1
00:00:07,269 --> 00:00:02,950
station this is houston are you ready

2
00:00:10,629 --> 00:00:08,310
houston

3
00:00:12,870 --> 00:00:10,639
stations ready for the event

4
00:00:15,669 --> 00:00:12,880
google plus moderator this is mission

5
00:00:17,670 --> 00:00:15,679
control houston please call station for

6
00:00:19,189 --> 00:00:17,680
a voice check

7
00:00:23,429 --> 00:00:19,199
station this is the google plus hangout

8
00:00:27,269 --> 00:00:25,349
google plus hangout international space

9
00:00:29,589 --> 00:00:27,279
station we have you loud and clear

10
00:00:31,109 --> 00:00:29,599
aboard we have our own way of hanging

11
00:00:32,470 --> 00:00:31,119
out up here and watch my buddies hang

12
00:00:36,950 --> 00:00:32,480
out we're ready to hang out with you

13
00:00:40,389 --> 00:00:38,790

awesome we have a lot of questions for

14
00:00:42,709 --> 00:00:40,399
you guys today so let's start the first

15
00:00:44,950 --> 00:00:42,719
one from youtube

16
00:00:47,430 --> 00:00:44,960
i'm kristen lauth i'm ray arabi and

17
00:00:49,830 --> 00:00:47,440
we're from union high school in iowa our

18
00:00:51,990 --> 00:00:49,840
question is what is the exact purpose of

19
00:00:56,709 --> 00:00:52,000
having humans live on the space station

20
00:01:00,630 --> 00:00:58,389
well the whole point of having a space

21
00:01:02,389 --> 00:01:00,640
station is to have some place in space

22
00:01:03,750 --> 00:01:02,399
where people can take their ideas we

23
00:01:05,830 --> 00:01:03,760
have a huge

24
00:01:07,830 --> 00:01:05,840
power supply up here we have a lot of

25
00:01:09,350 --> 00:01:07,840
rack space and we have a lot of

26
00:01:11,590 --> 00:01:09,360
scientists on the ground with a lot of

27
00:01:13,350 --> 00:01:11,600
ideas about things to do in space we

28
00:01:15,510 --> 00:01:13,360
have literally hundreds of experiments

29
00:01:18,149 --> 00:01:15,520
going on right now as we're working up

30
00:01:19,910 --> 00:01:18,159
here and the space station really offers

31
00:01:21,670 --> 00:01:19,920
a lot of flexibility to us that you

32
00:01:23,109 --> 00:01:21,680
wouldn't have if you wanted to put an

33
00:01:24,870 --> 00:01:23,119
experiment in space and you didn't have

34
00:01:27,030 --> 00:01:24,880
a space station i don't know where you'd

35
00:01:28,870 --> 00:01:27,040
put it right next to us as a rack

36
00:01:30,950 --> 00:01:28,880
yesterday we took an experiment out of

37
00:01:33,670 --> 00:01:30,960
it called in space which is looking at

38
00:01:35,590 --> 00:01:33,680

special magnetic fluids that can change

39
00:01:36,469 --> 00:01:35,600
uh the the way we

40
00:01:38,149 --> 00:01:36,479
have

41
00:01:41,590 --> 00:01:38,159
really changed the operation of braking

42
00:01:43,510 --> 00:01:41,600
systems and maybe have applications to

43
00:01:47,270 --> 00:01:43,520
seismic dampers and stuff or earthquake

44
00:01:49,270 --> 00:01:47,280
zones many many many good offsets from

45
00:01:51,910 --> 00:01:49,280
that particular experiment and we

46
00:01:53,510 --> 00:01:51,920
finished it out yesterday and

47
00:01:56,469 --> 00:01:53,520
we're going to put in a new experiment

48
00:01:58,230 --> 00:01:56,479
next week that's coming up on dragon and

49
00:01:59,670 --> 00:01:58,240
it'll look at a completely different

50
00:02:01,350 --> 00:01:59,680
kind of thing it'll look at the way

51
00:02:03,190 --> 00:02:01,360
metals form in zero gravity and it's

52
00:02:04,950 --> 00:02:03,200
very important for us to look at the way

53
00:02:07,030 --> 00:02:04,960
the crystals form because it can make

54
00:02:08,469 --> 00:02:07,040
things very much stronger and so these

55
00:02:10,710 --> 00:02:08,479
are things that can only be done in zero

56
00:02:11,910 --> 00:02:10,720
gravity and we have no lack of ideas of

57
00:02:15,030 --> 00:02:11,920
things to do up here and we're here to

58
00:02:19,670 --> 00:02:16,550
thanks we're going to take our next

59
00:02:21,990 --> 00:02:19,680
question from youtube it's simon drubel

60
00:02:23,750 --> 00:02:22,000
who asks do you sometimes see falling

61
00:02:26,470 --> 00:02:23,760
stars in the atmosphere from the space

62
00:02:28,470 --> 00:02:26,480
station or is it frequent or do you see

63
00:02:32,949 --> 00:02:28,480

stuff like satellites in orbit thank you

64
00:02:36,949 --> 00:02:34,949
as a matter of fact shooting stars we do

65
00:02:39,270 --> 00:02:36,959
see there's one big difference they're

66
00:02:41,190 --> 00:02:39,280
below us instead of above us so when

67
00:02:42,390 --> 00:02:41,200
we're looking down at the earth we can

68
00:02:43,830 --> 00:02:42,400
see a little shooting star usually you

69
00:02:46,070 --> 00:02:43,840
don't see much movement other than the

70
00:02:48,229 --> 00:02:46,080
earth slowly going by you

71
00:02:49,990 --> 00:02:48,239
and so when it really catches your eye

72
00:02:51,270 --> 00:02:50,000
when you see a shooting star is a lot of

73
00:02:52,550 --> 00:02:51,280
movement there in the atmosphere it's

74
00:02:54,869 --> 00:02:52,560
very beautiful

75
00:02:56,470 --> 00:02:54,879
we don't see other satellites

76
00:02:59,589 --> 00:02:56,480
typically because

77
00:03:01,830 --> 00:02:59,599
we're all going very fast 17 500 miles

78
00:03:02,949 --> 00:03:01,840
an hour and if one's in an orbit near

79
00:03:05,030 --> 00:03:02,959
ours and dip

80
00:03:06,710 --> 00:03:05,040
slightly different orbital plane we pass

81
00:03:08,630 --> 00:03:06,720
by each other very quickly i've heard

82
00:03:12,070 --> 00:03:08,640
some astronauts have seen some go by but

83
00:03:13,430 --> 00:03:12,080
it's a very rare event great question

84
00:03:15,430 --> 00:03:13,440
all right thank you why don't we take

85
00:03:17,030 --> 00:03:15,440
the next question on youtube

86
00:03:18,790 --> 00:03:17,040
i'm destined from huntsville alabama

87
00:03:20,309 --> 00:03:18,800
this is sadie and spotsy on the

88
00:03:22,149 --> 00:03:20,319

international space station if you're

89
00:03:24,229 --> 00:03:22,159
free falling in one position without

90
00:03:26,070 --> 00:03:24,239
touching anything with no spin is it

91
00:03:27,589 --> 00:03:26,080
possible to wiggle in such a way that

92
00:03:29,990 --> 00:03:27,599
you're able to rotate to a different

93
00:03:31,509 --> 00:03:30,000
angular position and then stop on

94
00:03:33,270 --> 00:03:31,519
smarter every day we demonstrated this

95
00:03:35,110 --> 00:03:33,280
with a high-speed camera and a cat who

96
00:03:36,949 --> 00:03:35,120
is a non-holonomic system and can do

97
00:03:38,550 --> 00:03:36,959
this by extending his legs arching his

98
00:03:40,630 --> 00:03:38,560
back and twisting in a very specific

99
00:03:42,229 --> 00:03:40,640
pattern so can humans do this on orbit

100
00:03:43,589 --> 00:03:42,239
you want to say hey to the astronauts

101
00:03:48,710 --> 00:03:43,599
hey

102
00:03:52,869 --> 00:03:50,630
okay well that's a great question uh we

103
00:03:55,270 --> 00:03:52,879
don't have any cats on board but we have

104
00:03:57,270 --> 00:03:55,280
a medical doctor who maybe can try to

105
00:03:58,550 --> 00:03:57,280
demonstrate that yeah next best thing to

106
00:04:00,390 --> 00:03:58,560
a cat so he's going to try to

107
00:04:01,750 --> 00:04:00,400
demonstrate for you yes indeed you can

108
00:04:04,390 --> 00:04:01,760
you can do this so he's going to get out

109
00:04:05,509 --> 00:04:04,400
here and stop himself in an open space

110
00:04:06,949 --> 00:04:05,519
and he's going to show you how he can

111
00:04:09,190 --> 00:04:06,959
turn himself around

112
00:04:10,630 --> 00:04:09,200
so he uh he can't change his angular

113
00:04:12,229 --> 00:04:10,640

momentum but he can change his body

114
00:04:15,429 --> 00:04:12,239
position and move himself to an ore

115
00:04:17,749 --> 00:04:15,439
orientation so i hope you believe that

116
00:04:19,509 --> 00:04:17,759
what you saw happen with the cat isn't a

117
00:04:23,189 --> 00:04:19,519
mystery and that it can happen in space

118
00:04:27,830 --> 00:04:24,870
thanks here's kind of timely question

119
00:04:29,430 --> 00:04:27,840
from facebook ian beckham asks what was

120
00:04:31,030 --> 00:04:29,440
the first emotional reaction of the crew

121
00:04:32,710 --> 00:04:31,040
when they realized a few days ago that

122
00:04:34,150 --> 00:04:32,720
the s-band com was lost and they weren't

123
00:04:35,990 --> 00:04:34,160
able to talk to the ground anymore just

124
00:04:37,189 --> 00:04:36,000
over russian ground sites are there any

125
00:04:39,270 --> 00:04:37,199
procedures to keep calm in those

126
00:04:45,030 --> 00:04:39,280
situations or does training experience

127
00:04:49,670 --> 00:04:47,830
we uh trained individually as astronauts

128
00:04:51,830 --> 00:04:49,680
for many many years and we've trained

129
00:04:52,710 --> 00:04:51,840
together as a crew for several years as

130
00:04:53,430 --> 00:04:52,720
well

131
00:04:57,350 --> 00:04:53,440
so

132
00:04:59,350 --> 00:04:57,360
things to happen

133
00:05:01,270 --> 00:04:59,360
what happened just a couple days ago was

134
00:05:03,749 --> 00:05:01,280
really not not that big a deal we lost

135
00:05:06,310 --> 00:05:03,759
communications with the ground but

136
00:05:09,909 --> 00:05:06,320
the space station is is a robust tough

137
00:05:11,830 --> 00:05:09,919
spaceship and it kept just going around

138
00:05:13,029 --> 00:05:11,840

the world and all of its systems running

139
00:05:15,430 --> 00:05:13,039
just fine

140
00:05:17,350 --> 00:05:15,440
we worked together as a crew

141
00:05:20,070 --> 00:05:17,360
following the procedures like we trained

142
00:05:21,749 --> 00:05:20,080
to do it was actually pretty nice

143
00:05:23,830 --> 00:05:21,759
i was sitting there typing on the main

144
00:05:25,830 --> 00:05:23,840
interface tom was running the procedures

145
00:05:27,270 --> 00:05:25,840
with me and kevin as the commander was

146
00:05:28,950 --> 00:05:27,280
staying back watching how the whole

147
00:05:31,189 --> 00:05:28,960
thing was flowing and making sure that

148
00:05:32,870 --> 00:05:31,199
we were headed down the right path

149
00:05:34,710 --> 00:05:32,880
uh the people on the ground were

150
00:05:36,870 --> 00:05:34,720
scrambling and working hard and it

151
00:05:38,629 --> 00:05:36,880
wasn't until we came around the world

152
00:05:40,550 --> 00:05:38,639
and up and over top of russia where we

153
00:05:42,870 --> 00:05:40,560
can talk directly from an antenna on the

154
00:05:45,110 --> 00:05:42,880
ground to our antennas on board that

155
00:05:46,710 --> 00:05:45,120
then we could compare notes see where we

156
00:05:48,710 --> 00:05:46,720
were and eventually we got everything

157
00:05:50,230 --> 00:05:48,720
together and after just a couple orbits

158
00:05:52,230 --> 00:05:50,240
we got the computers talking to the

159
00:05:54,629 --> 00:05:52,240
antennas properly so we could talk to

160
00:05:57,830 --> 00:05:54,639
the ground so it wasn't any sort of

161
00:05:59,590 --> 00:05:57,840
panic or anything it was just uh us

162
00:06:01,590 --> 00:05:59,600
dealing with a problem on the ground in

163
00:06:03,270 --> 00:06:01,600

our crew dealing with a problem on board

164
00:06:05,350 --> 00:06:03,280
working like we've been trained working

165
00:06:07,909 --> 00:06:05,360
together as a team with a successful

166
00:06:10,790 --> 00:06:07,919
result it was uh things that happened in

167
00:06:14,150 --> 00:06:11,990
thank you why don't we take our next

168
00:06:15,990 --> 00:06:14,160
question on youtube

169
00:06:18,550 --> 00:06:16,000
hi my name is neil bramson i'm a teacher

170
00:06:20,550 --> 00:06:18,560
at new south wales australia my students

171
00:06:23,189 --> 00:06:20,560
have been following the expedition 34

172
00:06:25,590 --> 00:06:23,199
crew progress on twitter facebook and

173
00:06:27,510 --> 00:06:25,600
google plus now and my question relates

174
00:06:28,950 --> 00:06:27,520
to social media how do you feel as

175
00:06:30,550 --> 00:06:28,960
astronauts now that your communication

176
00:06:33,350 --> 00:06:30,560
methods have changed through the use of

177
00:06:34,790 --> 00:06:33,360
the likes of twitter and facebook and

178
00:06:36,710 --> 00:06:34,800
the impact that you now have on the

179
00:06:38,950 --> 00:06:36,720
global public in terms of space and

180
00:06:46,469 --> 00:06:38,960
space education secondly how do you feel

181
00:06:51,590 --> 00:06:48,550
i i don't think anybody

182
00:06:53,510 --> 00:06:51,600
tries to use technology to push back the

183
00:06:55,670 --> 00:06:53,520
edge of the human experience more than

184
00:06:57,909 --> 00:06:55,680
we do i mean look where we live and what

185
00:07:00,309 --> 00:06:57,919
we're doing how we're making this happen

186
00:07:02,790 --> 00:07:00,319
and so we constantly try and take

187
00:07:03,909 --> 00:07:02,800
something simple uh but then apply it in

188
00:07:06,150 --> 00:07:03,919

a new way

189
00:07:09,270 --> 00:07:06,160
and and allow it to improve our

190
00:07:11,270 --> 00:07:09,280
understanding uh really as a species

191
00:07:13,830 --> 00:07:11,280
and we are for the first time in history

192
00:07:16,629 --> 00:07:13,840
with this space station as a planet as a

193
00:07:19,029 --> 00:07:16,639
species we're leaving earth and it is

194
00:07:21,350 --> 00:07:19,039
just it's too good an experience not to

195
00:07:22,150 --> 00:07:21,360
share and with technology that we have

196
00:07:24,469 --> 00:07:22,160
now

197
00:07:26,870 --> 00:07:24,479
with the communications capability that

198
00:07:30,070 --> 00:07:26,880
nasa and others have put on board here

199
00:07:31,990 --> 00:07:30,080
we can real time communicate as people

200
00:07:34,629 --> 00:07:32,000
with with pretty much everybody on earth

201
00:07:36,950 --> 00:07:34,639
who has who has a computer or an iphone

202
00:07:39,110 --> 00:07:36,960
or something and so with twitter which

203
00:07:40,790 --> 00:07:39,120
is a really handy way to do that we can

204
00:07:42,710 --> 00:07:40,800
take a picture or have a thought here on

205
00:07:44,870 --> 00:07:42,720
board and just in a matter of a few

206
00:07:46,469 --> 00:07:44,880
minutes get it down to the ground and

207
00:07:48,390 --> 00:07:46,479
spread around the world

208
00:07:50,390 --> 00:07:48,400
that's wonderful for viewing things like

209
00:07:53,430 --> 00:07:50,400
the big tropical cyclone that's off

210
00:07:54,790 --> 00:07:53,440
madagascar right now uh it's a great way

211
00:07:56,869 --> 00:07:54,800
to communicate

212
00:07:58,869 --> 00:07:56,879
the transient emotions and the thoughts

213
00:08:00,390 --> 00:07:58,879

that that go through us as as we are

214
00:08:03,110 --> 00:08:00,400
experiencing this really on behalf of

215
00:08:04,469 --> 00:08:03,120
everybody and as far as being a media

216
00:08:07,110 --> 00:08:04,479
star i mean

217
00:08:09,510 --> 00:08:07,120
this is just a really rare human

218
00:08:11,430 --> 00:08:09,520
experience and we've worked hard to get

219
00:08:13,909 --> 00:08:11,440
here but at the same time we know just

220
00:08:15,990 --> 00:08:13,919
how lucky we are to be here and i think

221
00:08:18,150 --> 00:08:16,000
it's important to try and share it with

222
00:08:20,230 --> 00:08:18,160
as many people as possible

223
00:08:21,990 --> 00:08:20,240
but something else to remember everybody

224
00:08:24,150 --> 00:08:22,000
around the world if you just choose the

225
00:08:26,469 --> 00:08:24,160
right time of day you can look up and

226
00:08:27,909 --> 00:08:26,479
watch this star go over as well and

227
00:08:31,189 --> 00:08:27,919
that's a pretty nice touch back and

228
00:08:33,509 --> 00:08:32,550
thanks i'll take another one from social

229
00:08:34,709 --> 00:08:33,519
media

230
00:08:36,469 --> 00:08:34,719
i'm not sure if you guys have thought

231
00:08:38,070 --> 00:08:36,479
about this or not but it's something i

232
00:08:40,469 --> 00:08:38,080
don't think i've heard asked before it's

233
00:08:41,829 --> 00:08:40,479
on twitter at nozzlebar asks which

234
00:08:51,829 --> 00:08:41,839
scientist of the past would you like to

235
00:08:54,470 --> 00:08:52,550
well

236
00:08:56,949 --> 00:08:54,480
for me it just popped right into my head

237
00:08:58,870 --> 00:08:56,959
isaac newton because we see what he

238
00:09:00,870 --> 00:08:58,880

could only imagine we see it every day

239
00:09:02,710 --> 00:09:00,880
in everything we do

240
00:09:04,470 --> 00:09:02,720
large objects that we can move with a

241
00:09:06,150 --> 00:09:04,480
push of a finger although it takes a

242
00:09:07,750 --> 00:09:06,160
little bit of time to get them going

243
00:09:09,750 --> 00:09:07,760
small objects that bounce around very

244
00:09:11,829 --> 00:09:09,760
quickly uh the angular momentum

245
00:09:14,150 --> 00:09:11,839
demonstration you just saw all of these

246
00:09:16,470 --> 00:09:14,160
things it's it's really hard to believe

247
00:09:18,389 --> 00:09:16,480
that he was able to imagine these things

248
00:09:22,630 --> 00:09:18,399
and uh i would love for him to be able

249
00:09:25,670 --> 00:09:23,670
why don't we take another question on

250
00:09:27,590 --> 00:09:25,680
youtube

251
00:09:29,030 --> 00:09:27,600
hi my name is jennifer gates and i'm a

252
00:09:31,110 --> 00:09:29,040
high school science teacher in the

253
00:09:33,430 --> 00:09:31,120
midwest of the united states mostly

254
00:09:35,030 --> 00:09:33,440
teaching chemistry and physics and my

255
00:09:36,470 --> 00:09:35,040
question for you is what's the most

256
00:09:38,389 --> 00:09:36,480
important thing that they should be

257
00:09:40,630 --> 00:09:38,399
learning and focusing on understanding

258
00:09:42,230 --> 00:09:40,640
at this time in terms of perhaps working

259
00:09:43,430 --> 00:09:42,240
in science later

260
00:09:44,949 --> 00:09:43,440
or what do you feel like the most

261
00:09:46,550 --> 00:09:44,959
important thing was that you took from

262
00:09:53,509 --> 00:09:46,560
your high school science courses to help

263
00:09:57,829 --> 00:09:56,470

well that's a great question i wish i

264
00:10:01,110 --> 00:09:57,839
could have taken everything in high

265
00:10:02,150 --> 00:10:01,120
school uh twice actually because there's

266
00:10:04,070 --> 00:10:02,160
so much

267
00:10:05,990 --> 00:10:04,080
information there for students at that

268
00:10:07,990 --> 00:10:06,000
time and and i know that's a really

269
00:10:10,310 --> 00:10:08,000
really tough time in their lives and

270
00:10:11,829 --> 00:10:10,320
everything and there is it is almost

271
00:10:13,269 --> 00:10:11,839
overwhelming all the subjects that are

272
00:10:15,829 --> 00:10:13,279
offered to you and the choices that are

273
00:10:17,750 --> 00:10:15,839
offered to you at that time i i loved

274
00:10:20,870 --> 00:10:17,760
math and i love physics and i happen to

275
00:10:22,949 --> 00:10:20,880
have a very enthusiastic physics teacher

276
00:10:25,430 --> 00:10:22,959
who just made me i just couldn't wait to

277
00:10:28,310 --> 00:10:25,440
go to class every day and

278
00:10:30,310 --> 00:10:28,320
we talked about things like you know

279
00:10:32,069 --> 00:10:30,320
newton's laws and that sort of thing and

280
00:10:35,269 --> 00:10:32,079
and like tom just mentioned we get to

281
00:10:37,350 --> 00:10:35,279
see a seam up here in action and and in

282
00:10:38,870 --> 00:10:37,360
their advanced phases and stages as well

283
00:10:40,949 --> 00:10:38,880
like in orbital mechanics and those

284
00:10:43,350 --> 00:10:40,959
sorts of things so that's the one that

285
00:10:45,350 --> 00:10:43,360
really piqued my interest but we um we

286
00:10:47,670 --> 00:10:45,360
have a life support system on board

287
00:10:49,829 --> 00:10:47,680
that's very chemistry intensive and we

288
00:10:52,389 --> 00:10:49,839

we talk chemistry almost every day we

289
00:10:53,990 --> 00:10:52,399
use the mathematics every day uh it's

290
00:10:55,829 --> 00:10:54,000
very important in mission control too

291
00:10:58,069 --> 00:10:55,839
for the people who support us uh

292
00:10:59,509 --> 00:10:58,079
trajectories to get up i'm going back to

293
00:11:01,990 --> 00:10:59,519
earth in about three weeks and there are

294
00:11:03,990 --> 00:11:02,000
some brilliant mathematicians working on

295
00:11:06,150 --> 00:11:04,000
putting me in a very small spot in

296
00:11:07,430 --> 00:11:06,160
kazakhstan so there are people working

297
00:11:08,949 --> 00:11:07,440
uh waiting there for me and they're

298
00:11:10,949 --> 00:11:08,959
doing calculus and they're running it

299
00:11:12,470 --> 00:11:10,959
backwards so that they can integrate all

300
00:11:14,790 --> 00:11:12,480
the way back to the ground and get me to

301
00:11:17,750 --> 00:11:14,800
the right place on the ground so it's a

302
00:11:20,630 --> 00:11:17,760
lot of complicated science uh to to make

303
00:11:22,630 --> 00:11:20,640
this all work there's a medical you can

304
00:11:24,389 --> 00:11:22,640
see chris has got a special thing on his

305
00:11:25,590 --> 00:11:24,399
head today the medical science is very

306
00:11:27,990 --> 00:11:25,600
important to us to what we're doing on

307
00:11:30,550 --> 00:11:28,000
space station and no matter what you

308
00:11:33,350 --> 00:11:30,560
like what your field is you can find an

309
00:11:35,750 --> 00:11:33,360
area and and that that applies to space

310
00:11:37,829 --> 00:11:35,760
flight for sure so um just take all of

311
00:11:38,949 --> 00:11:37,839
them that you can and learn as much as

312
00:11:40,150 --> 00:11:38,959
you can about all of them you'll

313
00:11:41,509 --> 00:11:40,160

probably need them all if you're going

314
00:11:44,470 --> 00:11:41,519
to end up in the space business and you

315
00:11:46,389 --> 00:11:44,480
might need them all in almost any any

316
00:11:50,870 --> 00:11:46,399
business you end up in so

317
00:11:53,910 --> 00:11:51,910
why don't we take another question on

318
00:11:55,670 --> 00:11:53,920
youtube

319
00:11:57,670 --> 00:11:55,680
my name is fraser kane and i live on

320
00:11:59,269 --> 00:11:57,680
vancouver island canada and my question

321
00:12:00,389 --> 00:11:59,279
is for chris hadfield who's been

322
00:12:02,550 --> 00:12:00,399
delivering all these beautiful

323
00:12:04,550 --> 00:12:02,560
photographs from space and my question

324
00:12:06,790 --> 00:12:04,560
is how does being on the international

325
00:12:09,750 --> 00:12:06,800
space station change your photography

326
00:12:12,230 --> 00:12:09,760
technique with the microgravity the very

327
00:12:13,670 --> 00:12:12,240
harsh exposures the very distant objects

328
00:12:15,670 --> 00:12:13,680
that you're trying to focus on and

329
00:12:20,550 --> 00:12:15,680
perhaps the low light conditions

330
00:12:23,350 --> 00:12:22,150
hey thanks fraser and i used to live on

331
00:12:24,870 --> 00:12:23,360
vancouver island as well it's a

332
00:12:26,629 --> 00:12:24,880
beautiful part of the world nice part of

333
00:12:28,629 --> 00:12:26,639
canada

334
00:12:31,190 --> 00:12:28,639
taking pictures up here

335
00:12:32,310 --> 00:12:31,200
especially outside is quite complex at

336
00:12:33,670 --> 00:12:32,320
first

337
00:12:35,110 --> 00:12:33,680
we fortunately we have really good

338
00:12:37,110 --> 00:12:35,120

instructors down on earth some really

339
00:12:40,230 --> 00:12:37,120
good trainers who taught us prepared us

340
00:12:42,310 --> 00:12:40,240
gave us a lot of good tricks

341
00:12:44,710 --> 00:12:42,320
the the weird part about it is

342
00:12:46,230 --> 00:12:44,720
space is so incredibly black so

343
00:12:49,910 --> 00:12:46,240
incredibly dark

344
00:12:50,790 --> 00:12:49,920
it's a bottomless pit of deep black

345
00:12:54,790 --> 00:12:50,800
almost

346
00:12:56,790 --> 00:12:54,800
look at it and and when you have that in

347
00:12:58,949 --> 00:12:56,800
part of your picture and then the world

348
00:13:01,190 --> 00:12:58,959
reflecting the sunlight especially the

349
00:13:02,870 --> 00:13:01,200
tops of clouds somewhere else it's very

350
00:13:03,990 --> 00:13:02,880
difficult at least

351
00:13:06,310 --> 00:13:04,000
for people who aren't professional

352
00:13:08,389 --> 00:13:06,320
photographers to try and balance that

353
00:13:11,030 --> 00:13:08,399
and get a picture that that looks good

354
00:13:12,710 --> 00:13:11,040
both ways and the advantage of being in

355
00:13:14,550 --> 00:13:12,720
space though of course we have cameras

356
00:13:16,949 --> 00:13:14,560
with fairly typical lenses on them but

357
00:13:19,670 --> 00:13:16,959
we can get right out to 400 or 800

358
00:13:21,350 --> 00:13:19,680
millimeter lenses and they're weightless

359
00:13:22,790 --> 00:13:21,360
we don't need a tripod so every

360
00:13:24,629 --> 00:13:22,800
photographer in the world would love to

361
00:13:26,870 --> 00:13:24,639
have that much glass out in front of

362
00:13:28,790 --> 00:13:26,880
their eyes and and not have to hold it

363
00:13:30,870 --> 00:13:28,800

up or not have to balance it

364
00:13:33,509 --> 00:13:30,880
the the best part is um even though

365
00:13:35,269 --> 00:13:33,519
we're not photographers by by trade of

366
00:13:37,430 --> 00:13:35,279
course we have some really good

367
00:13:38,790 --> 00:13:37,440
professional photographers who train us

368
00:13:40,949 --> 00:13:38,800
and we have a

369
00:13:42,710 --> 00:13:40,959
vantage point up here perspective that

370
00:13:46,310 --> 00:13:42,720
is absolutely unparalleled so we do our

371
00:13:50,230 --> 00:13:48,150
thanks yeah i'm not sure there's a bad

372
00:13:51,750 --> 00:13:50,240
shot of earth from space station uh the

373
00:13:54,710 --> 00:13:51,760
next question from social media is on

374
00:13:56,949 --> 00:13:54,720
google plus it's from hippienesswins and

375
00:13:59,269 --> 00:13:56,959
the question is uh marshburn ford

376
00:14:07,910 --> 00:13:59,279
hadfield good morning and uh what is

377
00:14:12,629 --> 00:14:09,590
well what he has on his forehead is

378
00:14:14,069 --> 00:14:12,639
actually a temperature probe so it's

379
00:14:16,069 --> 00:14:14,079
two things being investigated here

380
00:14:18,150 --> 00:14:16,079
number one is the technology it's really

381
00:14:19,750 --> 00:14:18,160
nice to be able to measure body core

382
00:14:20,870 --> 00:14:19,760
temperature without having to get too

383
00:14:23,350 --> 00:14:20,880
invasive

384
00:14:24,550 --> 00:14:23,360
and so uh what that's doing is he's got

385
00:14:26,230 --> 00:14:24,560
another one on his chest and it's

386
00:14:27,990 --> 00:14:26,240
measuring his core temperature the

387
00:14:29,590 --> 00:14:28,000
reason why they're doing that is your

388
00:14:31,189 --> 00:14:29,600

body temperature the core temperature is

389
00:14:33,670 --> 00:14:31,199
a good indicator of how your body's

390
00:14:35,110 --> 00:14:33,680
cycle is moving your circadian rhythm we

391
00:14:37,910 --> 00:14:35,120
don't have sun

392
00:14:39,350 --> 00:14:37,920
sun rises and sunsets uh

393
00:14:41,509 --> 00:14:39,360
coming through the window like you do on

394
00:14:43,910 --> 00:14:41,519
earth we have 16 a day actually so it

395
00:14:45,990 --> 00:14:43,920
can really mess up your circadian rhythm

396
00:14:47,350 --> 00:14:46,000
so they're learning a lot about how our

397
00:14:50,150 --> 00:14:47,360
body functions

398
00:14:52,310 --> 00:14:50,160
uh through this kind of uh

399
00:14:53,829 --> 00:14:52,320
time cycle that's very strange and it

400
00:14:55,670 --> 00:14:53,839
has a lot of implications for people

401
00:14:57,670 --> 00:14:55,680
that do night shifts and that work

402
00:14:59,910 --> 00:14:57,680
extremely long hours and for astronauts

403
00:15:02,069 --> 00:14:59,920
living and living in space how we can

404
00:15:05,350 --> 00:15:02,079
improve work efficiency and improve rest

405
00:15:10,310 --> 00:15:06,710
great let's take another question from

406
00:15:15,430 --> 00:15:12,069
my name is mira richmond i live in

407
00:15:16,790 --> 00:15:15,440
bolivar missouri i am in second grade

408
00:15:18,550 --> 00:15:16,800
and i am eight

409
00:15:20,790 --> 00:15:18,560
the other night at desk i saw you guys

410
00:15:23,189 --> 00:15:20,800
fly over my house how long do you guys

411
00:15:26,790 --> 00:15:23,199
stay up there in the space station

412
00:15:28,389 --> 00:15:26,800
how who has the record for the longest

413
00:15:29,990 --> 00:15:28,399

for staying up there the longest thank

414
00:15:37,910 --> 00:15:30,000
you

415
00:15:39,430 --> 00:15:37,920
hopefully one of us was waving back at

416
00:15:41,269 --> 00:15:39,440
you

417
00:15:42,790 --> 00:15:41,279
we can stay up here about six months and

418
00:15:44,310 --> 00:15:42,800
that's actually a limitation of our

419
00:15:46,629 --> 00:15:44,320
spaceship that gets us here and brings

420
00:15:48,629 --> 00:15:46,639
us back home again it's certified to be

421
00:15:51,430 --> 00:15:48,639
up here in space for about six months

422
00:15:53,509 --> 00:15:51,440
humans can stay up longer the longest is

423
00:15:55,910 --> 00:15:53,519
a dr polyakov he's a cosmonaut and he

424
00:15:57,990 --> 00:15:55,920
lived on the mir space station for 14

425
00:15:59,990 --> 00:15:58,000
months actually so

426
00:16:02,389 --> 00:16:00,000
and we're going to have a few astronauts

427
00:16:04,790 --> 00:16:02,399
and a cosmonaut living up here

428
00:16:06,069 --> 00:16:04,800
for up to a year here in the next couple

429
00:16:07,910 --> 00:16:06,079
of years or so

430
00:16:09,910 --> 00:16:07,920
so right now as far as we can tell

431
00:16:11,829 --> 00:16:09,920
there's no limit how long humans can

432
00:16:14,069 --> 00:16:11,839
stay up here as long as

433
00:16:15,749 --> 00:16:14,079
uh we have the machines here to keep our

434
00:16:17,990 --> 00:16:15,759
bones and our muscles strong and have

435
00:16:20,310 --> 00:16:18,000
enough food and water and such and a lot

436
00:16:22,069 --> 00:16:20,320
of great work to do such as we're doing

437
00:16:24,310 --> 00:16:22,079
here right now and of course the view of

438
00:16:27,590 --> 00:16:24,320

the earth helps us stay up here

439
00:16:30,470 --> 00:16:29,189
great what's another question from

440
00:16:32,470 --> 00:16:30,480
social media this is from facebook

441
00:16:33,990 --> 00:16:32,480
sheila avrabush asks uh what was the

442
00:16:35,430 --> 00:16:34,000
most influential book you read that

443
00:16:41,910 --> 00:16:35,440
helped you help inspire you to go to

444
00:16:46,870 --> 00:16:45,030
well i actually was inspired to pursue

445
00:16:48,949 --> 00:16:46,880
becoming an astronaut because of a book

446
00:16:51,110 --> 00:16:48,959
i read when i was about 13 or 14 years

447
00:16:53,350 --> 00:16:51,120
old by an astronaut named michael

448
00:16:54,310 --> 00:16:53,360
collins who was part of the apollo 11

449
00:16:55,350 --> 00:16:54,320
crew

450
00:17:00,470 --> 00:16:55,360
and

451
00:17:03,910 --> 00:17:00,480
was a fantastic account of of his early

452
00:17:06,549 --> 00:17:03,920
life as a pilot and test pilot and i

453
00:17:08,470 --> 00:17:06,559
just really fell in love with uh

454
00:17:11,510 --> 00:17:08,480
with that profession because of that

455
00:17:13,189 --> 00:17:11,520
book and of course uh what he did uh was

456
00:17:14,870 --> 00:17:13,199
one of the most magical things that's

457
00:17:17,189 --> 00:17:14,880
happened in the course of human history

458
00:17:19,270 --> 00:17:17,199
as far as i'm concerned with the trip he

459
00:17:21,510 --> 00:17:19,280
took to the moon with neil armstrong and

460
00:17:23,829 --> 00:17:21,520
buzz aldrin so that's what inspired me

461
00:17:25,990 --> 00:17:23,839
that particular book after that i read

462
00:17:27,750 --> 00:17:26,000
lots and lots more that just inspired me

463
00:17:30,549 --> 00:17:27,760

further but that was really the one that

464
00:17:33,029 --> 00:17:31,909
great answer why don't we take another

465
00:17:34,549 --> 00:17:33,039
question from youtube we have a couple

466
00:17:37,110 --> 00:17:34,559
more minutes before this portion of the

467
00:17:39,190 --> 00:17:37,120
event concludes

468
00:17:41,350 --> 00:17:39,200
hello astronauts of the international

469
00:17:43,510 --> 00:17:41,360
space station my name is carolina

470
00:17:46,150 --> 00:17:43,520
morales and i'm a student of the neil

471
00:17:48,230 --> 00:17:46,160
armstrong institute in monterey mexico

472
00:17:50,390 --> 00:17:48,240
on behalf of my classmates we would like

473
00:17:52,390 --> 00:17:50,400
to ask you the following questions

474
00:17:54,870 --> 00:17:52,400
how are you prepared to face medical

475
00:17:56,870 --> 00:17:54,880
emergencies in the space station

476
00:17:58,950 --> 00:17:56,880
how do you treat regular sickness and

477
00:18:07,190 --> 00:17:58,960
what do you do in case you need surgical

478
00:18:11,830 --> 00:18:08,070
so

479
00:18:13,990 --> 00:18:11,840
emergencies up here medical emergencies

480
00:18:16,630 --> 00:18:14,000
first of all we always have two crew

481
00:18:18,630 --> 00:18:16,640
medical officers on board i could have

482
00:18:20,310 --> 00:18:18,640
any background but they're trained to

483
00:18:22,470 --> 00:18:20,320
apply first aid or take care of

484
00:18:24,789 --> 00:18:22,480
emergencies that can keep somebody alive

485
00:18:26,870 --> 00:18:24,799
for up to 24 hours i happen to be a

486
00:18:28,789 --> 00:18:26,880
doctor but there's no requirement to

487
00:18:30,870 --> 00:18:28,799
have a doctor up here all the time but

488
00:18:32,950 --> 00:18:30,880

right under our feet here are some

489
00:18:35,110 --> 00:18:32,960
medical kits and they are packed full of

490
00:18:38,150 --> 00:18:35,120
everything you need from say an aspirin

491
00:18:41,110 --> 00:18:38,160
to an iv if you got really sick

492
00:18:43,430 --> 00:18:41,120
the big answer though is if we ran into

493
00:18:44,870 --> 00:18:43,440
a big problem that's a defibrillator we

494
00:18:46,230 --> 00:18:44,880
hope we never have to actually use that

495
00:18:48,789 --> 00:18:46,240
but we know how to use it that's the

496
00:18:50,710 --> 00:18:48,799
emergency kick the the big red kit

497
00:18:52,950 --> 00:18:50,720
the big answer though is our soyuz is

498
00:18:55,350 --> 00:18:52,960
our ambulance and we would hop into

499
00:18:57,110 --> 00:18:55,360
soyuz and bring somebody home if we

500
00:18:59,350 --> 00:18:57,120
thought that they were going to be

501
00:19:01,669 --> 00:18:59,360
have a real big problem or even die from

502
00:19:03,350 --> 00:19:01,679
a medical problem up here

503
00:19:04,950 --> 00:19:03,360
not to mention all the doctors on the

504
00:19:06,630 --> 00:19:04,960
ground who have not only been preparing

505
00:19:08,710 --> 00:19:06,640
us for preparing this equipment and the

506
00:19:10,470 --> 00:19:08,720
procedures and the techniques but also

507
00:19:12,630 --> 00:19:10,480
would be giving us advice real time if

508
00:19:14,470 --> 00:19:12,640
something happened space motion sickness

509
00:19:15,909 --> 00:19:14,480
is really common about three out of five

510
00:19:17,669 --> 00:19:15,919
astronauts get it we've got some

511
00:19:21,430 --> 00:19:17,679
medicines to take care of that so it's

512
00:19:24,710 --> 00:19:23,430
thank you that concludes our portion we

513
00:19:26,710 --> 00:19:24,720

really appreciate you guys from joining

514
00:19:28,470 --> 00:19:26,720
us on international space station please

515
00:19:36,789 --> 00:19:28,480
please stay with us for more questions

516
00:19:43,110 --> 00:19:39,270
station this is houston acr thank you

517
00:19:47,190 --> 00:19:44,710
thank you google plus hangout

518
00:19:48,150 --> 00:19:47,200
participants and nasa social media

519
00:19:50,470 --> 00:19:48,160
guests