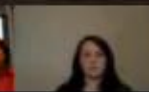


Google+



1
00:00:14,260 --> 00:00:12,820
our Google+ hangout with three recently

2
00:00:16,359 --> 00:00:14,270
returned crew members from the

3
00:00:18,609 --> 00:00:16,369
International Space Station which is

4
00:00:21,760 --> 00:00:18,619
orbiting 250 miles above the planet

5
00:00:24,400 --> 00:00:21,770
right now we have with us veteran

6
00:00:27,939 --> 00:00:24,410
astronauts Kevin Ford the commander of

7
00:00:31,120 --> 00:00:27,949
expedition 34 Tom Marshburn flight

8
00:00:33,070 --> 00:00:31,130
engineer from expedition 34/35 and Chris

9
00:00:35,110 --> 00:00:33,080
Hadfield the former commander of

10
00:00:37,299 --> 00:00:35,120
expedition 35 of the Canadian Space

11
00:00:40,270 --> 00:00:37,309
Agency the first two astronauts I

12
00:00:41,889 --> 00:00:40,280
mentioned were both NASA astronauts we

13
00:00:43,900 --> 00:00:41,899

have a number of other participants on

14

00:00:47,410 --> 00:00:43,910

the Hangout today we have

15

00:00:51,490 --> 00:00:47,420

representatives of the National Model UN

16

00:00:56,490 --> 00:00:51,500

we have Christina Mader as well as Luigi

17

00:01:01,389 --> 00:00:56,500

Amanda Starr Rossmann we have Eric

18

00:01:04,420 --> 00:01:01,399

Michael Eaton as well as my king from

19

00:01:07,510 --> 00:01:04,430

the National Model UN and we have a

20

00:01:11,529 --> 00:01:07,520

number of participants such as Sean

21

00:01:13,749 --> 00:01:11,539

Flynn from News 14 in North Carolina and

22

00:01:15,460 --> 00:01:13,759

we have cro Frandsen from the birds we

23

00:01:18,850 --> 00:01:15,470

want to welcome everybody to the Hangout

24

00:01:20,710 --> 00:01:18,860

and I want to go first to the crew who

25

00:01:22,749 --> 00:01:20,720

are in the studio here at the Johnson

26

00:01:24,910 --> 00:01:22,759

Space are in Houston for any opening

27

00:01:26,350 --> 00:01:24,920

comments you might want to make guys hey

28

00:01:29,380 --> 00:01:26,360

yeah well this is Kevin can you hear me

29

00:01:31,330 --> 00:01:29,390

Kelly I can hear you great Kevin tastic

30

00:01:33,760 --> 00:01:31,340

well welcome everybody who's

31

00:01:36,309 --> 00:01:33,770

participating today it's well it's great

32

00:01:37,809 --> 00:01:36,319

to have everybody aboard and I want to

33

00:01:40,809 --> 00:01:37,819

say I haven't seen too much of these

34

00:01:43,089 --> 00:01:40,819

guys in the last two months I left the

35

00:01:44,320 --> 00:01:43,099

space station about two months ago and

36

00:01:46,029 --> 00:01:44,330

these guys has just been home for a

37

00:01:47,230 --> 00:01:46,039

little bit over a week so they're

38

00:01:49,449 --> 00:01:47,240

they're really in the middle of

39

00:01:50,889 --> 00:01:49,459
reconditioning and everything and we had

40

00:01:52,690 --> 00:01:50,899
a great time one board is the crew of

41

00:01:55,449 --> 00:01:52,700
expedition 34 and then they stayed

42

00:01:57,070 --> 00:01:55,459
aboard and and conducted expedition 35

43

00:01:59,620 --> 00:01:57,080
both of which we think we're really

44

00:02:01,570 --> 00:01:59,630
successful and we're really fun so we're

45

00:02:04,570 --> 00:02:01,580
great friends now it's great to all be

46

00:02:06,729 --> 00:02:04,580
back together and we're happy to be here

47

00:02:09,460 --> 00:02:06,739
and talk NASA with you tell you about

48

00:02:11,170 --> 00:02:09,470
the the space station how outstanding it

49

00:02:11,470 --> 00:02:11,180
is up there how great it is to work on

50

00:02:16,990 --> 00:02:11,480
it

51
00:02:19,479 --> 00:02:17,000
the public in general so thanks for

52
00:02:21,039 --> 00:02:19,489
having us Kelly well great well let's go

53
00:02:23,119 --> 00:02:21,049
ahead and get to your questions first

54
00:02:25,789 --> 00:02:23,129
why waste time

55
00:02:27,530 --> 00:02:25,799
let's let's start out I want to give

56
00:02:34,069 --> 00:02:27,540
Carl Frandsen with the verge of the

57
00:02:35,959 --> 00:02:34,079
first question here thank you can you

58
00:02:39,020 --> 00:02:35,969
hear me all right we can hear you well

59
00:02:40,369 --> 00:02:39,030
sorry I had my mic muted some technical

60
00:02:43,009 --> 00:02:40,379
troubles you guys don't know anything

61
00:02:45,229 --> 00:02:43,019
about that you know in the space station

62
00:02:47,149 --> 00:02:45,239
I'm sure you know went into any troubles

63
00:02:49,039 --> 00:02:47,159

up there but thank you for making the

64

00:02:52,099 --> 00:02:49,049

time we have a question from one of our

65

00:02:54,379 --> 00:02:52,109

readers hear about how emotional your

66

00:02:57,619 --> 00:02:54,389

return to Earth has been how emotional

67

00:03:03,080 --> 00:03:01,399

yeah I can answer I think maybe for all

68

00:03:04,580 --> 00:03:03,090

of us that the first emotion is that

69

00:03:06,710 --> 00:03:04,590

you're leaving behind your brothers

70

00:03:09,140 --> 00:03:06,720

leaving behind a bit of your family

71

00:03:10,759 --> 00:03:09,150

there so I regardless of the

72

00:03:12,589 --> 00:03:10,769

anticipation of getting back to seeing

73

00:03:14,300 --> 00:03:12,599

your own family getting back to the good

74

00:03:15,770 --> 00:03:14,310

things about Earth it's tough to leave

75

00:03:16,990 --> 00:03:15,780

your crewmates after having such an

76

00:03:20,420 --> 00:03:17,000

incredible adventure together

77

00:03:21,530 --> 00:03:20,430

spectacular landing and then as a whole

78

00:03:24,050 --> 00:03:21,540

other story in itself

79

00:03:26,030 --> 00:03:24,060

but once you get back I certainly want

80

00:03:28,099 --> 00:03:26,040

to see our families that's the most

81

00:03:29,899 --> 00:03:28,109

emotional event but after that

82

00:03:32,089 --> 00:03:29,909

everything else just builds day by day

83

00:03:34,610 --> 00:03:32,099

all the pleasures of living on earth the

84

00:03:36,439 --> 00:03:34,620

wind the grass the trees the food it

85

00:03:38,240 --> 00:03:36,449

just comes day by day and you enjoy it

86

00:03:40,429 --> 00:03:38,250

but quite a bit we look back at our

87

00:03:41,899 --> 00:03:40,439

adventure in space and I don't know for

88

00:03:46,550 --> 00:03:41,909

me I'd like to get back there someday

89

00:03:49,009 --> 00:03:46,560

maybe we all do all right

90

00:03:51,349 --> 00:03:49,019

hey I've heard it said many times in

91

00:03:54,710 --> 00:03:51,359

many ways that the space station is its

92

00:03:56,719 --> 00:03:54,720

own little United Nations onboard you

93

00:03:58,490 --> 00:03:56,729

have folks from 15 different countries

94

00:04:00,800 --> 00:03:58,500

that are participating in the space

95

00:04:02,839 --> 00:04:00,810

station activity let's take a question

96

00:04:04,839 --> 00:04:02,849

from one of our UN participants maybe we

97

00:04:08,890 --> 00:04:04,849

can start off with my king and and

98

00:04:10,909 --> 00:04:08,900

Michael Eaton with the National Model UN

99

00:04:12,499 --> 00:04:10,919

yeah sure

100

00:04:14,059 --> 00:04:12,509

one of our questions that we got from

101
00:04:15,800 --> 00:04:14,069
some of our students that participate in

102
00:04:17,149 --> 00:04:15,810
our program this is for Kevin

103
00:04:19,189 --> 00:04:17,159
specifically but maybe for all of you

104
00:04:20,930 --> 00:04:19,199
Kevin I read in your bio you have a

105
00:04:22,430 --> 00:04:20,940
degree a master's degree in

106
00:04:24,050 --> 00:04:22,440
international relations in addition to

107
00:04:27,170 --> 00:04:24,060
lots of other degrees where there's a

108
00:04:28,399 --> 00:04:27,180
aerospace engineering other things can

109
00:04:29,719 --> 00:04:28,409
you talk about kind of what your

110
00:04:32,690 --> 00:04:29,729
interest was in international relations

111
00:04:34,940 --> 00:04:32,700
why you got into it for a master's

112
00:04:36,010 --> 00:04:34,950
degree and how its kind of changed your

113
00:04:38,290 --> 00:04:36,020

perspective

114

00:04:41,230 --> 00:04:38,300

in you know as an astronaut in space

115

00:04:43,659 --> 00:04:41,240

working for their astronauts yeah

116

00:04:45,760 --> 00:04:43,669

absolutely well at the time I pursued

117

00:04:48,730 --> 00:04:45,770

that degree I was a military officer

118

00:04:50,379 --> 00:04:48,740

stationed overseas in Germany and I had

119

00:04:51,640 --> 00:04:50,389

just really started traveling the world

120

00:04:54,100 --> 00:04:51,650

you know I grew up in northeastern

121

00:04:55,809 --> 00:04:54,110

Indiana and wet you know just kind of

122

00:04:57,400 --> 00:04:55,819

lived in the same state for the first 22

123

00:04:59,140 --> 00:04:57,410

years and then then I joined the Air

124

00:05:00,640 --> 00:04:59,150

Force and I I was starting to really get

125

00:05:02,980 --> 00:05:00,650

out in the world and see lots of places

126

00:05:05,950 --> 00:05:02,990

and of course since then I've really

127

00:05:09,129 --> 00:05:05,960

seen a lot of the world but I just found

128

00:05:10,360 --> 00:05:09,139

it really really fascinating to get the

129

00:05:12,189 --> 00:05:10,370

perspectives of people in other

130

00:05:13,960 --> 00:05:12,199

countries you know they all have very

131

00:05:16,089 --> 00:05:13,970

different backgrounds where they came

132

00:05:18,640 --> 00:05:16,099

from what their histories are really

133

00:05:21,100 --> 00:05:18,650

kind of dictate how they they look at

134

00:05:23,050 --> 00:05:21,110

the world but but I just thought it was

135

00:05:24,939 --> 00:05:23,060

really fun for in the cultures and

136

00:05:29,620 --> 00:05:24,949

learned some of the languages and

137

00:05:31,149 --> 00:05:29,630

everything and you know to to to make to

138

00:05:32,350 --> 00:05:31,159

get the payoff the ultimate payoff from

139

00:05:33,670 --> 00:05:32,360

that ultimately living on the

140

00:05:35,200 --> 00:05:33,680

International Space Station was

141

00:05:36,790 --> 00:05:35,210

incredible where we could go to Russia

142

00:05:38,339 --> 00:05:36,800

and we could go to Europe and we could

143

00:05:40,480 --> 00:05:38,349

go to Japan all within a few minutes

144

00:05:43,270 --> 00:05:40,490

sometimes within seconds when you're

145

00:05:45,279 --> 00:05:43,280

doing some kinds of drills and working

146

00:05:48,219 --> 00:05:45,289

with those cultures in the training as

147

00:05:50,140 --> 00:05:48,229

well and bringing bringing really all

148

00:05:52,300 --> 00:05:50,150

these these countries together one of

149

00:05:54,640 --> 00:05:52,310

the things that just really warms my

150

00:05:57,189 --> 00:05:54,650

heart is that what a great project the

151
00:05:58,450 --> 00:05:57,199
International Space Station is it you

152
00:06:00,040 --> 00:05:58,460
know it doesn't include every country in

153
00:06:03,040 --> 00:06:00,050
the world but it includes 15 of the most

154
00:06:05,170 --> 00:06:03,050
affluent richest ones who have have a

155
00:06:06,760 --> 00:06:05,180
little bit of spare capacity to do

156
00:06:08,529 --> 00:06:06,770
something for future generations and

157
00:06:10,990 --> 00:06:08,539
that's what we're doing up there this is

158
00:06:12,670 --> 00:06:11,000
a project it's a peaceful project so

159
00:06:14,080 --> 00:06:12,680
unique on this planet that we've all

160
00:06:16,089 --> 00:06:14,090
come together to do some really cool

161
00:06:19,420 --> 00:06:16,099
stuff you know and having Chris on board

162
00:06:20,529 --> 00:06:19,430
with me from Canada and akio see day for

163
00:06:23,560 --> 00:06:20,539

the first half of my increment from

164

00:06:25,870 --> 00:06:23,570

Japan and everything just we just all

165

00:06:27,129 --> 00:06:25,880

feel like one group of people and that's

166

00:06:28,510 --> 00:06:27,139

really what we are on this planet one

167

00:06:32,560 --> 00:06:28,520

group of people trying to do something

168

00:06:34,480 --> 00:06:32,570

for the future all right hey I want to

169

00:06:37,120 --> 00:06:34,490

go to one of the Google+ questions that

170

00:06:40,180 --> 00:06:37,130

we got and bring Chris Hadfield into the

171

00:06:42,520 --> 00:06:40,190

conversation the question is that that

172

00:06:44,529 --> 00:06:42,530

they'd love to know what was that

173

00:06:47,840 --> 00:06:44,539

scrumptious first sandwich you had when

174

00:06:53,520 --> 00:06:50,910

you know living on the space station the

175

00:06:56,880 --> 00:06:53,530

food is really good but there's no way

176
00:06:58,410 --> 00:06:56,890
to preserve the texture of the food the

177
00:07:00,540 --> 00:06:58,420
food is good but but it's sort of like

178
00:07:02,460 --> 00:07:00,550
eating the world's best baby food a lot

179
00:07:04,290 --> 00:07:02,470
of it it's all in a pouch or squeezable

180
00:07:05,520 --> 00:07:04,300
something and and the taste is good and

181
00:07:08,100 --> 00:07:05,530
the variety is good and it keeps us

182
00:07:09,720 --> 00:07:08,110
really healthy I've just found out this

183
00:07:12,060 --> 00:07:09,730
week that in fact I came back a little

184
00:07:13,800 --> 00:07:12,070
stronger for straight raw muscle power

185
00:07:17,580 --> 00:07:13,810
than I launched so the food is doing its

186
00:07:19,500 --> 00:07:17,590
job but it's nothing like a big messy

187
00:07:21,480 --> 00:07:19,510
crunchy sandwich and you bite into a

188
00:07:23,220 --> 00:07:21,490

little bits fall down and it's got you

189

00:07:25,710 --> 00:07:23,230

know some crunchy bits and some soft

190

00:07:29,160 --> 00:07:25,720

bits and you know a dill pickle and that

191

00:07:30,900 --> 00:07:29,170

big variety of sliced meat and cheese

192

00:07:33,150 --> 00:07:30,910

and vegetables and lettuce and

193

00:07:35,400 --> 00:07:33,160

everything even though the taste of the

194

00:07:38,940 --> 00:07:35,410

food on board is good the texture and

195

00:07:41,250 --> 00:07:38,950

the aromas and the straight multi-sensor

196

00:07:42,960 --> 00:07:41,260

all pleasure of food is something that

197

00:07:46,920 --> 00:07:42,970

you don't get in orbit and it's one of

198

00:07:49,710 --> 00:07:46,930

the real nice reasons to come home all

199

00:07:52,800 --> 00:07:49,720

right thanks a lot Chris I heard you

200

00:07:55,340 --> 00:07:52,810

were doing some experimenting with how

201
00:07:58,130 --> 00:07:55,350
you could mix different foods together

202
00:08:00,540 --> 00:07:58,140
yeah in fact I worked with the guys from

203
00:08:02,220 --> 00:08:00,550
Mythbusters they were looking at fun

204
00:08:04,230 --> 00:08:02,230
stuff that we could do on board together

205
00:08:06,330 --> 00:08:04,240
and they said they talked to some

206
00:08:08,550 --> 00:08:06,340
professional chefs because we have what

207
00:08:12,420 --> 00:08:08,560
looks like a pretty long pantry list of

208
00:08:14,940 --> 00:08:12,430
of pantry items or menu items and they

209
00:08:16,920 --> 00:08:14,950
said given this raw material of food how

210
00:08:18,870 --> 00:08:16,930
could you make something you know a

211
00:08:20,250 --> 00:08:18,880
mash-up or something together that would

212
00:08:22,260 --> 00:08:20,260
that would that would be both practical

213
00:08:23,670 --> 00:08:22,270

for us to make and something a little

214

00:08:25,290 --> 00:08:23,680

different than just squeeze in one tube

215

00:08:27,060 --> 00:08:25,300

of something and then another tube of

216

00:08:29,400 --> 00:08:27,070

something and the fact that we have

217

00:08:31,110 --> 00:08:29,410

tortillas on board and little packets of

218

00:08:33,200 --> 00:08:31,120

hot sauce really helped and then we just

219

00:08:37,020 --> 00:08:33,210

chose a couple ingredients and made a

220

00:08:39,120 --> 00:08:37,030

space burrito and it actually worked out

221

00:08:41,190 --> 00:08:39,130

really well broke up some meat it's not

222

00:08:43,110 --> 00:08:41,200

a very good place to mix foods because

223

00:08:45,360 --> 00:08:43,120

as soon as you take something out of the

224

00:08:47,310 --> 00:08:45,370

package it becomes just a flying object

225

00:08:49,980 --> 00:08:47,320

around the inside and it's very hard to

226

00:08:51,420 --> 00:08:49,990

get all things together but but they did

227

00:08:52,890 --> 00:08:51,430

come up with a practical way of just

228

00:08:55,020 --> 00:08:52,900

squeezing and layering a few things into

229

00:08:56,640 --> 00:08:55,030

one burrito and it was good enough that

230

00:08:59,190 --> 00:08:56,650

I talked Chris Cassidy who's up there

231

00:09:00,940 --> 00:08:59,200

right now into trying it after he got up

232

00:09:03,850 --> 00:09:00,950

there and he made the same concoct

233

00:09:07,570 --> 00:09:03,860

and and he really liked it as well so it

234

00:09:10,390 --> 00:09:07,580

was a good practical and and tasty space

235

00:09:12,010 --> 00:09:10,400

recipe a space burrito and I'm gonna use

236

00:09:13,690 --> 00:09:12,020

moderators privilege here to ask you one

237

00:09:15,730 --> 00:09:13,700

more question on that because I saw one

238

00:09:17,440 --> 00:09:15,740

of the recipes involved asparagus and I

239

00:09:19,510 --> 00:09:17,450

gotta ask you does that mean the same

240

00:09:22,810 --> 00:09:19,520

thing to you on orbit as it does on the

241

00:09:24,820 --> 00:09:22,820

ground there's no way to tell it's an

242

00:09:27,850 --> 00:09:24,830

extremely well ventilated environment up

243

00:09:29,800 --> 00:09:27,860

there so so no way to tell asparagus is

244

00:09:32,170 --> 00:09:29,810

is actually asparagus is not all I think

245

00:09:33,370 --> 00:09:32,180

you saw in the video it's it's when

246

00:09:35,320 --> 00:09:33,380

you're eating asparagus that's all you

247

00:09:37,180 --> 00:09:35,330

can do because there's asparagus wants

248

00:09:39,400 --> 00:09:37,190

to launch in every direction it doesn't

249

00:09:41,740 --> 00:09:39,410

have a thick sauce on it and any small

250

00:09:43,000 --> 00:09:41,750

hard piece of food or anything just of

251
00:09:44,860 --> 00:09:43,010
course wants to come out of the package

252
00:09:46,090 --> 00:09:44,870
and fly away so you really have to pay

253
00:09:48,040 --> 00:09:46,100
attention and capture the rogue

254
00:09:50,200 --> 00:09:48,050
asparagus each time when you're eating

255
00:09:52,360 --> 00:09:50,210
so it's not a good food to mix with

256
00:09:54,340 --> 00:09:52,370
other ones but but then again it's one

257
00:09:55,810 --> 00:09:54,350
of the few that freeze dries as well 3

258
00:09:57,520 --> 00:09:55,820
freeze dry as well so that when you eat

259
00:09:59,470 --> 00:09:57,530
it it still tastes almost like fresh

260
00:10:00,970 --> 00:09:59,480
fresh vegetables and we look forward we

261
00:10:02,410 --> 00:10:00,980
actually kind of hey who gets the

262
00:10:04,990 --> 00:10:02,420
asparagus today because it's one of the

263
00:10:07,720 --> 00:10:05,000

high demand items all right hey let's go

264

00:10:10,810 --> 00:10:07,730

to Sean Flynn with news 14 in North

265

00:10:12,580 --> 00:10:10,820

Carolina hello gentlemen commander

266

00:10:14,140 --> 00:10:12,590

Hatfield I know everyone calls you

267

00:10:16,210 --> 00:10:14,150

pretty much the rock star after that

268

00:10:18,490 --> 00:10:16,220

small video you put out there but here

269

00:10:20,650 --> 00:10:18,500

in Tar Heel country

270

00:10:22,060 --> 00:10:20,660

Tom you're you're the rock star here

271

00:10:23,230 --> 00:10:22,070

everyone's real excited about what

272

00:10:25,480 --> 00:10:23,240

you've been doing up there we've all

273

00:10:27,310 --> 00:10:25,490

been following your Twitter all the

274

00:10:28,510 --> 00:10:27,320

pictures that you sent talked about some

275

00:10:30,490 --> 00:10:28,520

of the pictures that you did send

276

00:10:32,410 --> 00:10:30,500

specifically of this side of the world

277

00:10:33,550 --> 00:10:32,420

and any plans you might have to come on

278

00:10:35,560 --> 00:10:33,560

back here and share some of your

279

00:10:37,600 --> 00:10:35,570

information of what you've done up there

280

00:10:41,260 --> 00:10:37,610

in space with with the folks back in

281

00:10:44,290 --> 00:10:41,270

home well the it's very hard to take a

282

00:10:45,880 --> 00:10:44,300

bad picture of the Earth from space the

283

00:10:47,410 --> 00:10:45,890

the world when you first get there

284

00:10:49,060 --> 00:10:47,420

you're just astounded by what you can

285

00:10:50,950 --> 00:10:49,070

see just seeing the continents the

286

00:10:52,540 --> 00:10:50,960

oceans you know mostly when you look out

287

00:10:55,240 --> 00:10:52,550

the window you see an ocean with the

288

00:10:57,010 --> 00:10:55,250

clouds and that beautiful thin blue rim

289

00:10:58,720 --> 00:10:57,020

of the atmosphere the Wonder and the

290

00:10:59,980 --> 00:10:58,730

beauty of being up there for five months

291

00:11:02,620 --> 00:10:59,990

is that you start to pick out your

292

00:11:05,350 --> 00:11:02,630

favorite places your number favorite

293

00:11:07,360 --> 00:11:05,360

place grows you begin to see nuances

294

00:11:09,670 --> 00:11:07,370

that you never realized before when

295

00:11:10,900 --> 00:11:09,680

you're looking at continents and ridges

296

00:11:13,690 --> 00:11:10,910

and you begin to wonder how did that

297

00:11:14,800 --> 00:11:13,700

form so I was just trying to look at the

298

00:11:17,200 --> 00:11:14,810

natural beauty of there

299

00:11:19,600 --> 00:11:17,210

and both ask the question and for myself

300

00:11:21,400 --> 00:11:19,610

answer in a very small way how did this

301
00:11:24,220 --> 00:11:21,410
happen why does Australia look the way

302
00:11:26,290 --> 00:11:24,230
it does help this area of the world gets

303
00:11:29,500 --> 00:11:26,300
so desiccated in this other area be so

304
00:11:31,480 --> 00:11:29,510
lush but over all of it is just

305
00:11:33,430 --> 00:11:31,490
breathtaking so you've really fall in

306
00:11:36,940 --> 00:11:33,440
love with the earth again and so as

307
00:11:38,560 --> 00:11:36,950
tries just trying to to put that out and

308
00:11:41,740 --> 00:11:38,570
help other people fall in love with

309
00:11:43,650 --> 00:11:41,750
their their planet so certainly hope to

310
00:11:45,910 --> 00:11:43,660
gather all those pictures together and

311
00:11:49,450 --> 00:11:45,920
we have plans for coming up to North

312
00:11:51,280 --> 00:11:49,460
Carolina and where I could be going

313
00:11:53,440 --> 00:11:51,290

through my home movies my slides of

314

00:11:54,970 --> 00:11:53,450

pictures from space for hours so I'll go

315

00:11:58,030 --> 00:11:54,980

as long as people are willing to take it

316

00:12:00,010 --> 00:11:58,040

so it's a really wonderful place to be

317

00:12:05,230 --> 00:12:00,020

and it's great to fall in love with your

318

00:12:07,240 --> 00:12:05,240

planet again alright great hey I know

319

00:12:09,910 --> 00:12:07,250

we've got some additional students from

320

00:12:11,019 --> 00:12:09,920

the National Model UN Cristina you and

321

00:12:14,500 --> 00:12:11,029

one of your colleagues like to throw in

322

00:12:16,900 --> 00:12:14,510

a question here great yeah

323

00:12:19,030 --> 00:12:16,910

so I have a question it's kind of

324

00:12:21,910 --> 00:12:19,040

related to Model UN and in my real life

325

00:12:23,710 --> 00:12:21,920

I work for the NGO working group on

326
00:12:24,790 --> 00:12:23,720
women peace and security and I've also

327
00:12:26,740 --> 00:12:24,800
worked with the National girls

328
00:12:28,329 --> 00:12:26,750
collaborative project so my question is

329
00:12:30,790 --> 00:12:28,339
about women in space

330
00:12:32,710 --> 00:12:30,800
um the under-representation of women in

331
00:12:34,750 --> 00:12:32,720
science and engineering fields is a

332
00:12:37,180 --> 00:12:34,760
critical issue for the world as a whole

333
00:12:40,090 --> 00:12:37,190
but the United States in particular NASA

334
00:12:42,400 --> 00:12:40,100
has been advancing gender equality in

335
00:12:44,350 --> 00:12:42,410
its own work both in fostering female

336
00:12:47,050 --> 00:12:44,360
astronauts scientists and engineers for

337
00:12:48,970 --> 00:12:47,060
example um there have been upwards of 31

338
00:12:51,880 --> 00:12:48,980

women on the International Space Station

339

00:12:54,940 --> 00:12:51,890

a 27 of which were brought by NASA and

340

00:12:57,220 --> 00:12:54,950

and they also NASA also does programs on

341

00:12:59,949 --> 00:12:57,230

advancing girls and women in pursuing

342

00:13:02,620 --> 00:12:59,959

careers such as now in girls program so

343

00:13:05,590 --> 00:13:02,630

my question is how has the International

344

00:13:08,079 --> 00:13:05,600

Space Station served as a platform for

345

00:13:09,699 --> 00:13:08,089

cooperating at the international level

346

00:13:12,160 --> 00:13:09,709

with other countries and promoting

347

00:13:14,320 --> 00:13:12,170

gender equality and are there particular

348

00:13:16,680 --> 00:13:14,330

programs or efforts to advance gender

349

00:13:19,630 --> 00:13:16,690

equality and women's involvement in

350

00:13:22,150 --> 00:13:19,640

engineering in science in the context of

351

00:13:24,040 --> 00:13:22,160

the International Space Station sure

352

00:13:26,930 --> 00:13:24,050

well this Chris Hadfield will probably

353

00:13:30,110 --> 00:13:26,940

just split the answer amongst us but

354

00:13:33,010 --> 00:13:30,120

I you know what we really respect on the

355

00:13:34,900 --> 00:13:33,020

space station is competence that is the

356

00:13:37,940 --> 00:13:34,910

fundamental thing that is required

357

00:13:39,710 --> 00:13:37,950

competence is everything you know the

358

00:13:41,360 --> 00:13:39,720

personality and the culture in the

359

00:13:43,310 --> 00:13:41,370

background are of course the richness

360

00:13:45,410 --> 00:13:43,320

that you bring but at the core of it is

361

00:13:48,170 --> 00:13:45,420

competence and NASA stresses that right

362

00:13:51,260 --> 00:13:48,180

across the board and and we really honor

363

00:13:52,400 --> 00:13:51,270

that and and we have luckily enough with

364

00:13:53,540 --> 00:13:52,410

so many people that are interested in

365

00:13:54,890 --> 00:13:53,550

coming to the program we have great

366

00:13:56,930 --> 00:13:54,900

depths of confidence within the

367

00:13:58,610 --> 00:13:56,940

astronaut corps and right across to the

368

00:14:01,880 --> 00:13:58,620

Johnson Space Center where we are and

369

00:14:04,430 --> 00:14:01,890

you and specifically if you want to look

370

00:14:07,070 --> 00:14:04,440

at gender of course the the commander of

371

00:14:09,050 --> 00:14:07,080

the International Space Station a couple

372

00:14:11,000 --> 00:14:09,060

times has been a woman with Peggy

373

00:14:13,850 --> 00:14:11,010

Whitson first and and Sonny Williams

374

00:14:15,470 --> 00:14:13,860

recently the chief of all flight

375

00:14:17,720 --> 00:14:15,480

corporations for NASA here at the

376

00:14:19,310 --> 00:14:17,730

Johnson Space Center is Janet Cavani so

377

00:14:21,170 --> 00:14:19,320

she is the person who's in charge the

378

00:14:24,200 --> 00:14:21,180

astronaut office is just one of the

379

00:14:25,730 --> 00:14:24,210

things that she's in charge of and so I

380

00:14:28,130 --> 00:14:25,740

mean that's that's a tremendous

381

00:14:30,140 --> 00:14:28,140

accomplishment for any human being Janet

382

00:14:33,080 --> 00:14:30,150

Cavani being a superbly qualified one

383

00:14:35,390 --> 00:14:33,090

and even more so the director of the

384

00:14:37,460 --> 00:14:35,400

Johnson Space Center who runs this

385

00:14:40,190 --> 00:14:37,470

entire place all of the responsibilities

386

00:14:42,530 --> 00:14:40,200

is ellen ochoa dr. ellen ochoa and she

387

00:14:44,660 --> 00:14:42,540

is a Tech's astronaut a wonderfully

388

00:14:47,930 --> 00:14:44,670

competent a warm and really caring

389

00:14:50,150 --> 00:14:47,940

person and doing a magnificent job in

390

00:14:51,890 --> 00:14:50,160

which like always it's difficult times

391

00:14:54,350 --> 00:14:51,900

there's always trials in trying to

392

00:14:56,150 --> 00:14:54,360

maintain a cutting-edge capability and

393

00:14:59,510 --> 00:14:56,160

to take care of all these people and

394

00:15:02,210 --> 00:14:59,520

their families and their jobs and so it

395

00:15:05,090 --> 00:15:02,220

I think the best measure of the quality

396

00:15:07,070 --> 00:15:05,100

is where it becomes transparent and in a

397

00:15:08,870 --> 00:15:07,080

lot of places in the world it is not by

398

00:15:11,630 --> 00:15:08,880

any means whether you divvy up people

399

00:15:14,000 --> 00:15:11,640

through through culture or language or

400

00:15:15,470 --> 00:15:14,010

race or skin color earth or gender or

401

00:15:17,870 --> 00:15:15,480

whatever there's lots of places it is

402

00:15:20,480 --> 00:15:17,880

not but I think one of the places that

403

00:15:23,510 --> 00:15:20,490

it really is that you can really hold up

404

00:15:25,760 --> 00:15:23,520

as a shining example of of where

405

00:15:28,670 --> 00:15:25,770

competence and ability are what reigns

406

00:15:30,110 --> 00:15:28,680

supreme is both here at the Johnson

407

00:15:32,300 --> 00:15:30,120

Space Center where we live and work and

408

00:15:34,070 --> 00:15:32,310

onboard the space station all we're

409

00:15:36,200 --> 00:15:34,080

really looking for are good competent

410

00:15:39,470 --> 00:15:36,210

people and we're lucky enough to work

411

00:15:40,889 --> 00:15:39,480

and and fly with with people male female

412

00:15:44,309 --> 00:15:40,899

and from all around the world

413

00:15:47,280 --> 00:15:44,319

I might just throw in a short edition if

414

00:15:48,629 --> 00:15:47,290

I could as expedition through 33 flight

415

00:15:52,019 --> 00:15:48,639

engineer my commander was Sunita

416

00:15:53,460 --> 00:15:52,029

Williams and to get kind of a little bit

417

00:15:55,230 --> 00:15:53,470

more - maybe the hurdle your question

418

00:15:58,230 --> 00:15:55,240

was how do we how do we share this with

419

00:15:59,549 --> 00:15:58,240

other countries and of course she was

420

00:16:02,100 --> 00:15:59,559

the commander of the Russian crew as

421

00:16:04,199 --> 00:16:02,110

well and Yuri Malenchenko was asked this

422

00:16:05,999 --> 00:16:04,209

question in Star City before launch he

423

00:16:07,169 --> 00:16:06,009

said hey Yuri you're flying with the

424

00:16:08,579 --> 00:16:07,179

woman commander what do you think this

425

00:16:11,249 --> 00:16:08,589

is a question that they might ask in

426

00:16:13,439 --> 00:16:11,259

Russia that you might not see in the US

427

00:16:15,090 --> 00:16:13,449

and he said just what Chris said he said

428

00:16:16,919 --> 00:16:15,100

it doesn't matter to me at all

429

00:16:18,509 --> 00:16:16,929

all that matters to me is that it's a

430

00:16:20,069 --> 00:16:18,519

great person and a great commander and I

431

00:16:22,319 --> 00:16:20,079

have absolute trust in them and respect

432

00:16:25,169 --> 00:16:22,329

for them and so sunny set a great

433

00:16:27,749 --> 00:16:25,179

example for them and she set a great

434

00:16:30,389 --> 00:16:27,759

example not not just in Russia but

435

00:16:32,100 --> 00:16:30,399

across all cultures I think if you look

436

00:16:34,019 --> 00:16:32,110

at our flight control room sometime on

437

00:16:35,910 --> 00:16:34,029

NASA TV you're gonna see an awful lot of

438

00:16:37,199 --> 00:16:35,920

women in technical positions including

439

00:16:38,790 --> 00:16:37,209

many of them in the flight director

440

00:16:40,319 --> 00:16:38,800

chair which is the highest of all

441

00:16:43,829 --> 00:16:40,329

position for the operation of the space

442

00:16:45,960 --> 00:16:43,839

station well above even us so we get our

443

00:16:48,509 --> 00:16:45,970

marching orders from them and so you see

444

00:16:51,030 --> 00:16:48,519

this this competence and and that way we

445

00:16:52,439 --> 00:16:51,040

we set a good example the other

446

00:16:54,059 --> 00:16:52,449

countries participating in the

447

00:16:55,590 --> 00:16:54,069

International Space Station are setting

448

00:16:57,210 --> 00:16:55,600

this great example as well and that's

449

00:16:59,369 --> 00:16:57,220

that's the message we can take to the

450

00:17:05,220 --> 00:16:59,379

rest of the world is a look at what

451
00:17:06,960 --> 00:17:05,230
we're doing okay thank you guys I want

452
00:17:09,240 --> 00:17:06,970
to remind everybody that we're taking

453
00:17:11,250 --> 00:17:09,250
questions live through various means

454
00:17:13,529 --> 00:17:11,260
through Google+ through Twitter through

455
00:17:18,360 --> 00:17:13,539
Facebook and I've got one I want to go

456
00:17:21,419 --> 00:17:18,370
to hear from from Twitter at Pablo NYC

457
00:17:24,210 --> 00:17:21,429
Pablo wano asks for people who question

458
00:17:26,159 --> 00:17:24,220
space based research can you pick an

459
00:17:32,070 --> 00:17:26,169
experiment you think will tangibly

460
00:17:33,299 --> 00:17:32,080
benefit life on Earth sure the hard part

461
00:17:37,260 --> 00:17:33,309
are answering that question is just

462
00:17:40,620 --> 00:17:37,270
picking one and I'll just I'll pick one

463
00:17:43,440 --> 00:17:40,630

just because I'm a physician we do

464

00:17:45,000 --> 00:17:43,450

ultrasound experiments onboard we look

465

00:17:46,980 --> 00:17:45,010

at our bodies and the changes of

466

00:17:48,180 --> 00:17:46,990

zero-gravity on our bodies everybody's

467

00:17:50,610 --> 00:17:48,190

familiar with ultrasound and its

468

00:17:53,399 --> 00:17:50,620

capabilities on earth what's unique

469

00:17:54,600 --> 00:17:53,409

about spaceflight and ultrasound is that

470

00:17:56,490 --> 00:17:54,610

because we

471

00:17:58,950 --> 00:17:56,500

have MRIs cat-scans onboard the space

472

00:18:00,480 --> 00:17:58,960

station we are forced to answer a very

473

00:18:03,570 --> 00:18:00,490

difficult question how do you take care

474

00:18:05,160 --> 00:18:03,580

of astronauts and get diagnostic imaging

475

00:18:06,390 --> 00:18:05,170

in space when you don't have that

476

00:18:08,310 --> 00:18:06,400

capability so you take a known

477

00:18:10,770 --> 00:18:08,320

capability ultrasound fly it up there

478

00:18:12,299 --> 00:18:10,780

and expand the boundaries of what it can

479

00:18:15,270 --> 00:18:12,309

do find out there's so many things that

480

00:18:17,370 --> 00:18:15,280

can do that our ground-based medical

481

00:18:20,070 --> 00:18:17,380

world there's no need for it so it would

482

00:18:22,080 --> 00:18:20,080

be in big cities at least so no need to

483

00:18:25,140 --> 00:18:22,090

do it so so why even look into that it

484

00:18:27,539 --> 00:18:25,150

has actually tangibly affected the way

485

00:18:29,700 --> 00:18:27,549

surgeons for instance are trained around

486

00:18:31,380 --> 00:18:29,710

the world really mostly in the u.s. in

487

00:18:33,060 --> 00:18:31,390

the first hour of trauma care you can

488

00:18:34,710 --> 00:18:33,070

get an ultrasound machine small machine

489

00:18:37,020 --> 00:18:34,720

onto a patient and make life-and-death

490

00:18:38,419 --> 00:18:37,030

decisions and it's being done right now

491

00:18:41,159 --> 00:18:38,429

and Russians are being trained that way

492

00:18:43,799 --> 00:18:41,169

so that but that's just a very small

493

00:18:44,820 --> 00:18:43,809

thing everything we do from the basic

494

00:18:47,640 --> 00:18:44,830

research which it's going to have

495

00:18:51,590 --> 00:18:47,650

impacts 10 20 years 30 years from now

496

00:18:53,789 --> 00:18:51,600

two things that devices that are being

497

00:18:55,530 --> 00:18:53,799

tested out on the space station there

498

00:18:57,900 --> 00:18:55,540

was a device that came from Canada that

499

00:19:01,020 --> 00:18:57,910

looks at it's a very very small machine

500

00:19:03,330 --> 00:19:01,030

that measures samples within the blood

501
00:19:04,890 --> 00:19:03,340
and constituents of the blood if you can

502
00:19:06,450 --> 00:19:04,900
get it really small and effective and

503
00:19:07,799 --> 00:19:06,460
working really well then you can put it

504
00:19:11,520 --> 00:19:07,809
out to underserved areas of the world

505
00:19:16,500 --> 00:19:11,530
and it provide better medical care for

506
00:19:17,820 --> 00:19:16,510
underserved areas and so again we see

507
00:19:19,530 --> 00:19:17,830
this we have the privilege of being up

508
00:19:20,730 --> 00:19:19,540
there and seeing this reenacted over and

509
00:19:23,789 --> 00:19:20,740
over again with everything we put our

510
00:19:25,350 --> 00:19:23,799
hands on when we do research so I wish I

511
00:19:26,970 --> 00:19:25,360
could have the hours to tell you all

512
00:19:31,530 --> 00:19:26,980
about everything that I know but that's

513
00:19:33,120 --> 00:19:31,540

even just a small part of it Tom to any

514

00:19:39,000 --> 00:19:33,130

your colleagues have anything to add in

515

00:19:40,850 --> 00:19:39,010

there right and go ahead Chris sure you

516

00:19:43,860 --> 00:19:40,860

know right now on the space station

517

00:19:46,020 --> 00:19:43,870

there are over a hundred experiments

518

00:19:48,090 --> 00:19:46,030

running simultaneously everything

519

00:19:50,520 --> 00:19:48,100

something from something as mundane to

520

00:19:52,620 --> 00:19:50,530

just trying to learn how to make a

521

00:19:56,039 --> 00:19:52,630

really good spaceship you know how do

522

00:19:59,430 --> 00:19:56,049

you design a pump or a fan or a toilet

523

00:20:03,120 --> 00:19:59,440

or what material should the hull be made

524

00:20:04,560 --> 00:20:03,130

of or how do you how do you cool it in

525

00:20:06,720 --> 00:20:04,570

order to be able to go further from

526
00:20:08,610 --> 00:20:06,730
Earth we have to be able to figure that

527
00:20:10,799 --> 00:20:08,620
out while we're still safely close

528
00:20:13,200 --> 00:20:10,809
just like sailing ships did for

529
00:20:15,659 --> 00:20:13,210
centuries within sight of land before

530
00:20:17,460 --> 00:20:15,669
they could safely leave the security of

531
00:20:19,019 --> 00:20:17,470
a home port we're doing that on Space

532
00:20:21,390 --> 00:20:19,029
Station Mountain on top of the space

533
00:20:23,250 --> 00:20:21,400
station we are collecting dark matter

534
00:20:26,250 --> 00:20:23,260
and dark energy from the universe to try

535
00:20:27,750 --> 00:20:26,260
and understand what three-quarters of

536
00:20:29,760 --> 00:20:27,760
everything is made of we're just

537
00:20:31,500 --> 00:20:29,770
starting to understand the universe

538
00:20:33,990 --> 00:20:31,510

around us and the space station is a

539

00:20:36,090 --> 00:20:34,000

stable powered platform that's allowing

540

00:20:38,010 --> 00:20:36,100

us to do that and we have a huge suite

541

00:20:40,019 --> 00:20:38,020

of sensors facing the earth itself

542

00:20:41,580 --> 00:20:40,029

looking at the atmosphere looking at

543

00:20:43,830 --> 00:20:41,590

pollution in the atmosphere looking at

544

00:20:46,049 --> 00:20:43,840

climate change we've been taking

545

00:20:47,760 --> 00:20:46,059

pictures of the world for little over 50

546

00:20:49,950 --> 00:20:47,770

years and in that time we've seen

547

00:20:51,990 --> 00:20:49,960

significant change even in the time that

548

00:20:55,049 --> 00:20:52,000

we've been flying in space looking at

549

00:20:58,860 --> 00:20:55,059

changes in glacial flow down in

550

00:21:01,680 --> 00:20:58,870

Patagonia or in in the Aral see that the

551
00:21:03,779 --> 00:21:01,690
changes are so vivid and so it gives us

552
00:21:06,960 --> 00:21:03,789
everything from from how to measure

553
00:21:08,370 --> 00:21:06,970
blood samples remotely right through to

554
00:21:10,529 --> 00:21:08,380
understanding the health of our own

555
00:21:12,480 --> 00:21:10,539
planet and to try and understand what

556
00:21:15,570 --> 00:21:12,490
the universe is made of and that's going

557
00:21:16,860 --> 00:21:15,580
on 24/7 on the space station

558
00:21:18,450 --> 00:21:16,870
you know monks to everything else that

559
00:21:21,299 --> 00:21:18,460
the space station represents so it's

560
00:21:25,820 --> 00:21:21,309
it's a fascinating laboratory to be both

561
00:21:28,590 --> 00:21:25,830
a lab rat and a laboratory technician

562
00:21:30,360 --> 00:21:28,600
and if you're not tired of the question

563
00:21:32,549 --> 00:21:30,370

yet Kelly you want me to throw one inch

564

00:21:36,299 --> 00:21:32,559

keep going Kevin okay all right

565

00:21:40,110 --> 00:21:36,309

well I launched on a Soyuz with two

566

00:21:42,510 --> 00:21:40,120

Russian crewmates and 32 fish and while

567

00:21:45,029 --> 00:21:42,520

we were up there we kept these fish in

568

00:21:47,130 --> 00:21:45,039

an aquarium and the whole point of them

569

00:21:50,010 --> 00:21:47,140

going up with us they're called medaka

570

00:21:52,019 --> 00:21:50,020

as a Japanese experiment and then the

571

00:21:54,019 --> 00:21:52,029

experiments called medaka osteoclast and

572

00:21:57,029 --> 00:21:54,029

the whole point of it is to look at

573

00:21:58,740 --> 00:21:57,039

osteoporotic studies and these

574

00:22:01,110 --> 00:21:58,750

particular fish are unique in that they

575

00:22:03,090 --> 00:22:01,120

have bones like mammals and since we're

576

00:22:05,070 --> 00:22:03,100

mammals - we're really interested in

577

00:22:07,649 --> 00:22:05,080

what happens to their the way their bone

578

00:22:09,269 --> 00:22:07,659

is created and destroyed and these fish

579

00:22:11,370 --> 00:22:09,279

are very they're very transparent and

580

00:22:13,350 --> 00:22:11,380

they just a really really great subjects

581

00:22:16,919 --> 00:22:13,360

for learning about the study of

582

00:22:20,310 --> 00:22:16,929

osteoporosis scientists looking at at

583

00:22:22,380 --> 00:22:20,320

these these particular samples you know

584

00:22:25,230 --> 00:22:22,390

believe that they have a really

585

00:22:26,940 --> 00:22:25,240

good shot at making a big dent in

586

00:22:28,640 --> 00:22:26,950

osteoporosis someday if maybe not even

587

00:22:30,600 --> 00:22:28,650

eliminating it wouldn't it be nice if

588

00:22:32,880 --> 00:22:30,610

osteoporosis someday went the way of

589

00:22:35,400 --> 00:22:32,890

scurvy and some of the other things that

590

00:22:37,590 --> 00:22:35,410

we've stamped out and that would make a

591

00:22:39,330 --> 00:22:37,600

difference to the billions of people on

592

00:22:41,610 --> 00:22:39,340

the planet just that experiment itself

593

00:22:43,890 --> 00:22:41,620

would make the space station worthwhile

594

00:22:45,990 --> 00:22:43,900

but like these guys said hundreds going

595

00:22:47,910 --> 00:22:46,000

on at a time and thousands going on over

596

00:22:50,250 --> 00:22:47,920

the course of the Space Station's

597

00:22:53,100 --> 00:22:50,260

history well of course that's why the

598

00:22:54,570 --> 00:22:53,110

station is up there right hey I would

599

00:22:56,340 --> 00:22:54,580

like to get back to those billions on

600

00:22:58,350 --> 00:22:56,350

the planet Earth again and and how they

601
00:23:00,330 --> 00:22:58,360
interact Laurel Connor you're one of our

602
00:23:03,290 --> 00:23:00,340
mode UN participants you haven't had a

603
00:23:06,630 --> 00:23:03,300
chance to ask a question ask away

604
00:23:08,940 --> 00:23:06,640
thank you and I have a question from one

605
00:23:10,590 --> 00:23:08,950
of our staffers and would you like to

606
00:23:12,330 --> 00:23:10,600
see a change policy for the

607
00:23:14,580 --> 00:23:12,340
international cooperation between

608
00:23:17,070 --> 00:23:14,590
countries for the cooperative space

609
00:23:20,130 --> 00:23:17,080
exploration and if so what change would

610
00:23:22,590 --> 00:23:20,140
you like to see hmm

611
00:23:25,350 --> 00:23:22,600
well I'll answer it I guess unless you

612
00:23:28,080 --> 00:23:25,360
guys got something right away I think

613
00:23:29,940 --> 00:23:28,090

what we're doing in space the

614

00:23:33,180 --> 00:23:29,950

cooperative nature of the agreement is

615

00:23:35,160 --> 00:23:33,190

unprecedented I've been an astronaut for

616

00:23:37,950 --> 00:23:35,170

21 years when I came into the program

617

00:23:40,770 --> 00:23:37,960

there was no cooperation between NASA

618

00:23:42,510 --> 00:23:40,780

and Russia at the time in fact it was it

619

00:23:45,120 --> 00:23:42,520

was still very much right in the tailing

620

00:23:47,130 --> 00:23:45,130

edge of the of the Cold War and to think

621

00:23:50,250 --> 00:23:47,140

where we are now that to all of us

622

00:23:51,690 --> 00:23:50,260

helped fly a Russian space ship that it

623

00:23:54,510 --> 00:23:51,700

was our lifeboat while we are on board

624

00:23:56,130 --> 00:23:54,520

that we were integrated with crews from

625

00:23:58,590 --> 00:23:56,140

Russia and you don't have to go very far

626
00:24:00,810 --> 00:23:58,600
back in human history of the where we

627
00:24:02,820 --> 00:24:00,820
had recent enmities between nations that

628
00:24:05,700 --> 00:24:02,830
are now doing this thing together and

629
00:24:07,710 --> 00:24:05,710
and it's not easy to do it this way it

630
00:24:09,420 --> 00:24:07,720
is hard to do the International Space

631
00:24:12,240 --> 00:24:09,430
Station the way we're doing but we are

632
00:24:13,830 --> 00:24:12,250
doing it and everybody on earth no

633
00:24:16,560 --> 00:24:13,840
matter where you're watching your

634
00:24:18,360 --> 00:24:16,570
particular dawn or your sunset you can

635
00:24:22,200 --> 00:24:18,370
watch the space station go over your

636
00:24:23,340 --> 00:24:22,210
head as a shining tangible example of

637
00:24:25,770 --> 00:24:23,350
what people can do when they work

638
00:24:27,230 --> 00:24:25,780

together and we're writing the book on a

639

00:24:30,150 --> 00:24:27,240

lot of it the way that we build up

640

00:24:33,570 --> 00:24:30,160

intergovernmental agreements research

641

00:24:35,820 --> 00:24:33,580

agreements day to day practicalities how

642

00:24:37,680 --> 00:24:35,830

it is when there's a problem in one set

643

00:24:39,660 --> 00:24:37,690

how we all work together with missions

644

00:24:42,390 --> 00:24:39,670

control all around the world and solve

645

00:24:44,100 --> 00:24:42,400

that if you're looking both in Model

646

00:24:46,080 --> 00:24:44,110

United Nations and the real United

647

00:24:48,990 --> 00:24:46,090

Nations or at any international

648

00:24:50,520 --> 00:24:49,000

organization there's some real lessons

649

00:24:52,380 --> 00:24:50,530

to be learned from how we've managed to

650

00:24:53,940 --> 00:24:52,390

solve those problems since we started

651

00:24:56,010 --> 00:24:53,950

taking the US Space Shuttle to the

652

00:24:58,650 --> 00:24:56,020

Russian space station Mir and how far

653

00:25:00,480 --> 00:24:58,660

we've come ever since and we don't we're

654

00:25:01,950 --> 00:25:00,490

not perfect we don't claim to be but

655

00:25:03,870 --> 00:25:01,960

we're pretty good examples of how other

656

00:25:05,730 --> 00:25:03,880

people might do it and we're all really

657

00:25:09,210 --> 00:25:05,740

proud I think to have to have helped

658

00:25:13,700 --> 00:25:09,220

move that both that internal process but

659

00:25:19,110 --> 00:25:15,990

thanks Chris hey I'm going to take

660

00:25:22,760 --> 00:25:19,120

another question from online remember as

661

00:25:26,330 --> 00:25:22,770

Astro is the hashtag for that but

662

00:25:29,430 --> 00:25:26,340

autonomy of our Innova asks that a

663

00:25:31,350 --> 00:25:29,440

question about how long is the space

664

00:25:33,240 --> 00:25:31,360

station going to remain in orbit and

665

00:25:38,610 --> 00:25:33,250

what are the plans for maintaining

666

00:25:42,950 --> 00:25:38,620

expanding the station well as far as we

667

00:25:45,450 --> 00:25:42,960

know the late 2020s is the current plan

668

00:25:47,250 --> 00:25:45,460

for what we've seen certainly I could

669

00:25:49,500 --> 00:25:47,260

have tested the fact that being up there

670

00:25:51,750 --> 00:25:49,510

on the space station it is a it still

671

00:25:53,760 --> 00:25:51,760

seems to be a pristine beautiful

672

00:25:56,070 --> 00:25:53,770

instrument for human exploration and

673

00:25:58,140 --> 00:25:56,080

research there are consumables that

674

00:25:59,490 --> 00:25:58,150

those are resupplied and there are

675

00:26:01,770 --> 00:25:59,500

things to break we've demonstrated

676

00:26:04,170 --> 00:26:01,780

ability to fix that and actually on our

677

00:26:06,330 --> 00:26:04,180

flight to fix it really fast if we need

678

00:26:08,250 --> 00:26:06,340

to don't be bad yeah two weeks ago

679

00:26:09,600 --> 00:26:08,260

you're outside right that's weird ten

680

00:26:11,610 --> 00:26:09,610

days ago I was outside doing a spacewalk

681

00:26:13,170 --> 00:26:11,620

after finding out only 48 hours before

682

00:26:17,250 --> 00:26:13,180

that there was even a problem that

683

00:26:18,720 --> 00:26:17,260

required a spacewalk so I feel like the

684

00:26:19,830 --> 00:26:18,730

space station just keep going as long as

685

00:26:22,680 --> 00:26:19,840

we have the will to keep it up there

686

00:26:24,600 --> 00:26:22,690

there's nothing preventing it so as

687

00:26:27,180 --> 00:26:24,610

Chris mentioned these are the

688

00:26:28,950 --> 00:26:27,190

technologies that certainly will need to

689

00:26:31,320 --> 00:26:28,960

be used when we keep going further and

690

00:26:34,050 --> 00:26:31,330

further away and for longer periods of

691

00:26:37,020 --> 00:26:34,060

time and the processes as well as the

692

00:26:38,640 --> 00:26:37,030

materials all of that I have a lot of

693

00:26:40,620 --> 00:26:38,650

hope that we're going to be able to do

694

00:26:42,710 --> 00:26:40,630

that and do it very very well because of

695

00:26:45,600 --> 00:26:42,720

what we're doing on the space station

696

00:26:47,640 --> 00:26:45,610

throw in as well that you know when

697

00:26:49,350 --> 00:26:47,650

before I was assigned to my space

698

00:26:51,210 --> 00:26:49,360

station flight I kind of wondered

699

00:26:53,220 --> 00:26:51,220

you know myself what is it we do up

700

00:26:56,400 --> 00:26:53,230

there you know on a day-to-day basis and

701
00:26:58,169 --> 00:26:56,410
I would come from a shuttle world and

702
00:26:59,730 --> 00:26:58,179
that was a shuttle pilot and and that

703
00:27:01,799 --> 00:26:59,740
wasn't that in tune with the science and

704
00:27:03,480 --> 00:27:01,809
I got up there and the science one board

705
00:27:05,280 --> 00:27:03,490
is absolutely fascinating

706
00:27:06,990 --> 00:27:05,290
you trained it on the ground and it's

707
00:27:09,450 --> 00:27:07,000
all kind of make-believe when you're

708
00:27:10,710 --> 00:27:09,460
training it we used plastic fish to

709
00:27:13,049 --> 00:27:10,720
simulate the real fish that we were

710
00:27:14,400 --> 00:27:13,059
gonna have one board and and then you

711
00:27:15,960 --> 00:27:14,410
get up there and you get to see

712
00:27:18,960 --> 00:27:15,970
everything happening in zero-gravity

713
00:27:21,419 --> 00:27:18,970

it's just absolutely fascinating to see

714

00:27:23,190 --> 00:27:21,429

how different things can be a lot of the

715

00:27:25,289 --> 00:27:23,200

stuff goes on behind racks and stuff and

716

00:27:26,490 --> 00:27:25,299

we can't really see it all combustion

717

00:27:28,620 --> 00:27:26,500

and that sort of thing for our safety

718

00:27:30,570 --> 00:27:28,630

purposes but you can also you can see it

719

00:27:33,210 --> 00:27:30,580

online and you can find videos of it and

720

00:27:34,590 --> 00:27:33,220

the scientists and the investigators are

721

00:27:36,780 --> 00:27:34,600

watching it real time on the planet

722

00:27:39,780 --> 00:27:36,790

Earth and they're very excited about it

723

00:27:41,549 --> 00:27:39,790

and we we're not going to run out of

724

00:27:43,680 --> 00:27:41,559

things to do if we fly this thing to

725

00:27:45,900 --> 00:27:43,690

2028 and people are paying attention

726
00:27:47,430 --> 00:27:45,910
they're gonna get so many good ideas

727
00:27:50,610 --> 00:27:47,440
from the things that are going on right

728
00:27:53,730 --> 00:27:50,620
now and I just think that the amount of

729
00:27:56,400 --> 00:27:53,740
research on board can blossom if we if

730
00:27:58,409 --> 00:27:56,410
we do the promotion right and we enable

731
00:28:01,710 --> 00:27:58,419
it properly and get it up there there's

732
00:28:03,870 --> 00:28:01,720
there's almost no limit right now in my

733
00:28:08,100 --> 00:28:03,880
mind to what we could do on board for

734
00:28:11,520 --> 00:28:08,110
for everybody hey thanks guys hey here's

735
00:28:15,590 --> 00:28:11,530
another one from Twitter this may be a

736
00:28:18,840 --> 00:28:15,600
little bit more for Tom as a doctor but

737
00:28:20,640 --> 00:28:18,850
the name of Franco Daniel Franco wants

738
00:28:23,520 --> 00:28:20,650

to know how many litres of blood can you

739

00:28:26,610 --> 00:28:23,530

lose in five months and heart muscles

740

00:28:28,110 --> 00:28:26,620

lose their fit well hopefully there's

741

00:28:30,450 --> 00:28:28,120

not a lot of blood loss while you're up

742

00:28:32,549 --> 00:28:30,460

there now we learned lose about 15

743

00:28:34,200 --> 00:28:32,559

percent of our total body water that's

744

00:28:37,860 --> 00:28:34,210

just the normal state your body has this

745

00:28:39,450 --> 00:28:37,870

incredible ability to adapt to space so

746

00:28:42,419 --> 00:28:39,460

we get up there the body says hey for

747

00:28:43,620 --> 00:28:42,429

all the fluid goes to the top to the

748

00:28:44,760 --> 00:28:43,630

upper part of your body towards your

749

00:28:47,039 --> 00:28:44,770

head your body says hey there's too much

750

00:28:49,260 --> 00:28:47,049

on board so we get it gets rid of it in

751

00:28:54,870 --> 00:28:49,270

a natural way so we end up pretty

752

00:28:56,789 --> 00:28:54,880

quickly about 15% and so it's a pretty

753

00:29:01,469 --> 00:28:56,799

much all that happens and I'm sorry the

754

00:29:04,320 --> 00:29:03,209

yeah as a matter of fact that's one of

755

00:29:07,109 --> 00:29:04,330

the things that's fascinating about

756

00:29:09,029 --> 00:29:07,119

Space Flight both moan loss heart

757

00:29:11,519 --> 00:29:09,039

atrophy or vessels atrophying blood

758

00:29:13,680 --> 00:29:11,529

vessels either from zero-g or from

759

00:29:16,019 --> 00:29:13,690

radiation essentially on the human being

760

00:29:18,180 --> 00:29:16,029

zero-gravity is an accelerated aging

761

00:29:20,969 --> 00:29:18,190

process and we were all guinea pigs in

762

00:29:23,339 --> 00:29:20,979

that long research project where you're

763

00:29:24,570 --> 00:29:23,349

able to within a few missions do the

764

00:29:26,789 --> 00:29:24,580

amount of research they would take

765

00:29:30,449 --> 00:29:26,799

decades to record or to do on the ground

766

00:29:33,810 --> 00:29:30,459

as people age and study both what

767

00:29:35,909 --> 00:29:33,820

happens and fixes to the problems so

768

00:29:37,499 --> 00:29:35,919

yeah the heart atrophies there's changes

769

00:29:39,959 --> 00:29:37,509

in the way the heart moves I was

770

00:29:42,560 --> 00:29:39,969

involved in a study where we're very

771

00:29:45,239 --> 00:29:42,570

intently using ultrasound EKGs every

772

00:29:47,579 --> 00:29:45,249

device that I've ever heard enough to

773

00:29:49,259 --> 00:29:47,589

look at how my heart worked to see

774

00:29:51,839 --> 00:29:49,269

exactly how the heart works both in a

775

00:29:53,969 --> 00:29:51,849

resting condition and while exercising

776

00:29:56,069 --> 00:29:53,979

and those results would generally be

777

00:29:57,329 --> 00:29:56,079

used to help people that are in I see

778

00:29:59,729 --> 00:29:57,339

use that are in bed rest for a long

779

00:30:02,609 --> 00:29:59,739

period of time and as people get older

780

00:30:05,759 --> 00:30:02,619

to try to counteract the atrophy that

781

00:30:07,049 --> 00:30:05,769

occurs with that as well you know I'd

782

00:30:08,969 --> 00:30:07,059

like to ask all three of you as a

783

00:30:10,199 --> 00:30:08,979

follow-up to that since you all just

784

00:30:13,019 --> 00:30:10,209

came back from the space station

785

00:30:15,839 --> 00:30:13,029

long-duration stays when you first got

786

00:30:18,239 --> 00:30:15,849

back what did it feel like to get back

787

00:30:20,999 --> 00:30:18,249

on earth Tom I think you were trying

788

00:30:22,919 --> 00:30:21,009

really hard not to move your head as I

789

00:30:24,659 --> 00:30:22,929

saw you sit in the couch in Kazakhstan

790

00:30:27,269 --> 00:30:24,669

could you guys each tell us a little

791

00:30:28,560 --> 00:30:27,279

story about something to do with what

792

00:30:31,369 --> 00:30:28,570

it's like to come back to Earth after

793

00:30:34,199 --> 00:30:31,379

being on the station for so long

794

00:30:36,569 --> 00:30:34,209

yeah well certainly there's this

795

00:30:38,699 --> 00:30:36,579

gigantic magnet that's something you and

796

00:30:40,440 --> 00:30:38,709

every part of your body into the ground

797

00:30:42,269 --> 00:30:40,450

and that's I happened to be on the down

798

00:30:45,180 --> 00:30:42,279

side of the Soyuz after we stopped

799

00:30:47,430 --> 00:30:45,190

tipped over and rolled and the grass was

800

00:30:49,589 --> 00:30:47,440

about that far from my face as I was

801
00:30:51,709 --> 00:30:49,599
looking through the window so climbing

802
00:30:53,879 --> 00:30:51,719
out of that position was one of the

803
00:30:55,649 --> 00:30:53,889
biggest physical challenges I've ever

804
00:30:56,969 --> 00:30:55,659
had and you're right you don't want to

805
00:30:58,289 --> 00:30:56,979
move your head because as soon as you

806
00:31:00,629 --> 00:30:58,299
move your head in the world

807
00:31:01,940 --> 00:31:00,639
tilts and spins all around you because

808
00:31:04,139 --> 00:31:01,950
your inner ear just isn't used to

809
00:31:07,319 --> 00:31:04,149
interpreting that gravity vector very

810
00:31:08,969 --> 00:31:07,329
well takes a while and that for me was

811
00:31:10,619 --> 00:31:08,979
connected to my stomach so I just did

812
00:31:12,499 --> 00:31:10,629
not want to move my head but it went

813
00:31:14,400 --> 00:31:12,509

away after a couple of days all right

814

00:31:15,780 --> 00:31:14,410

almost completely up

815

00:31:18,660 --> 00:31:15,790

one days but most of it went away even

816

00:31:20,190 --> 00:31:18,670

in just a few hours but boy that that

817

00:31:22,550 --> 00:31:20,200

the way the gravity sucks you into the

818

00:31:23,760 --> 00:31:22,560

ground is very remarkable force

819

00:31:25,770 --> 00:31:23,770

unbelievable

820

00:31:29,340 --> 00:31:25,780

it's amazing how adaptable the human

821

00:31:31,740 --> 00:31:29,350

body is that after 40 or 50 years here

822

00:31:34,140 --> 00:31:31,750

of living in gravity suddenly when we

823

00:31:36,390 --> 00:31:34,150

get to space your body immediately

824

00:31:37,830 --> 00:31:36,400

starts to adapt to weightlessness it

825

00:31:41,100 --> 00:31:37,840

starts turning you from an earthling

826

00:31:42,750 --> 00:31:41,110

into a space link and and in some ways

827

00:31:45,030 --> 00:31:42,760

it's easier on your body your heart

828

00:31:46,770 --> 00:31:45,040

doesn't need to fight gravity you don't

829

00:31:48,990 --> 00:31:46,780

even really need a balance system become

830

00:31:50,040 --> 00:31:49,000

totally visually based you can fly

831

00:31:53,820 --> 00:31:50,050

everywhere that you go

832

00:31:54,990 --> 00:31:53,830

and so it's almost you know I've said

833

00:31:57,840 --> 00:31:55,000

before it's sort of like a superpower

834

00:32:00,510 --> 00:31:57,850

you can fly and float and tumble and and

835

00:32:01,320 --> 00:32:00,520

you really get used to it but then when

836

00:32:04,350 --> 00:32:01,330

you come home

837

00:32:07,020 --> 00:32:04,360

the gravity just feels so unfair it's

838

00:32:09,030 --> 00:32:07,030

just it's bizarre and the first time I

839

00:32:11,550 --> 00:32:09,040

worked with my physical trainer right

840

00:32:14,100 --> 00:32:11,560

after I got back the next day I'm on the

841

00:32:16,260 --> 00:32:14,110

exercise mat and just the weight of my

842

00:32:18,300 --> 00:32:16,270

own head I swore someone had their foot

843

00:32:22,190 --> 00:32:18,310

on my neck I was scrunching my head down

844

00:32:24,330 --> 00:32:22,200

into the floor just just you're so

845

00:32:26,340 --> 00:32:24,340

unused to the weight of your own body

846

00:32:28,380 --> 00:32:26,350

and it manifests itself all different

847

00:32:30,240 --> 00:32:28,390

ways you have the dizziness you aren't

848

00:32:32,580 --> 00:32:30,250

mega regulating your own blood pressure

849

00:32:35,460 --> 00:32:32,590

you can't balance properly you feel

850

00:32:37,680 --> 00:32:35,470

nauseous even though your strength is

851

00:32:38,940 --> 00:32:37,690

okay your cardiovascular system isn't

852

00:32:42,210 --> 00:32:38,950

put in the blood in the right places

853

00:32:44,220 --> 00:32:42,220

it's it's a it's kind of a brutal return

854

00:32:46,590 --> 00:32:44,230

home it's worth thinking about for going

855

00:32:47,730 --> 00:32:46,600

to Mars though about five or six months

856

00:32:49,350 --> 00:32:47,740

is how long it'll take you to get to

857

00:32:51,960 --> 00:32:49,360

another planet and so we're really

858

00:32:53,160 --> 00:32:51,970

trying to learn what is the body going

859

00:32:54,840 --> 00:32:53,170

to be like when we get there how many

860

00:32:57,000 --> 00:32:54,850

days of grace will you need to give a

861

00:32:59,370 --> 00:32:57,010

crew when they first get to another

862

00:33:01,260 --> 00:32:59,380

planet before they're able to truly put

863

00:33:03,570 --> 00:33:01,270

on a spacesuit go do something useful

864

00:33:05,700 --> 00:33:03,580

outside do we have to spin our whole

865

00:33:07,500 --> 00:33:05,710

spaceship to keep an artificial gravity

866

00:33:09,900 --> 00:33:07,510

like you see in some science fiction

867

00:33:11,340 --> 00:33:09,910

stories or will we learn enough on the

868

00:33:13,170 --> 00:33:11,350

space station about weightlessness to

869

00:33:15,360 --> 00:33:13,180

show maybe there's if you give a few

870

00:33:17,730 --> 00:33:15,370

days the astronauts can reliably get

871

00:33:19,440 --> 00:33:17,740

outside and do a spacewalk we're

872

00:33:22,170 --> 00:33:19,450

learning all that from station and we're

873

00:33:24,150 --> 00:33:22,180

just the the 6 foot tall guinea pigs

874

00:33:26,220 --> 00:33:24,160

trying to figure out those answers but

875

00:33:27,990 --> 00:33:26,230

the life of a guinea pig isn't a

876

00:33:30,960 --> 00:33:28,000

hopeless pleasant and

877

00:33:35,400 --> 00:33:30,970

readapt ation is is keeping us keeping

878

00:33:37,500 --> 00:33:35,410

us under its thumb right now and yeah

879

00:33:41,040 --> 00:33:37,510

I'm not six foot tall but I am a guinea

880

00:33:43,680 --> 00:33:41,050

pig so maybe it's just throwing a couple

881

00:33:46,680 --> 00:33:43,690

of other things to the sensory changes

882

00:33:48,090 --> 00:33:46,690

that you go through just a story from in

883

00:33:49,440 --> 00:33:48,100

space tonight I think I might have told

884

00:33:50,730 --> 00:33:49,450

these guys about it while I was up there

885

00:33:52,230 --> 00:33:50,740

but when I was up there a long one time

886

00:33:53,970 --> 00:33:52,240

I was at the cupola window looking out

887

00:33:56,400 --> 00:33:53,980

and I swore out of the corner of my eye

888

00:33:58,380 --> 00:33:56,410

I saw a bird fit I would fly over and

889

00:33:59,760 --> 00:33:58,390

land on a solar array of the Soyuz and I

890

00:34:01,260 --> 00:33:59,770

I thought I wonder what kind of bird

891

00:34:03,180 --> 00:34:01,270

that is before I thought about it I

892

00:34:05,550 --> 00:34:03,190

realized it's probably not a bird 250

893

00:34:07,080 --> 00:34:05,560

miles high doing 17,000 miles per hour

894

00:34:09,629 --> 00:34:07,090

and indeed it was probably it was just a

895

00:34:11,430 --> 00:34:09,639

piece of debris going by and then

896

00:34:14,010 --> 00:34:11,440

heading toward the glass but it's funny

897

00:34:16,740 --> 00:34:14,020

how your earth environment you're used

898

00:34:19,260 --> 00:34:16,750

to soak in things in and the way you

899

00:34:21,090 --> 00:34:19,270

your eyes and mind interprets things and

900

00:34:23,100 --> 00:34:21,100

you get used to the zero-gravity up

901
00:34:26,639 --> 00:34:23,110
there and you get used to 22 degrees

902
00:34:28,110 --> 00:34:26,649
Celsius about 72 degrees Fahrenheit for

903
00:34:31,350 --> 00:34:28,120
five straight months you get used to

904
00:34:33,270 --> 00:34:31,360
about 35% humidity and we have some

905
00:34:35,610 --> 00:34:33,280
ventilation so a very light breeze but

906
00:34:37,500 --> 00:34:35,620
then you come back to earth and all of a

907
00:34:39,810 --> 00:34:37,510
sudden finally you get some wind in your

908
00:34:41,610 --> 00:34:39,820
face and rain seems like a really

909
00:34:42,780 --> 00:34:41,620
beautiful thing I remember being with

910
00:34:44,760 --> 00:34:42,790
some people and they were a little

911
00:34:45,810 --> 00:34:44,770
little complaining about the rain I was

912
00:34:47,909 --> 00:34:45,820
like this is great

913
00:34:50,220 --> 00:34:47,919

rainwater falling out of the sky it's

914

00:34:52,500 --> 00:34:50,230

almost hard to imagine after all that

915

00:34:55,139 --> 00:34:52,510

time and and another thing from

916

00:34:56,490 --> 00:34:55,149

Kazakhstan was when I got the coast and

917

00:34:58,080 --> 00:34:56,500

I after the helicopter ride they

918

00:35:00,150 --> 00:34:58,090

immediately gave me some beautiful

919

00:35:02,310 --> 00:35:00,160

flowers which when I saw them come and I

920

00:35:03,870 --> 00:35:02,320

just like wow I haven't seen I haven't

921

00:35:06,180 --> 00:35:03,880

seen those kinds of colors and I put him

922

00:35:08,640 --> 00:35:06,190

in my arms and the aroma from them

923

00:35:11,070 --> 00:35:08,650

though beautiful and great was

924

00:35:13,440 --> 00:35:11,080

overwhelming I just said somebody hold

925

00:35:16,530 --> 00:35:13,450

these and I'll get back to them a little

926

00:35:17,850 --> 00:35:16,540

bit later because you really do you are

927

00:35:19,920 --> 00:35:17,860

in tune on the earth with all these

928

00:35:22,020 --> 00:35:19,930

things that come and go and all the the

929

00:35:23,640 --> 00:35:22,030

senses around you and so we're a little

930

00:35:25,500 --> 00:35:23,650

deprived of those in space and have to

931

00:35:28,500 --> 00:35:25,510

get used to them again back back on the

932

00:35:30,570 --> 00:35:28,510

planet alright great well hey let's

933

00:35:32,760 --> 00:35:30,580

cycle through our folks that are hanging

934

00:35:34,890 --> 00:35:32,770

10 with us here on the on the Hangout

935

00:35:38,640 --> 00:35:34,900

Carl how about you for another question

936

00:35:41,580 --> 00:35:38,650

yeah thank you so much it's great to

937

00:35:44,280 --> 00:35:41,590

hear all your answers really quite

938

00:35:46,260 --> 00:35:44,290

a journey that you guys have all bound I

939

00:35:47,250 --> 00:35:46,270

wanted to ask a little bit about the way

940

00:35:49,700 --> 00:35:47,260

you've been able to share that

941

00:35:52,350 --> 00:35:49,710

particularly for commander Hadfield

942

00:35:54,900 --> 00:35:52,360

we've had some readers interested in

943

00:35:59,160 --> 00:35:54,910

obviously your numerous YouTube videos

944

00:36:02,790 --> 00:35:59,170

and your songs and just your use of

945

00:36:05,250 --> 00:36:02,800

Twitter it's up to social media you have

946

00:36:07,380 --> 00:36:05,260

on tumblr I believe so your use of

947

00:36:09,780 --> 00:36:07,390

social media and I believe you all have

948

00:36:11,370 --> 00:36:09,790

you know social media presences but this

949

00:36:13,500 --> 00:36:11,380

one was from one of our readers for

950

00:36:15,920 --> 00:36:13,510

commander Hadfield and just curious as

951
00:36:18,600 --> 00:36:15,930
to you know what what's been your

952
00:36:20,370 --> 00:36:18,610
experience with that what drew you to it

953
00:36:24,300 --> 00:36:20,380
and what surprised you about that

954
00:36:27,150 --> 00:36:24,310
experience well I I first flew in space

955
00:36:29,550 --> 00:36:27,160
almost 20 years ago I helped build the

956
00:36:32,460 --> 00:36:29,560
Russian space station Mir and at that

957
00:36:34,500 --> 00:36:32,470
time their social media didn't really

958
00:36:36,180 --> 00:36:34,510
exist the internet was really just

959
00:36:38,250 --> 00:36:36,190
getting going every picture we took on

960
00:36:40,470 --> 00:36:38,260
there on the way to Mir was on film and

961
00:36:42,960 --> 00:36:40,480
so it was months before I could even

962
00:36:44,970 --> 00:36:42,970
show anybody what it looked like and

963
00:36:48,860 --> 00:36:44,980

I've been trying for the last 20 years

964

00:36:51,450 --> 00:36:48,870

to tell people how incredibly

965

00:36:54,960 --> 00:36:51,460

overpoweringly beautiful our planet is

966

00:36:56,880 --> 00:36:54,970

everywhere you look and how how one

967

00:36:58,380 --> 00:36:56,890

little change of the Sun angle will show

968

00:37:01,260 --> 00:36:58,390

you something on the planet that

969

00:37:02,340 --> 00:37:01,270

completely surprises you that the beauty

970

00:37:04,260 --> 00:37:02,350

of the ripples on the water at

971

00:37:07,320 --> 00:37:04,270

occurrence of the Gulf Stream or or how

972

00:37:10,050 --> 00:37:07,330

a river suddenly turns to silver and I

973

00:37:12,450 --> 00:37:10,060

can say these things out loud but to

974

00:37:14,790 --> 00:37:12,460

with the with the technology that nASA

975

00:37:17,730 --> 00:37:14,800

has put on board right now the ability

976

00:37:23,160 --> 00:37:17,740

to real-time share the experience I

977

00:37:26,070 --> 00:37:23,170

think has really helped show why we even

978

00:37:27,630 --> 00:37:26,080

do this why do we explore it's not so

979

00:37:29,340 --> 00:37:27,640

that a few remote people can take some

980

00:37:30,840 --> 00:37:29,350

pictures and then come show it to you in

981

00:37:33,060 --> 00:37:30,850

your high school gymnasium five years

982

00:37:35,100 --> 00:37:33,070

from now it's because it is real-time

983

00:37:36,990 --> 00:37:35,110

adding to the richness of the human

984

00:37:39,270 --> 00:37:37,000

experience and we now have the

985

00:37:40,980 --> 00:37:39,280

technology on board to do that and show

986

00:37:42,810 --> 00:37:40,990

people within minutes of seeing

987

00:37:46,020 --> 00:37:42,820

something spectacular on board with us

988

00:37:47,460 --> 00:37:46,030

sharing a joke or an idea or Kevin one

989

00:37:49,590 --> 00:37:47,470

night said hey let's let's load some

990

00:37:51,450 --> 00:37:49,600

water balls around a node one and just

991

00:37:53,370 --> 00:37:51,460

you know reflect and play with two and

992

00:37:55,470 --> 00:37:53,380

put some different oils and things

993

00:37:57,750 --> 00:37:55,480

together and just see how things look

994

00:38:00,060 --> 00:37:57,760

that night but we're sending pictures to

995

00:38:01,530 --> 00:38:00,070

the earth of just how spectacular a ball

996

00:38:04,349 --> 00:38:01,540

of water is when you look at it in a

997

00:38:07,800 --> 00:38:04,359

whole new environment and so I've been

998

00:38:09,660 --> 00:38:07,810

trying for 20 years to do my best to

999

00:38:11,730 --> 00:38:09,670

share the experience that we're trusted

1000

00:38:14,730 --> 00:38:11,740

with flying in space now with the

1001
00:38:17,700 --> 00:38:14,740
technology we're not just robots up

1002
00:38:19,680 --> 00:38:17,710
there this is not just simple robotic

1003
00:38:22,020 --> 00:38:19,690
photography this is an enrichment of the

1004
00:38:23,070 --> 00:38:22,030
overall human experience and we now have

1005
00:38:25,490 --> 00:38:23,080
a way to do it

1006
00:38:28,080 --> 00:38:25,500
real time to make it interactive and

1007
00:38:29,430 --> 00:38:28,090
I've just delighted that with the

1008
00:38:32,070 --> 00:38:29,440
capability that's onboard the space

1009
00:38:33,660 --> 00:38:32,080
station now or everything from the

1010
00:38:36,180 --> 00:38:33,670
science that we're doing right through

1011
00:38:37,800 --> 00:38:36,190
to to music that is so important

1012
00:38:39,480 --> 00:38:37,810
everybody around the world why not have

1013
00:38:41,700 --> 00:38:39,490

that as part of this human experience in

1014

00:38:43,980 --> 00:38:41,710

a new outpost as well and and it's been

1015

00:38:45,990 --> 00:38:43,990

a lot of fun I think if it adds to our

1016

00:38:47,760 --> 00:38:46,000

fun onboard and it definitely adds to

1017

00:38:50,040 --> 00:38:47,770

the public awareness of what space

1018

00:38:50,550 --> 00:38:50,050

station can bring to everybody thank you

1019

00:38:53,910 --> 00:38:50,560

that's great

1020

00:38:57,390 --> 00:38:53,920

right hey let's say Sean Flynn why don't

1021

00:38:58,890 --> 00:38:57,400

you take another crack at it I do you

1022

00:39:00,300 --> 00:38:58,900

want to go back to dr. Marshburn I don't

1023

00:39:01,680 --> 00:39:00,310

forgive me I don't know your I know

1024

00:39:03,660 --> 00:39:01,690

you're a physician I don't know your if

1025

00:39:04,950 --> 00:39:03,670

you have any surgical background but the

1026
00:39:06,180 --> 00:39:04,960
last two days so you are up there

1027
00:39:08,580 --> 00:39:06,190
obviously you did that emergency

1028
00:39:10,410 --> 00:39:08,590
spacewalk which do you think is harder

1029
00:39:12,000 --> 00:39:10,420
actually performing surgery with gravity

1030
00:39:13,520 --> 00:39:12,010
or performing surgery on the space

1031
00:39:16,200 --> 00:39:13,530
station without gravity

1032
00:39:18,990 --> 00:39:16,210
that's a great question do you spend

1033
00:39:20,760 --> 00:39:19,000
years and years getting ready to do

1034
00:39:22,140 --> 00:39:20,770
surgery on a human being for good reason

1035
00:39:23,910 --> 00:39:22,150
that was an emergency room doctor so

1036
00:39:27,450 --> 00:39:23,920
only the most extreme surgery would I

1037
00:39:29,280 --> 00:39:27,460
ever do in the ER the the difference of

1038
00:39:30,930 --> 00:39:29,290

course in space is that we are trained

1039

00:39:34,050 --> 00:39:30,940

for years and years to do a very limited

1040

00:39:36,680 --> 00:39:34,060

set of tasks up there but there there

1041

00:39:39,390 --> 00:39:36,690

are some similarities no matter what you

1042

00:39:41,040 --> 00:39:39,400

what happens on a spacewalk when you get

1043

00:39:44,070 --> 00:39:41,050

to the site and we were going out there

1044

00:39:45,510 --> 00:39:44,080

to try to help diagnose whatever the the

1045

00:39:46,740 --> 00:39:45,520

problem was what the leak is an ammonia

1046

00:39:50,250 --> 00:39:46,750

leak that was out there see if we could

1047

00:39:53,609 --> 00:39:50,260

find it same thing you know when you

1048

00:39:54,870 --> 00:39:53,619

open up a patient you know you're not

1049

00:39:57,150 --> 00:39:54,880

really sure what you're going to find in

1050

00:39:59,220 --> 00:39:57,160

there so you have to be willing to think

1051
00:40:02,760 --> 00:39:59,230
and act based on whatever you find out

1052
00:40:05,130 --> 00:40:02,770
the site there so the other big thing

1053
00:40:05,820 --> 00:40:05,140
that's very reassuring the space station

1054
00:40:08,300 --> 00:40:05,830
is huge

1055
00:40:09,390 --> 00:40:08,310
it is incredibly complex and

1056
00:40:11,580 --> 00:40:09,400
spacewalkers

1057
00:40:14,100 --> 00:40:11,590
we know that we are just the on-site

1058
00:40:15,150 --> 00:40:14,110
eyes and hands of an enormous amount of

1059
00:40:16,830 --> 00:40:15,160
people who are looking through our

1060
00:40:19,680 --> 00:40:16,840
cameras who are feeding us information

1061
00:40:23,010 --> 00:40:19,690
or give us and giving us instruction and

1062
00:40:24,660 --> 00:40:23,020
so you it's very clear through the

1063
00:40:27,030 --> 00:40:24,670

voices you hear and just through your

1064

00:40:29,340 --> 00:40:27,040

understanding of how a space walk has to

1065

00:40:31,200 --> 00:40:29,350

work that there's an army of people who

1066

00:40:33,630 --> 00:40:31,210

are actually doing this work and making

1067

00:40:35,160 --> 00:40:33,640

the diagnosis and we just happen to be

1068

00:40:38,670 --> 00:40:35,170

the the hands and the gloves that are

1069

00:40:40,410 --> 00:40:38,680

hands on the bolts there it's a it's

1070

00:40:41,430 --> 00:40:40,420

credible privilege to be a part of

1071

00:40:43,860 --> 00:40:41,440

something like that it's very humbling

1072

00:40:45,420 --> 00:40:43,870

actually I wish everybody could see the

1073

00:40:47,130 --> 00:40:45,430

same views we did because we got to see

1074

00:40:50,100 --> 00:40:47,140

the views when you had a second to break

1075

00:40:52,140 --> 00:40:50,110

away and look look around this but

1076

00:40:54,840 --> 00:40:52,150

that's that is certainly the biggest

1077

00:40:57,090 --> 00:40:54,850

difference they come I don't know if you

1078

00:40:59,790 --> 00:40:57,100

guys had heard but they turned the to be

1079

00:41:01,290 --> 00:40:59,800

channel back on yesterday and so we've

1080

00:41:03,690 --> 00:41:01,300

got full power from that set of solar

1081

00:41:06,030 --> 00:41:03,700

arrays again we're still looking to

1082

00:41:08,520 --> 00:41:06,040

watch the trends and see if we

1083

00:41:11,040 --> 00:41:08,530

completely stop the leaks but you got

1084

00:41:15,390 --> 00:41:11,050

the power back on inside the space

1085

00:41:17,730 --> 00:41:15,400

station from all later rays it feels

1086

00:41:20,100 --> 00:41:17,740

great but I tell you you know starting

1087

00:41:21,540 --> 00:41:20,110

with the people who made the decision

1088

00:41:23,700 --> 00:41:21,550

that yes this could be done and a

1089

00:41:26,280 --> 00:41:23,710

spacewalk can be done in two days

1090

00:41:28,350 --> 00:41:26,290

we couldn't believe the audacity of the

1091

00:41:30,980 --> 00:41:28,360

people to come up with that decision but

1092

00:41:34,740 --> 00:41:30,990

at no time did we feel rushed or unsafe

1093

00:41:36,600 --> 00:41:34,750

and we feel like NASA made it exactly

1094

00:41:39,360 --> 00:41:36,610

the right decision to put us out there

1095

00:41:41,280 --> 00:41:39,370

they're very safe and logical one as

1096

00:41:43,230 --> 00:41:41,290

well so it's incredibly gratifying to

1097

00:41:46,320 --> 00:41:43,240

know that that kind of decision through

1098

00:41:49,320 --> 00:41:46,330

all levels can be made and and have it

1099

00:41:50,910 --> 00:41:49,330

all work out I was wonderful you know I

1100

00:41:52,500 --> 00:41:50,920

think that was an international effort

1101

00:41:54,300 --> 00:41:52,510

from what I heard I had one of the

1102

00:41:56,760 --> 00:41:54,310

Russian crew members spotted the ammonia

1103

00:41:59,400 --> 00:41:56,770

flakes first and they reported it to a

1104

00:42:01,380 --> 00:41:59,410

Canadian commander and then you had two

1105

00:42:02,940 --> 00:42:01,390

American spacewalkers that went out and

1106

00:42:06,990 --> 00:42:02,950

fixed it while the Canadian commander

1107

00:42:09,570 --> 00:42:07,000

was the into vehicular officer let's

1108

00:42:12,450 --> 00:42:09,580

let's go back to the whole International

1109

00:42:14,100 --> 00:42:12,460

and Model UN aspect and and talk to

1110

00:42:18,360 --> 00:42:14,110

Christina and her folks and see what

1111

00:42:20,010 --> 00:42:18,370

they've got to ask about that I am my

1112

00:42:21,450 --> 00:42:20,020

name is Samir cannon before I asked my

1113

00:42:22,830 --> 00:42:21,460

question I just want to say thank you so

1114

00:42:23,910 --> 00:42:22,840

much and also

1115

00:42:26,370 --> 00:42:23,920

sorry Freddie Becker noises a

1116

00:42:28,140 --> 00:42:26,380

thunderstorm in the air city and right

1117

00:42:31,260 --> 00:42:28,150

outside the the UN right now

1118

00:42:34,140 --> 00:42:31,270

so only asked you already mentioned

1119

00:42:36,540 --> 00:42:34,150

about peaceful cooperation and how

1120

00:42:38,220 --> 00:42:36,550

unprecedented that is one of the topics

1121

00:42:40,590 --> 00:42:38,230

that we often discuss in Model UN is

1122

00:42:43,140 --> 00:42:40,600

militarization and weaponization of

1123

00:42:44,790 --> 00:42:43,150

space and I wanted to ask you if you had

1124

00:42:46,890 --> 00:42:44,800

any general thoughts on that and if you

1125

00:42:49,050 --> 00:42:46,900

thought that cooperation between these

1126
00:42:50,910 --> 00:42:49,060
15 countries on the international space

1127
00:42:53,550 --> 00:42:50,920
station helped reduce the likelihood of

1128
00:42:59,760 --> 00:42:53,560
conflict in general or the preparations

1129
00:43:03,060 --> 00:42:59,770
for that in space you know nations are

1130
00:43:05,220 --> 00:43:03,070
motivated by a lot of things survival by

1131
00:43:08,730 --> 00:43:05,230
their own self-sufficiency they're

1132
00:43:12,150 --> 00:43:08,740
becoming being self-sufficient but the

1133
00:43:14,070 --> 00:43:12,160
International Space Station is is all

1134
00:43:16,470 --> 00:43:14,080
about discovery and exploration and a

1135
00:43:17,850 --> 00:43:16,480
multinational effort where some of the

1136
00:43:22,650 --> 00:43:17,860
richest nations in the world to come

1137
00:43:25,620 --> 00:43:22,660
together to explore that is a very

1138
00:43:27,270 --> 00:43:25,630

remarkable achievement militarization of

1139

00:43:30,000 --> 00:43:27,280

space on I know that will will go

1140

00:43:33,540 --> 00:43:30,010

through many nations minds and there

1141

00:43:35,040 --> 00:43:33,550

will be advances and reaching out in

1142

00:43:38,040 --> 00:43:35,050

that area but the International Space

1143

00:43:40,500 --> 00:43:38,050

Station shows what can be done just for

1144

00:43:44,550 --> 00:43:40,510

that very high level of human evolution

1145

00:43:46,800 --> 00:43:44,560

to to explore so we represent human

1146

00:43:50,580 --> 00:43:46,810

beings not individuals from different

1147

00:43:51,540 --> 00:43:50,590

countries but the human race itself and

1148

00:43:54,780 --> 00:43:51,550

I think the international space station

1149

00:43:56,460 --> 00:43:54,790

stands for that if we're real kind of

1150

00:44:01,020 --> 00:43:56,470

we're at war with a common enemy and

1151

00:44:03,330 --> 00:44:01,030

that is complexity and the the great

1152

00:44:05,190 --> 00:44:03,340

right on the edge of human capability to

1153

00:44:07,380 --> 00:44:05,200

even do what we're doing on there it's

1154

00:44:09,510 --> 00:44:07,390

it's almost too much for any one nation

1155

00:44:11,310 --> 00:44:09,520

to burden to shoulder some countries can

1156

00:44:12,960 --> 00:44:11,320

do it for a little while but to make it

1157

00:44:14,850 --> 00:44:12,970

through all of our economic cycles and

1158

00:44:17,040 --> 00:44:14,860

our political cycles that that that

1159

00:44:18,930 --> 00:44:17,050

every nation is faced with it's very

1160

00:44:20,730 --> 00:44:18,940

difficult to start to leave earth now

1161

00:44:23,190 --> 00:44:20,740

with the technology that we have and do

1162

00:44:25,590 --> 00:44:23,200

it completely any one nation or any one

1163

00:44:28,350 --> 00:44:25,600

sub organization on their own and I

1164

00:44:31,350 --> 00:44:28,360

think the beauty of it is is is the the

1165

00:44:34,260 --> 00:44:31,360

complexity and the the risks of it

1166

00:44:35,580 --> 00:44:34,270

become a common enemy that then unites

1167

00:44:36,780 --> 00:44:35,590

people that might not otherwise be

1168

00:44:39,810 --> 00:44:36,790

working together

1169

00:44:42,690 --> 00:44:39,820

and to be able to have Pavel Vinogradov

1170

00:44:45,660 --> 00:44:42,700

float over to me and say could you see a

1171

00:44:47,130 --> 00:44:45,670

little leak outside and and for me then

1172

00:44:48,510 --> 00:44:47,140

to go with him to the window and then

1173

00:44:50,160 --> 00:44:48,520

the two of us talk with everybody on

1174

00:44:51,870 --> 00:44:50,170

board and then talk with Heather down in

1175

00:44:53,760 --> 00:44:51,880

who was the flight director at the time

1176
00:44:55,620 --> 00:44:53,770
and then Heather having her team look at

1177
00:44:57,660 --> 00:44:55,630
the data everybody from around the world

1178
00:44:59,580 --> 00:44:57,670
with Pavel and I suiting up Tom and

1179
00:45:01,800 --> 00:44:59,590
Chris to go outside and fix this thing

1180
00:45:03,900 --> 00:45:01,810
on behalf of international nation to me

1181
00:45:06,750 --> 00:45:03,910
it was just a lovely little microcosm of

1182
00:45:08,880 --> 00:45:06,760
how we all can be when we decide for

1183
00:45:10,800 --> 00:45:08,890
whatever reasons to work together in a

1184
00:45:12,870 --> 00:45:10,810
common direction and there's lots of

1185
00:45:15,000 --> 00:45:12,880
reasons and lots of examples where we

1186
00:45:17,370 --> 00:45:15,010
don't do things right but there are some

1187
00:45:19,470 --> 00:45:17,380
examples where we really do things right

1188
00:45:23,220 --> 00:45:19,480

and and you need examples to inspire

1189

00:45:24,420 --> 00:45:23,230

people and and we're just so happy we've

1190

00:45:26,130 --> 00:45:24,430

been working at it for a lot of years

1191

00:45:27,840 --> 00:45:26,140

together but we're really pleased that

1192

00:45:29,580 --> 00:45:27,850

we're part of one of those examples and

1193

00:45:32,300 --> 00:45:29,590

we know it's not perfect but it's a

1194

00:45:35,400 --> 00:45:32,310

pretty good example and and the results

1195

00:45:36,780 --> 00:45:35,410

hopefully speak for themselves I mean I

1196

00:45:38,250 --> 00:45:36,790

just throw out two I don't think there's

1197

00:45:39,510 --> 00:45:38,260

any turning back at this point

1198

00:45:42,900 --> 00:45:39,520

in terms of the international

1199

00:45:44,460 --> 00:45:42,910

cooperation this this is a not only has

1200

00:45:46,680 --> 00:45:44,470

it worked well and it's it's a good

1201
00:45:49,620 --> 00:45:46,690
example but it seems to be pretty much

1202
00:45:51,860 --> 00:45:49,630
the consensus that future major

1203
00:45:54,720 --> 00:45:51,870
endeavors like this whatever it might be

1204
00:45:56,670 --> 00:45:54,730
are going to be international efforts

1205
00:45:59,160 --> 00:45:56,680
together so that that's a good feeling

1206
00:46:00,750 --> 00:45:59,170
that the international space station

1207
00:46:03,150 --> 00:46:00,760
kind of kicked us off in that direction

1208
00:46:04,980 --> 00:46:03,160
I don't think I don't think we're ever

1209
00:46:08,240 --> 00:46:04,990
going back as a planet so that'll be a

1210
00:46:17,340 --> 00:46:10,940
alright let's go back to Mike and Mike

1211
00:46:20,850 --> 00:46:17,350
any questions from you mr. Anson part

1212
00:46:22,590 --> 00:46:20,860
one of mine so I imagine after being in

1213
00:46:24,990 --> 00:46:22,600

space looking down at the earth and

1214

00:46:27,210 --> 00:46:25,000

seeing no political boundaries that when

1215

00:46:29,850 --> 00:46:27,220

you come back and turn on the news and

1216

00:46:31,860 --> 00:46:29,860

some of the skirmishes that continue you

1217

00:46:35,430 --> 00:46:31,870

just want to strangle people and stay

1218

00:46:37,410 --> 00:46:35,440

but we're all on one planet how do you

1219

00:46:40,110 --> 00:46:37,420

deal with those things and what do you

1220

00:46:41,700 --> 00:46:40,120

say to people to try and express that

1221

00:46:43,440 --> 00:46:41,710

we're all in this together

1222

00:46:47,000 --> 00:46:43,450

with the unique perspective that you

1223

00:46:52,890 --> 00:46:49,860

yeah well it's it's a great privilege

1224

00:46:56,970 --> 00:46:52,900

for us to be up there and people

1225

00:46:58,710 --> 00:46:56,980

everybody has their their problems

1226
00:47:00,960 --> 00:46:58,720
everybody's guy has their challenges for

1227
00:47:05,250 --> 00:47:00,970
their own survival we can see rivers

1228
00:47:06,810 --> 00:47:05,260
where the the river has moved every year

1229
00:47:08,160 --> 00:47:06,820
and you can see the the tribes with

1230
00:47:09,390 --> 00:47:08,170
people or the small towns that have

1231
00:47:11,790 --> 00:47:09,400
moved with that River people just

1232
00:47:14,250 --> 00:47:11,800
clustered around water just a lot of the

1233
00:47:15,360 --> 00:47:14,260
world is just trying to survive so we

1234
00:47:16,920 --> 00:47:15,370
realize how we were in a Provost

1235
00:47:19,140 --> 00:47:16,930
position to be a privileged position to

1236
00:47:21,540 --> 00:47:19,150
be able to look down on all that but my

1237
00:47:24,270 --> 00:47:21,550
feeling about it is that I got I felt

1238
00:47:26,700 --> 00:47:24,280

like I had a more Universal picture of

1239

00:47:28,230 --> 00:47:26,710

where human beings are you see the Milky

1240

00:47:31,920 --> 00:47:28,240

Way the vast Milky Way you see the

1241

00:47:34,350 --> 00:47:31,930

planet as more like a globe so much more

1242

00:47:37,020 --> 00:47:34,360

a part of the Milky Way and you imagine

1243

00:47:40,470 --> 00:47:37,030

the humans on this globe they're very

1244

00:47:43,140 --> 00:47:40,480

tiny very fragile part of it so I almost

1245

00:47:45,480 --> 00:47:43,150

felt like the human race is we're in our

1246

00:47:48,750 --> 00:47:45,490

teenage years or maybe even younger in

1247

00:47:50,790 --> 00:47:48,760

our evolution and it actually gave me a

1248

00:47:51,870 --> 00:47:50,800

great sense of hope for human beings as

1249

00:47:53,970 --> 00:47:51,880

we continue to mature

1250

00:47:56,820 --> 00:47:53,980

maybe's through space flight and but all

1251
00:47:59,190 --> 00:47:56,830
through all endeavors on the ground that

1252
00:48:03,300 --> 00:47:59,200
we are actually getting better and

1253
00:48:05,520 --> 00:48:03,310
better as time goes on I think there are

1254
00:48:07,410 --> 00:48:05,530
always reasons to despair if you want

1255
00:48:09,060 --> 00:48:07,420
there always going to be people just

1256
00:48:10,730 --> 00:48:09,070
just like in any big family there's

1257
00:48:13,380 --> 00:48:10,740
always someone having a squabble and

1258
00:48:14,700 --> 00:48:13,390
there are if you really want to focus on

1259
00:48:17,040 --> 00:48:14,710
it there's always something horrible

1260
00:48:19,020 --> 00:48:17,050
going on but there are a lot more great

1261
00:48:20,850 --> 00:48:19,030
things going on than there are horrible

1262
00:48:23,450 --> 00:48:20,860
things we tend to this point point our

1263
00:48:25,320 --> 00:48:23,460

cameras at the most newsworthy

1264

00:48:28,860 --> 00:48:25,330

unpleasant thing that's happening today

1265

00:48:31,020 --> 00:48:28,870

because it's maybe less shocking than

1266

00:48:32,610 --> 00:48:31,030

the beauty and the Wonder and the grace

1267

00:48:36,600 --> 00:48:32,620

that is almost the rest of the human

1268

00:48:38,670 --> 00:48:36,610

life from orbit you get to see the whole

1269

00:48:41,040 --> 00:48:38,680

world in an hour and a half you get to

1270

00:48:42,300 --> 00:48:41,050

see where people are trying their best

1271

00:48:44,070 --> 00:48:42,310

to live their lives

1272

00:48:45,810 --> 00:48:44,080

most people don't maybe have the

1273

00:48:47,400 --> 00:48:45,820

mobility to go somewhere else they're

1274

00:48:49,560 --> 00:48:47,410

living in this particular part of the

1275

00:48:52,350 --> 00:48:49,570

world one of the things I tried in orbit

1276
00:48:54,540 --> 00:48:52,360
was to tell me where I should visit when

1277
00:48:56,790 --> 00:48:54,550
I come back I was shocked

1278
00:48:59,160 --> 00:48:56,800
the number of people the vast majority

1279
00:49:00,300 --> 00:48:59,170
of people that said you need to come to

1280
00:49:02,640 --> 00:49:00,310
my hometown

1281
00:49:04,560 --> 00:49:02,650
this is the most beautiful part of the

1282
00:49:06,660 --> 00:49:04,570
world this is where people are good to

1283
00:49:08,700 --> 00:49:06,670
each other and this is from everywhere

1284
00:49:10,590 --> 00:49:08,710
on the planet languages I can't even

1285
00:49:13,530 --> 00:49:10,600
read the alphabet people are telling me

1286
00:49:15,000 --> 00:49:13,540
this is a wonderful place we are good

1287
00:49:17,340 --> 00:49:15,010
people here and we are just trying to

1288
00:49:19,100 --> 00:49:17,350

lead a life a productive and life of

1289

00:49:21,990 --> 00:49:19,110

grace for ourselves and our children and

1290

00:49:24,210 --> 00:49:22,000

yes it's easy to focus on the headline

1291

00:49:26,160 --> 00:49:24,220

of the day or some horribly behaving

1292

00:49:29,070 --> 00:49:26,170

person who does something rude and

1293

00:49:31,530 --> 00:49:29,080

obnoxious but there's so much beauty and

1294

00:49:33,180 --> 00:49:31,540

wonder in the world and hopefully the

1295

00:49:35,430 --> 00:49:33,190

perspective of course that affects us

1296

00:49:37,800 --> 00:49:35,440

directly but the ones that we try and

1297

00:49:39,960 --> 00:49:37,810

share will influence as many people as

1298

00:49:41,910 --> 00:49:39,970

possible to appreciate the big picture

1299

00:49:44,160 --> 00:49:41,920

appreciate the real wonder that's going

1300

00:49:48,000 --> 00:49:44,170

on and maybe shape their lives a little

1301

00:49:50,160 --> 00:49:48,010

bit in that direction also thanks guys

1302

00:49:52,350 --> 00:49:50,170

hey as I mentioned we're taking

1303

00:49:55,350 --> 00:49:52,360

questions from all around the social

1304

00:49:57,150 --> 00:49:55,360

media sphere we have a special

1305

00:49:59,760 --> 00:49:57,160

International Space Station Facebook

1306

00:50:01,710 --> 00:49:59,770

page we've got a question from Cindy Han

1307

00:50:04,590 --> 00:50:01,720

- Qi who asked about her ninth grade

1308

00:50:07,790 --> 00:50:04,600

class of science students and they're

1309

00:50:11,310 --> 00:50:07,800

studying right now future space missions

1310

00:50:13,830 --> 00:50:11,320

especially going to Mars and she wanted

1311

00:50:17,520 --> 00:50:13,840

to know if Space Station missions are

1312

00:50:20,880 --> 00:50:17,530

limited by radiation exposure or if that

1313

00:50:22,470 --> 00:50:20,890

problem has been solved well I guess

1314

00:50:24,180 --> 00:50:22,480

I'll take a crack at it it's my turn

1315

00:50:27,750 --> 00:50:24,190

those were great answers so if you guys

1316

00:50:30,330 --> 00:50:27,760

just gave the the radiation problem is

1317

00:50:33,270 --> 00:50:30,340

very serious fortunately when we're in

1318

00:50:35,400 --> 00:50:33,280

low Earth orbit we have the the Van

1319

00:50:37,440 --> 00:50:35,410

Allen belts helping us out protecting us

1320

00:50:39,150 --> 00:50:37,450

a little bit nevertheless we're learning

1321

00:50:41,790 --> 00:50:39,160

a lot about the radiation environment

1322

00:50:43,050 --> 00:50:41,800

there with other kinds of vehicles we're

1323

00:50:45,300 --> 00:50:43,060

learning a lot about the radiation

1324

00:50:47,130 --> 00:50:45,310

environment outside in deep space and

1325

00:50:49,890 --> 00:50:47,140

it's a very serious problem there's a

1326

00:50:52,320 --> 00:50:49,900

lot of a lot of dangerous radiation out

1327

00:50:54,840 --> 00:50:52,330

there so when we do start visiting other

1328

00:50:57,090 --> 00:50:54,850

planets it's not that far away when we

1329

00:50:59,970 --> 00:50:57,100

do start doing it we need to solve that

1330

00:51:02,640 --> 00:50:59,980

problem so we're learning a lot from

1331

00:51:04,200 --> 00:51:02,650

station and other other vehicles too

1332

00:51:06,150 --> 00:51:04,210

that are part of the exploration effort

1333

00:51:08,400 --> 00:51:06,160

and you're absolutely right we have to

1334

00:51:10,710 --> 00:51:08,410

we have to crack that one and learn to

1335

00:51:14,759 --> 00:51:10,720

learn live out in it and handle it

1336

00:51:20,289 --> 00:51:18,009

all right let's give Laurel Connor

1337

00:51:23,469 --> 00:51:20,299

another chance to ask you n really good

1338

00:51:25,390 --> 00:51:23,479

question thank you and it's slightly

1339

00:51:27,549 --> 00:51:25,400

different and not necessarily um related

1340

00:51:29,559 --> 00:51:27,559

and but when most of our volunteers at

1341

00:51:32,319 --> 00:51:29,569

national Model UN found out about this

1342

00:51:34,150 --> 00:51:32,329

call we were all very excited and many

1343

00:51:35,829 --> 00:51:34,160

of us spoke about how we ourselves would

1344

00:51:38,140 --> 00:51:35,839

like to go into space so with that in

1345

00:51:39,819 --> 00:51:38,150

mind and do you think space wise is

1346

00:51:42,069 --> 00:51:39,829

something that will be accessible to the

1347

00:51:46,839 --> 00:51:42,079

masses within our lifetime or perhaps in

1348

00:51:50,259 --> 00:51:46,849

the next generation I gotta leave for me

1349

00:51:54,130 --> 00:51:50,269

to talk yeah the answer of course is

1350

00:51:58,870 --> 00:51:54,140

absolutely yes if you if you were doing

1351
00:52:00,969 --> 00:51:58,880
a Model UN in nineteen eight or 1910 or

1352
00:52:04,329 --> 00:52:00,979
League of Nations or whatever existed

1353
00:52:07,180 --> 00:52:04,339
then but you could have asked the same

1354
00:52:09,069 --> 00:52:07,190
thing about airplane travel or if it had

1355
00:52:12,029 --> 00:52:09,079
been 300 years previous you could have

1356
00:52:15,279 --> 00:52:12,039
asked the same about about transoceanic

1357
00:52:17,469 --> 00:52:15,289
travel in a boat we always take the very

1358
00:52:19,390 --> 00:52:17,479
limit of our technology and push it

1359
00:52:21,160 --> 00:52:19,400
through large organizations and research

1360
00:52:23,759 --> 00:52:21,170
groups and a few people that are willing

1361
00:52:27,099 --> 00:52:23,769
to take the risk until we develop the

1362
00:52:29,410 --> 00:52:27,109
technology that then drops the risk and

1363
00:52:31,180 --> 00:52:29,420

once you've got the risk down then you

1364

00:52:33,189 --> 00:52:31,190

can start dropping the cost and then

1365

00:52:35,199 --> 00:52:33,199

raising the accessibility and there's

1366

00:52:37,689 --> 00:52:35,209

multiple repeated examples of that

1367

00:52:38,829 --> 00:52:37,699

throughout human history right now we

1368

00:52:41,589 --> 00:52:38,839

are somewhere around

1369

00:52:44,170 --> 00:52:41,599

I don't know nineteen twelve in aviation

1370

00:52:45,759 --> 00:52:44,180

you know where yes airplanes fly at a

1371

00:52:47,709 --> 00:52:45,769

regular basis they can fly across the

1372

00:52:50,410 --> 00:52:47,719

English Channel not quite across the

1373

00:52:52,599 --> 00:52:50,420

Atlantic yet but people regularly fly

1374

00:52:54,699 --> 00:52:52,609

and don't die but there's still a lot of

1375

00:52:58,239 --> 00:52:54,709

risk involved and you still don't really

1376
00:52:59,709 --> 00:52:58,249
have room just for pure passengers even

1377
00:53:01,329 --> 00:52:59,719
if right now if you have the money to

1378
00:53:03,339 --> 00:53:01,339
fly on the Soyuz like a few wealthy

1379
00:53:05,289 --> 00:53:03,349
people have they still have to go and

1380
00:53:07,209 --> 00:53:05,299
train you know when you get on an

1381
00:53:08,410 --> 00:53:07,219
airliner and the the Stewart or

1382
00:53:10,150 --> 00:53:08,420
stewardess at the front stands up and

1383
00:53:12,039 --> 00:53:10,160
gives a two-minute brief on the safety

1384
00:53:14,259 --> 00:53:12,049
exits that briefing takes about nine

1385
00:53:16,209 --> 00:53:14,269
months to fly on the Soyuz you really

1386
00:53:18,609 --> 00:53:16,219
have to train for quite a while just to

1387
00:53:20,499 --> 00:53:18,619
go and we're still at that fledgling

1388
00:53:23,529 --> 00:53:20,509

stage but there are companies right now

1389

00:53:26,229 --> 00:53:23,539

working really hard to bring it to many

1390

00:53:27,880 --> 00:53:26,239

more people at least suborbital and it's

1391

00:53:30,249 --> 00:53:27,890

just the technology that limits

1392

00:53:32,019 --> 00:53:30,259

we need to invent slightly better

1393

00:53:33,400 --> 00:53:32,029

engines just like they did a hundred

1394

00:53:35,979 --> 00:53:33,410

years ago with airplanes we need to

1395

00:53:38,620 --> 00:53:35,989

invent better protective vehicles and

1396

00:53:41,529 --> 00:53:38,630

and more automated systems so it doesn't

1397

00:53:44,739 --> 00:53:41,539

require so much human interaction but to

1398

00:53:46,359 --> 00:53:44,749

think that that space is some sacrosanct

1399

00:53:47,529 --> 00:53:46,369

thing that we can't figure out the

1400

00:53:51,220 --> 00:53:47,539

technology it will make it more

1401
00:53:52,479 --> 00:53:51,230
accessible to people is just proven

1402
00:53:54,160 --> 00:53:52,489
wrong by so many things that have

1403
00:53:55,839 --> 00:53:54,170
happened in the past in history yes

1404
00:53:57,999 --> 00:53:55,849
we'll get there hopefully the work that

1405
00:53:59,470 --> 00:53:58,009
we've contributed to this and that all

1406
00:54:01,450 --> 00:53:59,480
of the governments that are currently

1407
00:54:03,640 --> 00:54:01,460
working on will bring it into the

1408
00:54:06,700 --> 00:54:03,650
popular realm the common realm of safety

1409
00:54:08,200 --> 00:54:06,710
and thus affordability exactly when it's

1410
00:54:11,049 --> 00:54:08,210
like trying to predict jet engines in

1411
00:54:12,940 --> 00:54:11,059
1915 but once you get through those

1412
00:54:14,680 --> 00:54:12,950
technological hurdles then it becomes

1413
00:54:17,950 --> 00:54:14,690

part of the common human experience and

1414

00:54:20,259 --> 00:54:17,960

we can really then allow the beauty and

1415

00:54:22,720 --> 00:54:20,269

the Wonder perspective that orbiting the

1416

00:54:28,630 --> 00:54:22,730

world brings to so many more people and

1417

00:54:30,460 --> 00:54:28,640

that'll that'll just enrich us all all

1418

00:54:33,279 --> 00:54:30,470

right I'll throw one more out from the

1419

00:54:35,349 --> 00:54:33,289

internet from Jawad and and this is

1420

00:54:38,680 --> 00:54:35,359

we're a little bit related to the recent

1421

00:54:41,200 --> 00:54:38,690

Google+ hangout with the cast of new

1422

00:54:42,999 --> 00:54:41,210

Star Trek movie it said did you see or

1423

00:54:44,799 --> 00:54:43,009

encounter anything in space that might

1424

00:54:49,259 --> 00:54:44,809

make you believe in the existence of

1425

00:54:51,759 --> 00:54:49,269

intelligent life outside of our planet

1426

00:54:55,440 --> 00:54:51,769

just speaking for myself the only thing

1427

00:54:57,609 --> 00:54:55,450

I saw was just the number of stars and

1428

00:55:02,470 --> 00:54:57,619

that was but rest' with the knowledge

1429

00:55:04,269 --> 00:55:02,480

that that NASA has provided largely that

1430

00:55:05,799 --> 00:55:04,279

most of those stars probably is

1431

00:55:07,809 --> 00:55:05,809

surrounded by planets every star we look

1432

00:55:09,370 --> 00:55:07,819

at now has planets they're not all

1433

00:55:11,109 --> 00:55:09,380

earth-like but now we're discovering the

1434

00:55:15,190 --> 00:55:11,119

hard to find in other words the

1435

00:55:18,099 --> 00:55:15,200

earth-like planets out there so we the

1436

00:55:20,079 --> 00:55:18,109

night sky from the space station looks a

1437

00:55:21,759 --> 00:55:20,089

lot like it does on earth if you can

1438

00:55:23,859 --> 00:55:21,769

find a field far away from any city

1439

00:55:25,779 --> 00:55:23,869

lights so you can you can have that

1440

00:55:27,579 --> 00:55:25,789

experience as well but if you let your

1441

00:55:29,380 --> 00:55:27,589

eyes adjust you can see the stars don't

1442

00:55:32,739 --> 00:55:29,390

Huichol you can see planets as little

1443

00:55:36,069 --> 00:55:32,749

disks so you feel like you are a part of

1444

00:55:38,950 --> 00:55:36,079

that that universe so that is the only

1445

00:55:40,359 --> 00:55:38,960

thing that made me think of life on

1446

00:55:41,680 --> 00:55:40,369

other planets I think it's almost a

1447

00:55:42,700 --> 00:55:41,690

certainty of course I don't know

1448

00:55:44,589 --> 00:55:42,710

that's one of the reasons why we're

1449

00:55:46,210 --> 00:55:44,599

doing the research but otherwise

1450

00:55:47,710 --> 00:55:46,220

anything that was unexplained was just

1451
00:55:49,510 --> 00:55:47,720
something that was unexplained like

1452
00:55:51,039 --> 00:55:49,520
little glittering pieces of things

1453
00:55:52,930 --> 00:55:51,049
flying off of your space station which

1454
00:55:56,049 --> 00:55:52,940
turned out to be ammonia there's usually

1455
00:55:58,960 --> 00:55:56,059
a reason anything did you see anything I

1456
00:56:00,849 --> 00:55:58,970
don't have anything else dad I didn't

1457
00:56:04,120 --> 00:56:00,859
see anything you know I had the same

1458
00:56:06,630 --> 00:56:04,130
imagination I think that Tom had just

1459
00:56:09,730 --> 00:56:06,640
out there it is a small planet almost

1460
00:56:12,400 --> 00:56:09,740
almost saw our earth our globe as as

1461
00:56:15,490 --> 00:56:12,410
like a city just with regrets it's just

1462
00:56:17,799 --> 00:56:15,500
a very small place in the universe so we

1463
00:56:20,710 --> 00:56:17,809

do we do feel the grandeur of it and the

1464

00:56:22,120 --> 00:56:20,720

infinity of it all out there so it's

1465

00:56:24,630 --> 00:56:22,130

it's hard to imagine that there's not

1466

00:56:26,829 --> 00:56:24,640

but I didn't I didn't see anything that

1467

00:56:30,069 --> 00:56:26,839

that showed showed me that there were

1468

00:56:32,440 --> 00:56:30,079

signs come in to visit us yet all right

1469

00:56:35,289 --> 00:56:32,450

as I understand that Chris had to take

1470

00:56:37,510 --> 00:56:35,299

off for some medical exams or something

1471

00:56:39,549 --> 00:56:37,520

like that let's take one more question

1472

00:56:41,319 --> 00:56:39,559

here before you wrap up and I want to

1473

00:56:42,700 --> 00:56:41,329

get to Christina you got one other

1474

00:56:45,010 --> 00:56:42,710

person there who hasn't had a chance to

1475

00:56:48,269 --> 00:56:45,020

ask a question let's get the last live

1476

00:56:51,190 --> 00:56:48,279

person on the Hangout into the mix I

1477

00:56:53,470 --> 00:56:51,200

thanks so much my name is Sasha slamming

1478

00:56:54,940 --> 00:56:53,480

it's so nice to hear all of your

1479

00:56:57,099 --> 00:56:54,950

responses and get to chat with you it's

1480

00:56:59,019 --> 00:56:57,109

not every day we get to talk to

1481

00:57:01,480 --> 00:56:59,029

astronauts so this has been really

1482

00:57:04,260 --> 00:57:01,490

fantastic so I guess one last thing

1483

00:57:07,240 --> 00:57:04,270

we're interested in knowing about is how

1484

00:57:10,359 --> 00:57:07,250

do you think we can build the capacity

1485

00:57:12,760 --> 00:57:10,369

of other countries who aren't able to

1486

00:57:14,140 --> 00:57:12,770

send astronauts to space or have the

1487

00:57:16,120 --> 00:57:14,150

space programs so that they can

1488

00:57:19,029 --> 00:57:16,130

experience the space station in the way

1489

00:57:20,260 --> 00:57:19,039

that you do is that possible or how do

1490

00:57:25,089 --> 00:57:20,270

you see the future of other countries

1491

00:57:27,670 --> 00:57:25,099

participating well that that's a great

1492

00:57:29,920 --> 00:57:27,680

question you know not every node every

1493

00:57:33,640 --> 00:57:29,930

country has the resources that the

1494

00:57:35,650 --> 00:57:33,650

richest do one of the United Kingdom I

1495

00:57:38,279 --> 00:57:35,660

again just joined a human spaceflight

1496

00:57:42,400 --> 00:57:38,289

and assigned that Tim Peake to go fly in

1497

00:57:44,740 --> 00:57:42,410

2015-2016 some time around there so

1498

00:57:48,190 --> 00:57:44,750

countries are starting to come back into

1499

00:57:50,470 --> 00:57:48,200

it and we would like to see you know a

1500

00:57:53,890 --> 00:57:50,480

cooperation really on a really large

1501
00:57:55,020 --> 00:57:53,900
international scale we do know you know

1502
00:57:57,000 --> 00:57:55,030
that they're they're fine

1503
00:57:59,820 --> 00:57:57,010
has involved this this does cost

1504
00:58:01,350 --> 00:57:59,830
something and those those countries that

1505
00:58:03,540 --> 00:58:01,360
participate like to have the

1506
00:58:06,120 --> 00:58:03,550
participation of their citizens but you

1507
00:58:08,430 --> 00:58:06,130
know hopefully like Chris Hadfield was

1508
00:58:10,320 --> 00:58:08,440
saying earlier you know as we as we get

1509
00:58:12,630 --> 00:58:10,330
more and more capacity and more space

1510
00:58:15,060 --> 00:58:12,640
flights and maybe even expand cruise on

1511
00:58:16,830 --> 00:58:15,070
the International Space Station to to a

1512
00:58:19,110 --> 00:58:16,840
larger compliment currently we usually

1513
00:58:20,730 --> 00:58:19,120

have six there sometimes down to three

1514

00:58:22,710 --> 00:58:20,740

if we could if we could have a bigger

1515

00:58:24,480 --> 00:58:22,720

crew up there that hopefully we can

1516

00:58:26,880 --> 00:58:24,490

expand the number of countries that

1517

00:58:28,350 --> 00:58:26,890

participate that and go out and share it

1518

00:58:30,870 --> 00:58:28,360

with the rest of the world but what

1519

00:58:34,710 --> 00:58:30,880

we're doing is really for the entire

1520

00:58:37,560 --> 00:58:34,720

planet so so I think that's that's

1521

00:58:39,330 --> 00:58:37,570

that's a big plus and hopefully five to

1522

00:58:40,860 --> 00:58:39,340

ten years and on down the line we'll be

1523

00:58:44,280 --> 00:58:40,870

able to to get more more countries

1524

00:58:46,260 --> 00:58:44,290

involved and it's happening right now as

1525

00:58:48,480 --> 00:58:46,270

well Italy for instance does not have a

1526
00:58:50,790 --> 00:58:48,490
launch pad as far as I know for sending

1527
00:58:53,100 --> 00:58:50,800
people into space it doesn't have a

1528
00:58:55,020 --> 00:58:53,110
rocket that is developed however it

1529
00:58:56,610 --> 00:58:55,030
builds beautiful spacecraft and we are

1530
00:58:59,220 --> 00:58:56,620
able to enjoy a lot of the modules that

1531
00:59:00,780 --> 00:58:59,230
Italy has built several of them attached

1532
00:59:02,580 --> 00:59:00,790
to the space station and one of their

1533
00:59:04,530 --> 00:59:02,590
astronauts Luca parmitano is going to be

1534
00:59:05,700 --> 00:59:04,540
launching here in just a few days to go

1535
00:59:07,680 --> 00:59:05,710
up there so there are many ways that

1536
00:59:09,360 --> 00:59:07,690
countries can be involved and that is

1537
00:59:11,070 --> 00:59:09,370
part of the international effort not

1538
00:59:13,500 --> 00:59:11,080

every country in the international

1539

00:59:17,370 --> 00:59:13,510

effort has to have all the elements of a

1540

00:59:20,520 --> 00:59:17,380

space program that's how our all of us

1541

00:59:22,530 --> 00:59:20,530

together can be greater than then as a

1542

00:59:25,650 --> 00:59:22,540

whole can be greater than all of us

1543

00:59:26,910 --> 00:59:25,660

individually just add it up so we're

1544

00:59:29,250 --> 00:59:26,920

looking forward to have a look on board

1545

00:59:32,130 --> 00:59:29,260

certainly you know I think that's a

1546

00:59:34,260 --> 00:59:32,140

great way to wrap it up with that note

1547

00:59:37,370 --> 00:59:34,270

of cooperation I want to thank everybody

1548

00:59:39,000 --> 00:59:37,380

on this Google+ Hangout today especially

1549

00:59:41,640 --> 00:59:39,010

Kevin Ford

1550

00:59:43,770 --> 00:59:41,650

Tom Marshburn and Chris Hadfield all the

1551

00:59:45,660 --> 00:59:43,780

Model UN participants are media

1552

00:59:47,430 --> 00:59:45,670

participants it's been really great

1553

00:59:50,100 --> 00:59:47,440

having everybody here and all the folks

1554

00:59:51,960 --> 00:59:50,110

out on Facebook and Twitter and every

1555

00:59:54,450 --> 00:59:51,970

other social media mechanism we have

1556

00:59:56,490 --> 00:59:54,460

Google+ of course we look forward to

1557

00:59:58,200 --> 00:59:56,500

seeing you guys all again i'm kelly