09,829 --> 00:17:06,959
the satellite to shipped over the space

424
00:17:13,110 --> 00:17:09,839
station and receives it's been received

425
00:17:14,870 --> 00:17:13,120
by a satellite dish on our

426
00:17:16,789 --> 00:17:14,880
space station called the

427
00:17:18,470 --> 00:17:16,799
radio frequency uh

428
00:17:19,270 --> 00:17:18,480
gimbal rfg

429
00:17:21,189 --> 00:17:19,280
so

430
00:17:22,789 --> 00:17:21,199
at that point it brings into s-band

431
00:17:24,949 --> 00:17:22,799
system gets

432
00:17:26,789 --> 00:17:24,959
pulled out into uh

433
00:17:28,950 --> 00:17:26,799
it gets decrypted first

434
00:17:32,549 --> 00:17:28,960
and then gets pulled out into audio data

435
00:17:34,630 --> 00:17:32,559
which goes to audio system and uh

436
00:17:36,390 --> 00:17:34,640
the systems data

437
00:17:38,310 --> 00:17:36,400
command data that goes into the main

438
00:17:42,070 --> 00:17:38,320

computer the main computer will then

439
00:17:49,990 --> 00:17:44,830
simple as that simple as

440
00:17:53,510 --> 00:17:51,909
my name's christina

441
00:17:55,669 --> 00:17:53,520
my question is

442
00:17:58,470 --> 00:17:55,679
how are commands and data sent between

443
00:18:00,470 --> 00:17:58,480
mcc and iss

444
00:18:02,789 --> 00:18:00,480
how are commands routed between mcc and

445
00:18:05,029 --> 00:18:02,799
iss we talked a little bit on the

446
00:18:07,590 --> 00:18:05,039
previous question but uh the commands

447
00:18:10,549 --> 00:18:07,600
are we have a set list of commands that

448
00:18:12,950 --> 00:18:10,559
we can choose from that we've tested in

449
00:18:14,470 --> 00:18:12,960
various settings and we can choose it on

450
00:18:16,390 --> 00:18:14,480
our linux workstations and linux

451
00:18:18,390 --> 00:18:16,400
workstations has an application

452
00:18:20,549 --> 00:18:18,400
interface with the command system we

453
00:18:22,710 --> 00:18:20,559
choose a command we

454
00:18:25,909 --> 00:18:22,720
hit you know basically hit we want to

455
00:18:27,430 --> 00:18:25,919
send it it gets added to the stream it

456
00:18:29,350 --> 00:18:27,440
gets combined

457
00:18:32,470 --> 00:18:29,360
with the audio system

458
00:18:35,510 --> 00:18:32,480
it gets encrypted so you know only the

459
00:18:38,390 --> 00:18:35,520
commands we want to send and get

460
00:18:39,350 --> 00:18:38,400
get onto the space station gets added to

461
00:18:41,669 --> 00:18:39,360
um

462
00:18:44,070 --> 00:18:41,679
radio frequency signal it gets embedded

463
00:18:45,990 --> 00:18:44,080

into that and it gets shipped out by

464
00:18:47,590 --> 00:18:46,000
white sands to

465
00:18:50,230 --> 00:18:47,600
the satellite the satellite will then

466
00:18:53,110 --> 00:18:50,240
relay the command the entire stream over

467
00:18:55,430 --> 00:18:53,120
to the s-band system and it'll get you

468
00:18:56,870 --> 00:18:55,440
know pulled out from there and shipped

469
00:18:59,350 --> 00:18:56,880
along where it needs to go the main

470
00:19:01,510 --> 00:18:59,360
computer will detect whether or not the

471
00:19:03,430 --> 00:19:01,520
command is valid and

472
00:19:05,190 --> 00:19:03,440
send it to where its destination is

473
00:19:06,470 --> 00:19:05,200
which is part of the header in the

474
00:19:08,230 --> 00:19:06,480
command field

475
00:19:09,669 --> 00:19:08,240
and it'll go from there we can ship

476
00:19:12,070 --> 00:19:09,679
commands to all different parts of the

477
00:19:14,710 --> 00:19:12,080
space station we can even ship

478
00:19:16,549 --> 00:19:14,720
information between modules between

479
00:19:18,789 --> 00:19:16,559
segments and so forth

480
00:19:20,390 --> 00:19:18,799
and despite the

481
00:19:21,909 --> 00:19:20,400
tearing those commands apart into the

482
00:19:23,510 --> 00:19:21,919
pieces so you know they go where they

483
00:19:25,830 --> 00:19:23,520
need to go i think it's interesting to

484
00:19:27,830 --> 00:19:25,840
note too is as you said that the path

485
00:19:29,669 --> 00:19:27,840
that information takes to get from here

486
00:19:32,630 --> 00:19:29,679
to the station is not a straight line no

487
00:19:35,270 --> 00:19:32,640
it's not it goes from here to new mexico

488
00:19:42,789 --> 00:19:35,280

to the satellite to the station

489
00:19:48,390 --> 00:19:45,430
hello my name is latia polk and

490
00:19:50,150 --> 00:19:48,400
we know that there are several countries

491
00:19:52,870 --> 00:19:50,160
working together

492
00:19:54,470 --> 00:19:52,880
um with the iss we want to know how do

493
00:19:55,990 --> 00:19:54,480
they work together how do we work

494
00:19:57,909 --> 00:19:56,000
together

495
00:20:01,190 --> 00:19:57,919
we there are a lot of countries that

496
00:20:03,350 --> 00:20:01,200
we're working with with iss right now um

497
00:20:05,590 --> 00:20:03,360
how we work together is we have lots of

498
00:20:07,990 --> 00:20:05,600
meetings lots of uh

499
00:20:10,310 --> 00:20:08,000
a lot of get togethers with the

500
00:20:12,390 --> 00:20:10,320
with our partners sometimes we talk to

501
00:20:14,870 --> 00:20:12,400
them over the phone sometimes we talk

502
00:20:18,070 --> 00:20:14,880
over in mission control

503
00:20:21,590 --> 00:20:18,080
to them via telephone systems is what's

504
00:20:23,990 --> 00:20:21,600
called device behind us we can listen to

505
00:20:26,070 --> 00:20:24,000
dozens of loops at any given time

506
00:20:28,070 --> 00:20:26,080
and these are patched into

507
00:20:29,990 --> 00:20:28,080
moscow they're patched into japan

508
00:20:31,990 --> 00:20:30,000
they're patched into europe

509
00:20:34,710 --> 00:20:32,000
patched into alabama

510
00:20:37,110 --> 00:20:34,720
it can be patched almost anywhere so we

511
00:20:38,230 --> 00:20:37,120
could talk to them real time by those

512
00:20:40,149 --> 00:20:38,240
methods

513
00:20:41,990 --> 00:20:40,159

and we have a pretty good relationship

514
00:20:45,029 --> 00:20:42,000
with our partners

515
00:20:47,190 --> 00:20:45,039
some partners uh the russians require

516
00:20:48,950 --> 00:20:47,200
extra translation

517
00:20:51,350 --> 00:20:48,960
because that

518
00:20:53,350 --> 00:20:51,360
we speak english they speak russian

519
00:20:56,310 --> 00:20:53,360
so it requires an extra

520
00:20:58,390 --> 00:20:56,320
person involved and both teams have sets

521
00:21:00,390 --> 00:20:58,400
of translators that assist us so we make

522
00:21:02,630 --> 00:21:00,400
sure we communicate the correct

523
00:21:05,590 --> 00:21:02,640
information to both sides and the other

524
00:21:06,630 --> 00:21:05,600
side receives the correct information

525
00:21:07,909 --> 00:21:06,640
but

526
00:21:09,669 --> 00:21:07,919
we have a pretty good symbiotic

527
00:21:11,750 --> 00:21:09,679
relationship between all the countries

528
00:21:13,990 --> 00:21:11,760
working together and that's as you say

529
00:21:15,669 --> 00:21:14,000
it's 16 different countries now that are

530
00:21:18,789 --> 00:21:15,679
involved and

531
00:21:20,230 --> 00:21:18,799
the the device that you talked about i

532
00:21:21,990 --> 00:21:20,240
know you can't see it too well on

533
00:21:24,070 --> 00:21:22,000
television but from this panel right

534
00:21:25,990 --> 00:21:24,080
here we can punch buttons and through

535
00:21:27,909 --> 00:21:26,000
the headsets that we're wearing we can

536
00:21:30,230 --> 00:21:27,919
talk to not only everybody else in this

537
00:21:34,310 --> 00:21:30,240
room but other people in this building

538
00:21:36,230 --> 00:21:34,320

and in russia and in germany and in

539
00:21:38,230 --> 00:21:36,240
japan and this is the same system that

540
00:21:41,590 --> 00:21:38,240
certain people can talk to those

541
00:21:45,830 --> 00:21:41,600
astronauts up in space right now right

542
00:21:48,310 --> 00:21:46,870
okay

543
00:21:49,830 --> 00:21:48,320
did uh

544
00:21:52,310 --> 00:21:49,840
did we have some more i know some of you

545
00:21:53,830 --> 00:21:52,320
had two questions

546
00:21:57,510 --> 00:21:53,840
do any of you have any additional

547
00:22:00,950 --> 00:21:59,909
all right if i may i'd like to ask a

548
00:22:03,350 --> 00:22:00,960
question

549
00:22:05,110 --> 00:22:03,360
and that is uh

550
00:22:06,789 --> 00:22:05,120
what different career fields are now

551
00:22:08,870 --> 00:22:06,799
everyone thinks of nasa they think of

552
00:22:10,710 --> 00:22:08,880
astronauts and things like that what are

553
00:22:12,630 --> 00:22:10,720
some of the different career fields

554
00:22:14,549 --> 00:22:12,640
available at nasa

555
00:22:16,470 --> 00:22:14,559
well i'm glad you asked that question i

556
00:22:17,750 --> 00:22:16,480
forgot to tell you my back story i'm

557
00:22:19,270 --> 00:22:17,760
actually

558
00:22:20,710 --> 00:22:19,280
i didn't i alluded to it but i'm an

559
00:22:22,310 --> 00:22:20,720
engineer and i actually worked in the

560
00:22:23,909 --> 00:22:22,320
field i studied in the field of

561
00:22:25,430 --> 00:22:23,919
electrical engineering communication

562
00:22:27,830 --> 00:22:25,440
systems

563
00:22:29,350 --> 00:22:27,840

there are a lot of engineers here a lot

564
00:22:31,510 --> 00:22:29,360
of engineers a lot of electrical

565
00:22:34,149 --> 00:22:31,520
engineers or aerospace engineers that

566
00:22:34,950 --> 00:22:34,159
work here some uh

567
00:22:36,390 --> 00:22:34,960
some

568
00:22:39,350 --> 00:22:36,400
people that work here are pure

569
00:22:40,950 --> 00:22:39,360
scientists so pure sciences either

570
00:22:48,230 --> 00:22:40,960
research

571
00:22:50,789 --> 00:22:48,240
payload type science

572
00:22:52,830 --> 00:22:50,799
other fields are

573
00:22:55,590 --> 00:22:52,840
medical fields there's a lot of

574
00:22:58,230 --> 00:22:55,600
medicinal doctor requirements doctors

575
00:23:03,750 --> 00:23:01,669
there are writers there are people who

576
00:23:06,470 --> 00:23:03,760
know about uh

577
00:23:08,789 --> 00:23:06,480
business operations and and

578
00:23:12,149 --> 00:23:08,799
there are people who run the buildings

579
00:23:14,549 --> 00:23:12,159
uh there are all kind of of occupations

580
00:23:17,190 --> 00:23:14,559
who are are needed uh working in nasa

581
00:23:19,029 --> 00:23:17,200
yeah it really takes a whole plethora of

582
00:23:21,510 --> 00:23:19,039
different types and different fields to

583
00:23:23,830 --> 00:23:21,520
work at uh nasa even johnson space

584
00:23:26,310 --> 00:23:23,840
center and it's really diverse

585
00:23:31,830 --> 00:23:26,320
background okay i we have time for one

586
00:23:36,390 --> 00:23:33,830
okay it looks like we we we have

587
00:23:37,750 --> 00:23:36,400
confucia folks okay one question all

588
00:23:38,950 --> 00:23:37,760

right we need to fight come on up i'm

589
00:23:49,669 --> 00:23:38,960
sorry

590
00:23:55,990 --> 00:23:53,750
my question is who designed iss and why

591
00:23:57,909 --> 00:23:56,000
who designed iss and why another good

592
00:23:59,909 --> 00:23:57,919
backstory question though please correct

593
00:24:02,149 --> 00:23:59,919
me if i'm wrong in the short version the

594
00:24:03,590 --> 00:24:02,159
short version is is that uh we were

595
00:24:06,390 --> 00:24:03,600
building a space station called space

596
00:24:09,110 --> 00:24:06,400
station freedom we were planning on one

597
00:24:11,350 --> 00:24:09,120
and moscow or sorry russia had partially

598
00:24:13,590 --> 00:24:11,360
built space station mir ii

599
00:24:15,590 --> 00:24:13,600
and uh europe had proposed a certain

600
00:24:17,909 --> 00:24:15,600
module columbus and we all kind of

601
00:24:20,310 --> 00:24:17,919
decided to pull our resources and and

602
00:24:21,990 --> 00:24:20,320
create an international space station

603
00:24:23,909 --> 00:24:22,000
but uh yeah a lot of people were working

604
00:24:25,590 --> 00:24:23,919
on different things and and it started

605
00:24:27,830 --> 00:24:25,600
to come together as a group back in the

606
00:24:29,110 --> 00:24:27,840
1990s

607
00:24:31,029 --> 00:24:29,120
and i think that's about the time we

608
00:24:32,789 --> 00:24:31,039
have ken i want to thank you for for

609
00:24:34,230 --> 00:24:32,799
joining us here and and some for some

610
00:24:36,070 --> 00:24:34,240
interesting answers and learning about

611
00:24:38,390 --> 00:24:36,080
what's what's going on here and we'll

612
00:24:41,029 --> 00:24:38,400
send it uh we'll send it back to the dln