
JAXA

1
00:00:09,360 --> 00:00:03,710
station this is Houston are you ready

2
00:00:15,670 --> 00:00:12,039
Houston this is station we are ready for

3
00:00:18,040 --> 00:00:15,680
the event Metropolitan Arts Institute

4
00:00:21,220 --> 00:00:18,050
this is Mission Control Houston police

5
00:00:23,050 --> 00:00:21,230
call station for a voice check station

6
00:00:27,249 --> 00:00:23,060
this is Metropolitan Arts Institute in

7
00:00:34,280 --> 00:00:30,439
hello we hear you loud and clear how do

8
00:00:40,069 --> 00:00:34,290
you hear us very well thank you thank

9
00:00:41,569 --> 00:00:40,079
you for speaking with us today it's a

10
00:00:42,110 --> 00:00:41,579
real pleasure or glad to have you on

11
00:00:45,380 --> 00:00:42,120
board

12
00:00:46,549 --> 00:00:45,390
welcome to expedition 34 we'll get

13
00:00:53,060 --> 00:00:46,559

started with the questions

14
00:00:55,389 --> 00:00:53,070
Andrew hello my name is Andrew Kendall

15
00:00:57,680 --> 00:00:55,399
and this question is for Chris Hadfield

16
00:00:59,360 --> 00:00:57,690
what do you consider the most vital

17
00:01:04,479 --> 00:00:59,370
component in an astronaut skillset

18
00:01:11,240 --> 00:01:07,460
the most vital component an astronaut's

19
00:01:13,790 --> 00:01:11,250
skillset for me I think its competence

20
00:01:15,980 --> 00:01:13,800
the fundamental key that everyone counts

21
00:01:18,230 --> 00:01:15,990
and everyone else for is competence when

22
00:01:19,850 --> 00:01:18,240
it comes right down to it you have spent

23
00:01:22,040 --> 00:01:19,860
the time you've done the homework you've

24
00:01:24,050 --> 00:01:22,050
practiced you've got the skillset inside

25
00:01:26,180 --> 00:01:24,060
so that you can do the required work as

26
00:01:27,710 --> 00:01:26,190
necessary everything else is good but

27
00:01:32,030 --> 00:01:27,720
without competence we're setting

28
00:01:37,910 --> 00:01:32,040
ourselves up for for real problems thank

29
00:01:40,669 --> 00:01:37,920
you hi my name is Felix and my question

30
00:01:46,380 --> 00:01:40,679
is also for Chris Hadfield how does zero

31
00:01:51,120 --> 00:01:49,800
hey thanks for the question I just

32
00:01:53,220 --> 00:01:51,130
happen to have brought my guitar with me

33
00:01:55,550 --> 00:01:53,230
right here this is a nice standard

34
00:01:58,830 --> 00:01:55,560
acoustic guitar six string metal string

35
00:02:01,140 --> 00:01:58,840
the difference of course is you don't

36
00:02:03,210 --> 00:02:01,150
need a strap because it just floats in

37
00:02:05,940 --> 00:02:03,220
front of you the strings behave about

38
00:02:07,620 --> 00:02:05,950

the same but it can resonate really well

39
00:02:09,090 --> 00:02:07,630
because it's not deadened against your

40
00:02:31,960 --> 00:02:09,100
body and it sounds about right here

41
00:02:35,510 --> 00:02:34,100
so it sounds alright

42
00:02:37,130 --> 00:02:35,520
as you see though as I'm playing it I

43
00:02:38,690 --> 00:02:37,140
kind of need to brace it mice against my

44
00:02:40,370 --> 00:02:38,700
body a little bit because the guitar

45
00:02:42,320 --> 00:02:40,380
wants to float around and if I want a

46
00:02:44,930 --> 00:02:42,330
bar chord then I've got to stabilize the

47
00:02:46,100 --> 00:02:44,940
guitar but you get used to it and it's

48
00:02:47,960 --> 00:02:46,110
nice not having to carry the weight

49
00:02:49,960 --> 00:02:47,970
around your neck and it's just wonderful

50
00:02:52,280 --> 00:02:49,970
to be able to play guitar as another

51
00:02:54,410 --> 00:02:52,290
human way to try and understand this

52
00:03:02,810 --> 00:02:54,420
incredible new experience of leaving the

53
00:03:04,460 --> 00:03:02,820
earth thank you hi my name is Sam

54
00:03:06,830 --> 00:03:04,470
Proctor and this question is for Tom

55
00:03:09,110 --> 00:03:06,840
Marshburn evidence shows that after a

56
00:03:10,340 --> 00:03:09,120
time and space black environment a human

57
00:03:12,320 --> 00:03:10,350
psyche can be stretched a few inches

58
00:03:13,729 --> 00:03:12,330
have you experienced this or other

59
00:03:19,610 --> 00:03:13,739
general changes to your body due to

60
00:03:21,260 --> 00:03:19,620
zero-gravity well you've been doing your

61
00:03:23,780 --> 00:03:21,270
homework that's true our bodies do

62
00:03:25,880 --> 00:03:23,790
stretch our spinal columns elongate the

63
00:03:27,470 --> 00:03:25,890

little cushions between the bones get

64
00:03:29,600 --> 00:03:27,480
more fluid in them because gravity is

65
00:03:31,460 --> 00:03:29,610
not squishing them down so we don't

66
00:03:33,020 --> 00:03:31,470
really feel it some astronauts get a

67
00:03:35,300 --> 00:03:33,030
little bit of back pain from the muscles

68
00:03:36,680 --> 00:03:35,310
stretching from that effect but we don't

69
00:03:38,300 --> 00:03:36,690
really feel it but just a couple of

70
00:03:40,220 --> 00:03:38,310
weeks ago we checked to make sure we fit

71
00:03:41,690 --> 00:03:40,230
in our our seats

72
00:03:43,490 --> 00:03:41,700
our Soyuz seats to make sure we can

73
00:03:46,720 --> 00:03:43,500
still fit in them when it's time to come

74
00:03:49,550 --> 00:03:46,730
home so we still seemed to fit very well

75
00:03:51,440 --> 00:03:49,560
so you have to measure it with a some

76
00:03:53,390 --> 00:03:51,450
kind of measuring device to notice that

77
00:03:56,440 --> 00:03:53,400
but yeah you feel lots of changes in

78
00:03:59,000 --> 00:03:56,450
your body our legs get skinnier our

79
00:04:00,620 --> 00:03:59,010
gastrointestinal system our stomach and

80
00:04:02,000 --> 00:04:00,630
intestines have to get used to it so

81
00:04:04,940 --> 00:04:02,010
we're back to normal as far as that goes

82
00:04:06,620 --> 00:04:04,950
just after arriving here but then you

83
00:04:08,120 --> 00:04:06,630
feel fluid in your head and that never

84
00:04:10,310 --> 00:04:08,130
really goes away the whole time so you

85
00:04:11,990 --> 00:04:10,320
feel that change as well but other than

86
00:04:13,880 --> 00:04:12,000
that your body is a wonderful machine

87
00:04:15,470 --> 00:04:13,890
it's capable of adapting really well

88
00:04:16,699 --> 00:04:15,480

we're gonna feel a lot of the changes

89
00:04:19,699 --> 00:04:16,709
again we get back to earth and we'll

90
00:04:26,390 --> 00:04:19,709
have to readapt great thank you very

91
00:04:28,850 --> 00:04:26,400
much hello my name is Sarah Prince my

92
00:04:30,950 --> 00:04:28,860
question is for Chris do you ever feel

93
00:04:33,800 --> 00:04:30,960
overwhelmed or intimidated by the deep

94
00:04:39,380 --> 00:04:33,810
vastness of empty space just beyond your

95
00:04:44,100 --> 00:04:42,360
that's really interesting question you

96
00:04:46,770 --> 00:04:44,110
would not believe Tom and I have both

97
00:04:49,380 --> 00:04:46,780
been outside on spacewalks where you put

98
00:04:51,060 --> 00:04:49,390
on a suit and go outside and that's

99
00:04:53,850 --> 00:04:51,070
probably where you feel that profound

100
00:04:56,700 --> 00:04:53,860
feeling more than ever because it's just

101
00:04:59,760 --> 00:04:56,710
you alone in the universe and you're in

102
00:05:02,160 --> 00:04:59,770
between the earth pouring by on one side

103
00:05:04,290 --> 00:05:02,170
and everything else all the blackness on

104
00:05:05,730 --> 00:05:04,300
the other side and you're maybe just

105
00:05:10,320 --> 00:05:05,740
holding onto the space station with one

106
00:05:13,490 --> 00:05:10,330
hand but for me it wasn't at all scary

107
00:05:16,620 --> 00:05:13,500
it was hugely exhilarating it was just a

108
00:05:18,890 --> 00:05:16,630
fantastically rewarding experience to be

109
00:05:21,480 --> 00:05:18,900
able to be in between those two things

110
00:05:24,060 --> 00:05:21,490
like literally with your body but also

111
00:05:26,550 --> 00:05:24,070
sort of historically as we are starting

112
00:05:28,380 --> 00:05:26,560
to leave Earth permanently as a species

113
00:05:30,540 --> 00:05:28,390

living on more than one planet and these

114
00:05:32,340 --> 00:05:30,550
are the very early steps so for me every

115
00:05:34,980 --> 00:05:32,350
time I look out there just feels me with

116
00:05:37,200 --> 00:05:34,990
a great sense of wonder and excitement

117
00:05:41,790 --> 00:05:37,210
of the things that you're going to be

118
00:05:52,210 --> 00:05:49,810
thank you hi my name is Amelia Atteberry

119
00:05:53,500 --> 00:05:52,220
my question is for Chris Hadfield what

120
00:05:58,930 --> 00:05:53,510
is the mistake you've made aboard the

121
00:06:03,860 --> 00:06:01,850
Miglia I was taking pictures with one of

122
00:06:05,840 --> 00:06:03,870
these cameras and we noticed in all of

123
00:06:07,760 --> 00:06:05,850
the images that there was a little bit

124
00:06:09,830 --> 00:06:07,770
of dirt like a little speck on the

125
00:06:12,110 --> 00:06:09,840
picture so I thought okay time to clean

126
00:06:14,420 --> 00:06:12,120
the camera so I got it the procedure and

127
00:06:16,040 --> 00:06:14,430
got this special pencil sort of thing

128
00:06:19,340 --> 00:06:16,050
that you reach inside you actually touch

129
00:06:20,330 --> 00:06:19,350
the sensor in the camera and it's Dayton

130
00:06:22,370 --> 00:06:20,340
you know you don't want to scratch the

131
00:06:24,260 --> 00:06:22,380
sensor but there I could see some dust

132
00:06:25,520 --> 00:06:24,270
that had floated onto it so I opened up

133
00:06:27,380 --> 00:06:25,530
very carefully reached in

134
00:06:28,760 --> 00:06:27,390
super-expensive cameras you know when

135
00:06:30,950 --> 00:06:28,770
they're how we photograph everything I

136
00:06:34,010 --> 00:06:30,960
reached inside I touched it and it left

137
00:06:36,740 --> 00:06:34,020
a great big scratchy smear on the sensor

138
00:06:38,330 --> 00:06:36,750

and I thought what did I do so I tried

139
00:06:39,710 --> 00:06:38,340
again carefully thinking maybe I just

140
00:06:42,860 --> 00:06:39,720
put something on there and it made it

141
00:06:44,150 --> 00:06:42,870
worse and I just had this horrible if if

142
00:06:46,820 --> 00:06:44,160
your stomach could sink without gravity

143
00:06:48,590 --> 00:06:46,830
I had like a stomach sinking feeling so

144
00:06:49,880 --> 00:06:48,600
I stopped doing what I was doing and I

145
00:06:51,950 --> 00:06:49,890
went and talked to our commander who's

146
00:06:54,170 --> 00:06:51,960
Kevin Ford and said Kevin I think I've

147
00:06:55,790 --> 00:06:54,180
wrecked a camera I feel terrible but he

148
00:06:57,320 --> 00:06:55,800
said no wait wait let me have a look

149
00:06:59,210 --> 00:06:57,330
and he's had more experience he's been

150
00:07:00,740 --> 00:06:59,220
up here longer than I have and he looked

151
00:07:02,780 --> 00:07:00,750
in he got to pencil in he realized you

152
00:07:04,010 --> 00:07:02,790
could touch it a little more got another

153
00:07:05,840 --> 00:07:04,020
pencil that we had or it's really a

154
00:07:07,520 --> 00:07:05,850
little we call it a pencil but it's a

155
00:07:09,410 --> 00:07:07,530
special cleaner and that helped clean up

156
00:07:10,790 --> 00:07:09,420
and it was really just sort of some

157
00:07:12,920 --> 00:07:10,800
residue I'd put in there I hadn't really

158
00:07:15,230 --> 00:07:12,930
scratched it so the day was saved and

159
00:07:16,820 --> 00:07:15,240
what I really learned from it was one be

160
00:07:19,250 --> 00:07:16,830
careful what you're doing follow the

161
00:07:21,920 --> 00:07:19,260
procedures to ask for help from other

162
00:07:23,600 --> 00:07:21,930
crew members and three even when

163
00:07:25,580 --> 00:07:23,610

something looks bad it's probably not as

164
00:07:27,590 --> 00:07:25,590
bad as you think and you just need to

165
00:07:30,549 --> 00:07:27,600
work together and solve it so it was a

166
00:07:38,169 --> 00:07:36,459
all right thank you hi my name is

167
00:07:40,749 --> 00:07:38,179
Scarlett bakerton and I'm speaking on

168
00:07:42,669 --> 00:07:40,759
behalf of Alexa rose to the both of you

169
00:07:47,969 --> 00:07:42,679
what are your favorite space related

170
00:07:55,839 --> 00:07:53,200
all right well when I was nine years old

171
00:07:57,670 --> 00:07:55,849
so a good bit younger than you I went to

172
00:07:59,409 --> 00:07:57,680
see a movie you may have heard of it I

173
00:08:02,200 --> 00:07:59,419
may have actually seen it it's called

174
00:08:03,279 --> 00:08:02,210
2001 a Space Odyssey I think if you saw

175
00:08:05,140 --> 00:08:03,289
it today you'd think it's a little bit

176
00:08:06,610 --> 00:08:05,150
funny a little bit strange and maybe a

177
00:08:08,619 --> 00:08:06,620
little outdated with the special effects

178
00:08:10,809 --> 00:08:08,629
but at the time it was at the cutting

179
00:08:12,820 --> 00:08:10,819
edge of special-effects actually a lot

180
00:08:14,079 --> 00:08:12,830
of space movies nowadays still draw from

181
00:08:17,739 --> 00:08:14,089
the techniques that were used in that

182
00:08:19,869 --> 00:08:17,749
movie and it was filled me with a sense

183
00:08:21,730 --> 00:08:19,879
of wonder I didn't understand it but I

184
00:08:23,800 --> 00:08:21,740
remember the visual image is impressing

185
00:08:26,260 --> 00:08:23,810
me very much after that movie my

186
00:08:29,350 --> 00:08:26,270
favorite favorite planet became Jupiter

187
00:08:31,510 --> 00:08:29,360
and my the whole idea of being in space

188
00:08:34,629 --> 00:08:31,520

of being away from the earth in the

189
00:08:36,399 --> 00:08:34,639
deepness of space was something that

190
00:08:37,810 --> 00:08:36,409
became ingrained in my psyche and

191
00:08:41,649 --> 00:08:37,820
something I wanted to find out more

192
00:08:42,879 --> 00:08:41,659
about ever since then Chris for me you

193
00:08:44,710 --> 00:08:42,889
know there's lots of movies that are

194
00:08:46,060 --> 00:08:44,720
like anything that you're you know a lot

195
00:08:47,560 --> 00:08:46,070
about when you see a movie off and they

196
00:08:49,629 --> 00:08:47,570
think of all the details wrong and it

197
00:08:53,740 --> 00:08:49,639
kind of spoils it for you but for me the

198
00:08:55,569 --> 00:08:53,750
best one is Apollo 13 they came and they

199
00:08:57,069 --> 00:08:55,579
spent time with us in Houston and in

200
00:08:58,809 --> 00:08:57,079
Florida they really tried to get the

201
00:09:00,280 --> 00:08:58,819
details right and I think they did a

202
00:09:02,439 --> 00:09:00,290
great job of telling the story of

203
00:09:03,730 --> 00:09:02,449
spaceflight and of what it's like to be

204
00:09:06,699 --> 00:09:03,740
an astronaut in some tough circumstances

205
00:09:08,780 --> 00:09:06,709
I think Apollo 13 is also a really good

206
00:09:15,769 --> 00:09:08,790
space movie

207
00:09:18,019 --> 00:09:15,779
very cool thank you hello my name is

208
00:09:21,889 --> 00:09:18,029
Jared Romero my question is for tom

209
00:09:23,629 --> 00:09:21,899
marshburn what are some basic space laws

210
00:09:30,500 --> 00:09:23,639
put in place for those serving aboard

211
00:09:32,360 --> 00:09:30,510
the ISS well it's a good question we

212
00:09:34,759 --> 00:09:32,370
actually do have a series of laws we

213
00:09:37,129 --> 00:09:34,769

call it a code of conduct between

214
00:09:39,889 --> 00:09:37,139
international company countries now keep

215
00:09:41,720 --> 00:09:39,899
in mind that countries have gotten

216
00:09:43,639 --> 00:09:41,730
together to decide who is going to be on

217
00:09:45,530 --> 00:09:43,649
the space station we can't have all

218
00:09:46,939 --> 00:09:45,540
countries represented all the time so

219
00:09:48,470 --> 00:09:46,949
that's a complicated plan that's brought

220
00:09:51,079 --> 00:09:48,480
up and then on top of that you have a

221
00:09:52,879 --> 00:09:51,089
commander and so that commander could be

222
00:09:54,590 --> 00:09:52,889
from from any country and those

223
00:09:57,500 --> 00:09:54,600
commanders have to hand over one to the

224
00:10:00,199 --> 00:09:57,510
other as we switch crew to crew so there

225
00:10:02,540 --> 00:10:00,209
are very specific laws as to who's in

226
00:10:04,310 --> 00:10:02,550
charge that is the commander and what

227
00:10:06,470 --> 00:10:04,320
modules people are in charge of that

228
00:10:08,720 --> 00:10:06,480
they are specifically taken care of the

229
00:10:10,220 --> 00:10:08,730
Russians in general take care of all the

230
00:10:13,759 --> 00:10:10,230
technical details on the Russian side

231
00:10:15,500 --> 00:10:13,769
the u.s. we have the u.s. lab and our

232
00:10:19,670 --> 00:10:15,510
other modules Columbus would be a

233
00:10:21,559 --> 00:10:19,680
European astronaut and the Japanese Kibo

234
00:10:24,110 --> 00:10:21,569
where we are right now Japanese module

235
00:10:26,750 --> 00:10:24,120
typically would be a Japanese astronaut

236
00:10:28,610 --> 00:10:26,760
if they happen to be on board and Chris

237
00:10:29,900 --> 00:10:28,620
as a Canadian will be the first Canadian

238
00:10:33,920 --> 00:10:29,910

commander on board the space station

239
00:10:35,900 --> 00:10:33,930
when we start expedition 35 so this is

240
00:10:38,300 --> 00:10:35,910
series of complicated laws to make sure

241
00:10:41,000 --> 00:10:38,310
we know who's in charge and to know what

242
00:10:42,379 --> 00:10:41,010
our responsibilities are and it's all

243
00:10:45,410 --> 00:10:42,389
written down we've got it all worked out

244
00:10:50,440 --> 00:10:45,420
and seems to work pretty well thank you

245
00:10:55,450 --> 00:10:52,930
hi my name is Jack Morris and my

246
00:10:57,130 --> 00:10:55,460
question is for Chris Hadfield if any

247
00:10:59,830 --> 00:10:57,140
form of assuming you simulated gravity

248
00:11:04,320 --> 00:10:59,840
was created would have benefit the ISS

249
00:11:09,270 --> 00:11:07,440
yeah we actually have artificial gravity

250
00:11:10,830 --> 00:11:09,280
on the space station we have centrifuges

251
00:11:13,170 --> 00:11:10,840
for a lot of the experiments you

252
00:11:15,210 --> 00:11:13,180
actually need some gravity like if we're

253
00:11:16,650 --> 00:11:15,220
doing blood work you need to spin the

254
00:11:18,090 --> 00:11:16,660
blood so that the heavy particles

255
00:11:20,340 --> 00:11:18,100
settled to the bottom so you can do the

256
00:11:22,470 --> 00:11:20,350
science right so we have small spinning

257
00:11:26,130 --> 00:11:22,480
centrifuges in our science racks on

258
00:11:27,840 --> 00:11:26,140
board so that we can we can do some

259
00:11:29,490 --> 00:11:27,850
certain types of things but one of the

260
00:11:31,500 --> 00:11:29,500
biggest benefits of the space station is

261
00:11:33,390 --> 00:11:31,510
that it doesn't have gravity you can do

262
00:11:34,980 --> 00:11:33,400
things here that are impossible to do on

263
00:11:37,920 --> 00:11:34,990

the earth and that's what most of the

264
00:11:39,180 --> 00:11:37,930
experiments do so to have gravity would

265
00:11:41,490 --> 00:11:39,190
kind of just make this a regular

266
00:11:42,800 --> 00:11:41,500
laboratory and not a unique laboratory

267
00:11:44,940 --> 00:11:42,810
for all of humanity

268
00:11:47,520 --> 00:11:44,950
it might make our lives a little easier

269
00:11:49,710 --> 00:11:47,530
if we had gravity but if you ever tried

270
00:11:50,880 --> 00:11:49,720
flying in weightlessness you'd realize

271
00:11:53,250 --> 00:11:50,890
that even though there's some

272
00:11:55,260 --> 00:11:53,260
disadvantages the advantages outweigh it

273
00:11:57,120 --> 00:11:55,270
is such a constant treat to be

274
00:11:58,770 --> 00:11:57,130
weightless that I'm really pleased that

275
00:12:00,540 --> 00:11:58,780
we haven't figured out artificial

276
00:12:01,860 --> 00:12:00,550
gravity yet and that we have the chance

277
00:12:04,650 --> 00:12:01,870
to be weightless for months and months

278
00:12:07,260 --> 00:12:04,660
it's just it's like it's like a toy that

279
00:12:09,330 --> 00:12:07,270
never winds down or like a present that

280
00:12:11,500 --> 00:12:09,340
constantly unwraps it's lovely being

281
00:12:18,100 --> 00:12:11,510
weightless

282
00:12:19,569 --> 00:12:18,110
thank you hi my name is Joseph medulla

283
00:12:22,000 --> 00:12:19,579
and this question is for Tom Marshburn

284
00:12:23,680 --> 00:12:22,010
what experiments have you participated

285
00:12:29,250 --> 00:12:23,690
in that you think have most benefitted

286
00:12:33,700 --> 00:12:31,630
you know that is a really difficult

287
00:12:36,280 --> 00:12:33,710
question to answer because all of them

288
00:12:38,769 --> 00:12:36,290

play a part in benefiting space travel

289
00:12:40,990 --> 00:12:38,779
which ends up benefiting humankind as

290
00:12:44,530 --> 00:12:41,000
well you know Chris and I have done a

291
00:12:45,970 --> 00:12:44,540
bunch of experiments I've on material

292
00:12:48,310 --> 00:12:45,980
science developing new materials those

293
00:12:49,900 --> 00:12:48,320
will probably play a part someday in not

294
00:12:52,630 --> 00:12:49,910
only earth-based applications but for

295
00:12:54,130 --> 00:12:52,640
spaceflight and new spaceships we've got

296
00:12:56,710 --> 00:12:54,140
all kinds of experiments on the outside

297
00:12:58,960 --> 00:12:56,720
being bombarded by the Sun and by cosmic

298
00:13:00,370 --> 00:12:58,970
rays and radiation and they're testing

299
00:13:02,100 --> 00:13:00,380
the Harding the hardening of those

300
00:13:04,570 --> 00:13:02,110
materials for spaceflight applications

301
00:13:06,820 --> 00:13:04,580
I'm a medical doctor a little bit biased

302
00:13:08,590 --> 00:13:06,830
I think the most important thing we've

303
00:13:10,570 --> 00:13:08,600
figured out is how to keep humans

304
00:13:12,400 --> 00:13:10,580
healthy onboard the space station we

305
00:13:14,710 --> 00:13:12,410
have wonderful exercise devices both

306
00:13:17,200 --> 00:13:14,720
resistive and cardiovascular exercise

307
00:13:18,730 --> 00:13:17,210
devices we've been able to maintain our

308
00:13:20,560 --> 00:13:18,740
bone and muscle like we've never been

309
00:13:23,470 --> 00:13:20,570
able to do before so there's almost no

310
00:13:25,180 --> 00:13:23,480
loss of bone at all and so we're

311
00:13:27,220 --> 00:13:25,190
extending the capability of humans to

312
00:13:29,170 --> 00:13:27,230
live in space so that we can go out for

313
00:13:32,530 --> 00:13:29,180

long long periods of time maybe a year

314
00:13:34,960 --> 00:13:32,540
or longer to you know an asteroid Moon

315
00:13:42,519 --> 00:13:34,970
Mars or even beyond that so that's what

316
00:13:45,190 --> 00:13:42,529
I would say hi my name is Ethan Kraft

317
00:13:51,199 --> 00:13:45,200
Chris what everyday activities on earth

318
00:13:55,410 --> 00:13:53,519
yeah Tom and I were talking about this

319
00:13:57,420 --> 00:13:55,420
earlier in fact a lot of things that are

320
00:13:59,850 --> 00:13:57,430
easy on earth are hard here and things

321
00:14:02,220 --> 00:13:59,860
that are hard on Earth are easy here but

322
00:14:04,410 --> 00:14:02,230
just simple stuff I mean you want to

323
00:14:05,910 --> 00:14:04,420
wash your hair it's you know it's it's

324
00:14:07,259 --> 00:14:05,920
more cutting your teeth you know you

325
00:14:10,889 --> 00:14:07,269
don't have a sink you don't have running

326
00:14:12,960 --> 00:14:10,899
water tying up your shoes is hard like

327
00:14:14,879 --> 00:14:12,970
just just picture if I want to tie up my

328
00:14:16,949 --> 00:14:14,889
shoe and I start doing in one shoe and

329
00:14:18,600 --> 00:14:16,959
then suddenly I'm floating away across

330
00:14:21,780 --> 00:14:18,610
the room and bouncing into things and

331
00:14:23,579 --> 00:14:21,790
and so stuff you take for granted stuff

332
00:14:26,970 --> 00:14:23,589
that you need to have a stable body for

333
00:14:30,660 --> 00:14:26,980
those are hard the simple mundane ways

334
00:14:32,009 --> 00:14:30,670
of life preparing food is complicated

335
00:14:33,329 --> 00:14:32,019
you know often when you're preparing

336
00:14:36,240 --> 00:14:33,339
food you add a little salt little pepper

337
00:14:38,490 --> 00:14:36,250
some spices put a little cheese fry this

338
00:14:41,400 --> 00:14:38,500

up throw it cut up grate up things peel

339
00:14:43,050 --> 00:14:41,410
things all of that creates waste and

340
00:14:45,090 --> 00:14:43,060
stuff floating all over the place and

341
00:14:47,340 --> 00:14:45,100
normally when we eat we eat one thing at

342
00:14:49,139 --> 00:14:47,350
a time so you heat up your vegetables

343
00:14:50,879 --> 00:14:49,149
you start your vegetable you finish your

344
00:14:52,620 --> 00:14:50,889
vegetable you throw it away then you get

345
00:14:54,449 --> 00:14:52,630
your meat you do that because it's much

346
00:14:57,360 --> 00:14:54,459
it's hard to keep four packages open at

347
00:14:59,759 --> 00:14:57,370
once so all the little stuff eating do

348
00:15:00,870 --> 00:14:59,769
it help your shoes all that well one

349
00:15:02,730 --> 00:15:00,880
thing that's really cool when you put

350
00:15:12,040 --> 00:15:02,740
your pants on here you can put on your

351
00:15:21,040 --> 00:15:17,920
Thanks hi my name is Taylor coupon and

352
00:15:22,840 --> 00:15:21,050
my question is also for Chris how long

353
00:15:24,340 --> 00:15:22,850
do you think it will be until we can

354
00:15:30,199 --> 00:15:24,350
travel to the moon like we travel

355
00:15:34,980 --> 00:15:32,819
you know I bet people were asking that

356
00:15:37,620 --> 00:15:34,990
exact same question a hundred years ago

357
00:15:39,060 --> 00:15:37,630
about airplanes you know airplanes were

358
00:15:40,560 --> 00:15:39,070
pretty new back then they were safe

359
00:15:42,420 --> 00:15:40,570
enough but there weren't like airlines

360
00:15:44,790 --> 00:15:42,430
yet and most people that flew airplanes

361
00:15:46,199 --> 00:15:44,800
then were taking a chance it had to be

362
00:15:49,259 --> 00:15:46,209
specially trained and there were a lot

363
00:15:50,850 --> 00:15:49,269

of risks involved just just a hundred

364
00:15:52,680 --> 00:15:50,860
years ago just like one long human

365
00:15:54,449 --> 00:15:52,690
lifetime ago and people were probably

366
00:15:56,069 --> 00:15:54,459
asking when can we like getting one of

367
00:15:58,860 --> 00:15:56,079
these things and you know fly from

368
00:16:00,780 --> 00:15:58,870
London to Paris or fly from from Phoenix

369
00:16:03,720 --> 00:16:00,790
to New York when can we actually do

370
00:16:05,190 --> 00:16:03,730
something with these things and now now

371
00:16:06,630 --> 00:16:05,200
look at it you don't even think about it

372
00:16:09,449 --> 00:16:06,640
right that when you get on an airplane

373
00:16:10,889 --> 00:16:09,459
you kind of mostly worried about whether

374
00:16:12,840 --> 00:16:10,899
they feed you and what movie you might

375
00:16:15,389 --> 00:16:12,850
see you aren't worried about the

376
00:16:16,769 --> 00:16:15,399
technology anymore and the reason we

377
00:16:20,100 --> 00:16:16,779
made that transition was because of

378
00:16:22,590 --> 00:16:20,110
human inventions we went from high drag

379
00:16:25,319 --> 00:16:22,600
very rickety engines in through to low

380
00:16:26,699 --> 00:16:25,329
drag and NASA NASA's predecessor did a

381
00:16:28,920 --> 00:16:26,709
lot of work on it

382
00:16:30,810 --> 00:16:28,930
making airplane streamline and engines

383
00:16:32,699 --> 00:16:30,820
engine technology was the big change

384
00:16:34,710 --> 00:16:32,709
coming up with reliable jet engines and

385
00:16:36,750 --> 00:16:34,720
that's what we need to answer your

386
00:16:38,220 --> 00:16:36,760
question before one to the moon is like

387
00:16:40,860 --> 00:16:38,230
like taking a trip across the Atlantic

388
00:16:43,769 --> 00:16:40,870

we need I think in the next level of

389
00:16:45,480 --> 00:16:43,779
rocket technology for engines because it

390
00:16:47,579 --> 00:16:45,490
right now to get us here we can do it

391
00:16:50,220 --> 00:16:47,589
but it's hard to keep it safe and

392
00:16:51,389 --> 00:16:50,230
therefore it's still very complex and

393
00:16:54,329 --> 00:16:51,399
expensive and takes years of training

394
00:16:56,280 --> 00:16:54,339
but I think a couple generations of

395
00:16:58,470 --> 00:16:56,290
invention of rocket technology hopefully

396
00:16:59,970 --> 00:16:58,480
someone there in Phoenix right now is

397
00:17:01,860 --> 00:16:59,980
thinking about it what could we do

398
00:17:04,169 --> 00:17:01,870
different come up with a new invention

399
00:17:06,120 --> 00:17:04,179
so that not only could you guys come and

400
00:17:08,159 --> 00:17:06,130
live and work on a space station but get

401
00:17:09,569 --> 00:17:08,169
to the moon pretty quickly just as we've

402
00:17:12,329 --> 00:17:09,579
learned to travel all around the surface

403
00:17:22,689 --> 00:17:19,000
thank you hello my name is Daisy pinky

404
00:17:24,579 --> 00:17:22,699
and my question is for Tom Marshburn do

405
00:17:30,160 --> 00:17:24,589
you find that your natural reflexes are

406
00:17:35,330 --> 00:17:32,930
that's an interesting question yeah the

407
00:17:38,000 --> 00:17:35,340
way I would answer that is to say my

408
00:17:39,950 --> 00:17:38,010
natural reflexes change when I come into

409
00:17:41,390 --> 00:17:39,960
space I think it happens to all of us so

410
00:17:43,700 --> 00:17:41,400
they would have to change again when I

411
00:17:46,220 --> 00:17:43,710
go back to earth for instance the reflex

412
00:17:48,050 --> 00:17:46,230
when you want to throw a ball you on

413
00:17:50,360 --> 00:17:48,060

earth if you want to have it get some

414
00:17:52,430 --> 00:17:50,370
good distance you have to throw it up a

415
00:17:55,310 --> 00:17:52,440
little bit so it makes a big arc but in

416
00:17:58,790 --> 00:17:55,320
space it's completely different so we

417
00:18:00,860 --> 00:17:58,800
are now used to being able to throw

418
00:18:02,480 --> 00:18:00,870
things slowly and carefully but in a

419
00:18:03,920 --> 00:18:02,490
straight line and that's a natural

420
00:18:05,510 --> 00:18:03,930
reflex it's going to have to change when

421
00:18:07,310 --> 00:18:05,520
we get back to earth a number of

422
00:18:09,200 --> 00:18:07,320
astronauts tend to go with their natural

423
00:18:10,820 --> 00:18:09,210
reflexes sometimes for the first few

424
00:18:12,230 --> 00:18:10,830
days and drop a lot of things I know

425
00:18:15,290 --> 00:18:12,240
after my shuttle flight I dropped a

426
00:18:17,210 --> 00:18:15,300
couple of glasses of water so those

427
00:18:19,160 --> 00:18:17,220
reflexes that work just great up here

428
00:18:22,250 --> 00:18:19,170
are gonna have to change again when we

429
00:18:23,840 --> 00:18:22,260
get back to earth and so yeah our

430
00:18:26,690 --> 00:18:23,850
natural reflexes will readapt when we

431
00:18:34,970 --> 00:18:26,700
get home I'm gonna hand it back to miss

432
00:18:36,710 --> 00:18:34,980
mess tech now my name is Izzy Ramos to

433
00:18:38,320 --> 00:18:36,720
Tom Marshburn have you or anyone you

434
00:18:44,210 --> 00:18:38,330
know suffers from physiological

435
00:18:50,630 --> 00:18:48,649
a lot of physiological effects yes but

436
00:18:53,870 --> 00:18:50,640
also perhaps some psychological as well

437
00:18:56,090 --> 00:18:53,880
and one of the things people will have

438
00:18:58,370 --> 00:18:56,100

to do is once they've been away

439
00:18:59,870 --> 00:18:58,380
it's not just unique to space but for

440
00:19:01,340 --> 00:18:59,880
anyone that's been away from their

441
00:19:03,380 --> 00:19:01,350
family for a long period of time and

442
00:19:05,570 --> 00:19:03,390
their friends is to readapt you know my

443
00:19:07,190 --> 00:19:05,580
family has been having it's their own

444
00:19:09,110 --> 00:19:07,200
lives and doing wonderful things on the

445
00:19:10,789 --> 00:19:09,120
earth we miss each other we keep in

446
00:19:12,320 --> 00:19:10,799
touch a little bit well when I get back

447
00:19:14,240 --> 00:19:12,330
I'm going to be integrated back into the

448
00:19:15,770 --> 00:19:14,250
family and it's gonna you know maybe

449
00:19:19,460 --> 00:19:15,780
take a little while for them get getting

450
00:19:20,860 --> 00:19:19,470
used to me being around again so that's

451
00:19:23,120 --> 00:19:20,870
probably the most difficult

452
00:19:25,190 --> 00:19:23,130
psychological effect I don't know there

453
00:19:26,570 --> 00:19:25,200
have been profound effects although you

454
00:19:27,950 --> 00:19:26,580
know having a chance as Chris was

455
00:19:29,930 --> 00:19:27,960
describing to look out and see the

456
00:19:32,060 --> 00:19:29,940
blackness of space to get just an

457
00:19:35,720 --> 00:19:32,070
inkling of our perhaps of our place in

458
00:19:37,460 --> 00:19:35,730
the cosmos is a very profound thing and

459
00:19:39,169 --> 00:19:37,470
I think over the years and years I know

460
00:19:41,240 --> 00:19:39,179
after my shuttle flight three or four

461
00:19:42,770 --> 00:19:41,250
years ago I've always thought about that

462
00:19:44,840 --> 00:19:42,780
what the space looked like and what the

463
00:19:46,399 --> 00:19:44,850

earth looked like from our vantage point

464
00:19:48,500 --> 00:19:46,409
and that's actually a wonderful

465
00:19:50,029 --> 00:19:48,510
psychological effect I wish everyone in

466
00:19:51,230 --> 00:19:50,039
the world could have we might reduce a

467
00:19:53,930 --> 00:19:51,240
lot of our problems on the earth if

468
00:19:57,590 --> 00:19:53,940
everyone could see that so those are the

469
00:19:58,850 --> 00:19:57,600
facts I anticipate when I get home thank

470
00:20:04,100 --> 00:19:58,860
you I'm gonna hand it back to miss

471
00:20:05,779 --> 00:20:04,110
mastic now thank you so much for taking

472
00:20:07,190 --> 00:20:05,789
the time to speak with us today this has

473
00:20:13,600 --> 00:20:07,200
been a wonderful experience and we

474
00:20:17,990 --> 00:20:16,730
thank you very much I wish Kevin Ford

475
00:20:19,340 --> 00:20:18,000
could be here with us but from Chris

476
00:20:21,680 --> 00:20:19,350
Hadfield and Tom Marshburn and

477
00:20:30,320 --> 00:20:21,690
expedition 34 is wonderful talking to

478
00:20:34,850 --> 00:20:32,730
station this is Houston ACR that

479
00:20:37,470 --> 00:20:34,860
concludes the event thank you

480
00:20:39,509 --> 00:20:37,480
Thank You Mel Metropolitan Arts