

**FIU** Medina Aquarius Program



Ryan



1  
00:00:15,509 --> 00:00:12,480  
okay so let's get started with this hey

2  
00:00:19,500 --> 00:00:15,519  
Nemo friends we're here down in Key

3  
00:00:21,150 --> 00:00:19,510  
Largo Florida doing the Nemo 19 mission

4  
00:00:22,710 --> 00:00:21,160  
and we're really thankful that for you

5  
00:00:26,189 --> 00:00:22,720  
guys to join us for our first ever

6  
00:00:27,810 --> 00:00:26,199  
Google hangout I'm Wendy Watkins and I'm

7  
00:00:31,019 --> 00:00:27,820  
from Johnson Space Center in Houston

8  
00:00:33,150 --> 00:00:31,029  
I'm the Nemo outreach person the person

9  
00:00:36,540 --> 00:00:33,160  
that hopefully you guys informed on

10  
00:00:38,760 --> 00:00:36,550  
social media since you're here we know

11  
00:00:40,709 --> 00:00:38,770  
you must follow along on our social

12  
00:00:43,380 --> 00:00:40,719  
media accounts but just in case you

13  
00:00:45,869 --> 00:00:43,390

don't know NASA is the NASA extreme

14

00:00:48,600 --> 00:00:45,879

environment Mission Operations um and

15

00:00:50,790 --> 00:00:48,610

like I said it's our 19th mission before

16

00:00:53,490 --> 00:00:50,800

we get started I want to remind you to

17

00:00:59,279 --> 00:00:53,500

send your questions now to the hashtag

18

00:01:01,189 --> 00:00:59,289

Nemo 19 that's in EE mo 19 1 9 um that's

19

00:01:04,499 --> 00:01:01,199

the number one night

20

00:01:07,879 --> 00:01:04,509

so I'm topside at Mission Control where

21

00:01:10,980 --> 00:01:07,889

the watch desk is and the crew is about

22

00:01:12,929 --> 00:01:10,990

5.4 nautical miles off the coast in

23

00:01:14,690 --> 00:01:12,939

about sixty two feet below the surface

24

00:01:16,830 --> 00:01:14,700

in the Florida International

25

00:01:19,469 --> 00:01:16,840

University's undersea habitat

26

00:01:22,109 --> 00:01:19,479

it's called Aquarius reef face it's

27

00:01:24,269 --> 00:01:22,119

about the size of a school bus so we

28

00:01:25,529 --> 00:01:24,279

have six crew members down there living

29

00:01:29,609 --> 00:01:25,539

and working together for about seven

30

00:01:31,319 --> 00:01:29,619

days and um they are getting to know

31

00:01:34,279 --> 00:01:31,329

each other pretty well for one but

32

00:01:37,409 --> 00:01:34,289

they're doing a whole bunch of tests and

33

00:01:40,949 --> 00:01:37,419

engineering evaluations for us right now

34

00:01:44,309 --> 00:01:40,959

uh NASA the European Space Agency in the

35

00:01:46,080 --> 00:01:44,319

Canadian Space Agency and FIU have

36

00:01:48,239 --> 00:01:46,090

joined together for this mission to send

37

00:01:50,219 --> 00:01:48,249

our crew down to live and work in

38

00:01:54,719 --> 00:01:50,229

Aquarius and they're doing what's called

39

00:01:57,719 --> 00:01:54,729

a saturation mission and um we thin them

40

00:02:00,019 --> 00:01:57,729

down to the Aquarius and other extreme

41

00:02:02,549 --> 00:02:00,029

places to test and harsh space like

42

00:02:05,609 --> 00:02:02,559

analogous environments to increase the

43

00:02:07,799 --> 00:02:05,619

reality of the high fidelity tests the

44

00:02:10,619 --> 00:02:07,809

tests that we do are specifically

45

00:02:13,320 --> 00:02:10,629

designed to inform future International

46

00:02:15,480 --> 00:02:13,330

Space Station and exploration activities

47

00:02:17,610 --> 00:02:15,490

and many of the studies correlate

48

00:02:19,740 --> 00:02:17,620

directly to life aboard the space

49

00:02:22,320 --> 00:02:19,750

station where the crews do perform

50

00:02:24,270 --> 00:02:22,330

critical tasks that have factors similar

51  
00:02:27,000 --> 00:02:24,280  
to those that are experienced in the

52  
00:02:30,180 --> 00:02:27,010  
undersea environment so um

53  
00:02:31,800 --> 00:02:30,190  
Nemo 19 has some really great tests and

54  
00:02:35,070 --> 00:02:31,810  
evaluations that I hope you'll learn

55  
00:02:37,590 --> 00:02:35,080  
about during this hangout um right now

56  
00:02:40,320 --> 00:02:37,600  
I'd really like to get to the really

57  
00:02:41,160 --> 00:02:40,330  
important part the crew you see on the

58  
00:02:42,540 --> 00:02:41,170  
screen

59  
00:02:44,070 --> 00:02:42,550  
they'll be answering your questions

60  
00:02:47,280 --> 00:02:44,080  
today and I'm going to go straight down

61  
00:02:50,100 --> 00:02:47,290  
to our commander NASA astronaut and now

62  
00:02:51,660 --> 00:02:50,110  
Aquanaut Randy Bresnik and I'm going to

63  
00:02:53,280 --> 00:02:51,670

ask him to get started with letting

64

00:02:54,930 --> 00:02:53,290

everyone give a brief introduction of

65

00:02:57,930 --> 00:02:54,940

who they are and what they are doing

66

00:03:00,300 --> 00:02:57,940

down there so I can stop talking then we

67

00:03:02,460 --> 00:03:00,310

can get to your questions so to you

68

00:03:05,280 --> 00:03:02,470

Randy all right thanks baby

69

00:03:08,540 --> 00:03:05,290

welcome everybody to Aquarius 62 feet

70

00:03:11,790 --> 00:03:08,550

under the seat mission day three Brooke

71

00:03:14,880 --> 00:03:11,800

we've conducted already our fifth

72

00:03:17,100 --> 00:03:14,890

spacewalk out of nine there's our first

73

00:03:19,500 --> 00:03:17,110

big exploration spacewalk and we talk

74

00:03:21,180 --> 00:03:19,510

more about that later on but whirring

75

00:03:22,830 --> 00:03:21,190

well adjusted going on the mouth of you

76

00:03:25,500 --> 00:03:22,840

know just over the 48-hour mark down

77

00:03:28,620 --> 00:03:25,510

here and it's pretty amazing even on the

78

00:03:33,210 --> 00:03:28,630

sea floor 62 feet under the ocean you

79

00:03:35,040 --> 00:03:33,220

can still feel an 880 time facility that

80

00:03:37,860 --> 00:03:35,050

Aquarius is this anchor down to the sea

81

00:03:39,390 --> 00:03:37,870

or you can still feel the waves move us

82

00:03:41,460 --> 00:03:39,400

back and forth rockets in the West

83

00:03:43,470 --> 00:03:41,470

that's something I think surprised all

84

00:03:45,960 --> 00:03:43,480

of us there's how much power there is

85

00:03:47,970 --> 00:03:45,970

that will uh go ahead and they reduce

86

00:03:49,979 --> 00:03:47,980

themselves like Jeremy and the Canadian

87

00:03:52,890 --> 00:03:49,989

Space Agency every step in it from

88

00:03:55,229 --> 00:03:52,900

Medusa and any mochas in for me so as

89

00:03:57,660 --> 00:03:55,239

well and also the first patient

90

00:04:00,620 --> 00:03:57,670

astronaut so here we build about

91

00:04:04,140 --> 00:04:00,630

yourself sure Randy said I'm from Canada

92

00:04:06,630 --> 00:04:04,150

my background is in Air Force who f-18s

93

00:04:08,940 --> 00:04:06,640

I've been working for the Canadian Space

94

00:04:10,500 --> 00:04:08,950

Agency now for five years training that

95

00:04:12,300 --> 00:04:10,510

flying space still waiting for my first

96

00:04:14,070 --> 00:04:12,310

mission which will come up in southern

97

00:04:17,340 --> 00:04:14,080

climate and in here not so distant

98

00:04:19,080 --> 00:04:17,350

future and I guess the first thing I

99

00:04:21,719 --> 00:04:19,090

pass on to you from my experience down

100

00:04:23,340 --> 00:04:21,729

here is just how amazing it is when you

101  
00:04:24,779 --> 00:04:23,350  
when you live someplace for a little

102  
00:04:26,280 --> 00:04:24,789  
while I mean I've only been here two

103  
00:04:28,590 --> 00:04:26,290  
days but already when I go

104  
00:04:30,630 --> 00:04:28,600  
now it's at and I'm on the ocean floor I

105  
00:04:33,690 --> 00:04:30,640  
just it feels completely different than

106  
00:04:35,400 --> 00:04:33,700  
any time I visited the ocean on scuba

107  
00:04:37,260 --> 00:04:35,410  
tanks like I feel a little bit more like

108  
00:04:40,980 --> 00:04:37,270  
I belong here have a little bit more

109  
00:04:43,380 --> 00:04:40,990  
time to watch the ocean life and it's

110  
00:04:46,710 --> 00:04:43,390  
just an incredible experience we over to

111  
00:04:48,240 --> 00:04:46,720  
you urban MLB Cigna I'm French I work

112  
00:04:52,050 --> 00:04:48,250  
for European Space Agency at the

113  
00:04:54,900 --> 00:04:52,060

European assault center my function is

114

00:04:57,570 --> 00:04:54,910

I'm the head of the geo and gave

115

00:05:03,600 --> 00:04:57,580

operation that he continued it over

116

00:05:06,470 --> 00:05:03,610

there and I'm also a Euro continent I'm

117

00:05:11,850 --> 00:05:06,480

really amazed to be here part of such a

118

00:05:15,630 --> 00:05:11,860

talented pool and as Jeremy said we feel

119

00:05:21,620 --> 00:05:15,640

like we belong cooperates and the Conrad

120

00:05:38,610 --> 00:05:35,370

pressure you see like regular and I was

121

00:05:42,900 --> 00:05:38,620

sitting like right big lights I'll be

122

00:05:51,350 --> 00:05:42,910

the hub areas that we feel from directly

123

00:05:56,720 --> 00:05:54,900

excuse me my name is a nd mo Vincent I'm

124

00:05:59,970 --> 00:05:56,730

from Denmark I'm an astronaut with the

125

00:06:02,250 --> 00:05:59,980

Europeans originally I'm an aerospace

126  
00:06:05,460 --> 00:06:02,260  
engineer I came an astronaut five years

127  
00:06:07,500 --> 00:06:05,470  
ago in training since then I was open

128  
00:06:10,980 --> 00:06:07,510  
enough to participate in the NEEMO

129  
00:06:13,800 --> 00:06:10,990  
mission last year second time it's great

130  
00:06:15,420 --> 00:06:13,810  
to be back unfortunately I can pretty

131  
00:06:17,850 --> 00:06:15,430  
much guarantee I won't be here next year

132  
00:06:19,620 --> 00:06:17,860  
because I'll be space at this time on my

133  
00:06:26,010 --> 00:06:19,630  
first mission to the International Space

134  
00:06:31,990 --> 00:06:29,200  
we're Nico's that fit that's perfect

135  
00:06:33,610 --> 00:06:32,000  
um so I guess we could go ahead and get

136  
00:06:38,260 --> 00:06:33,620  
to some of the questions that we've

137  
00:06:40,090 --> 00:06:38,270  
gathered from Twitter and Google+ and we

138  
00:06:41,590 --> 00:06:40,100

have to see any come in from Facebook so

139

00:06:43,780 --> 00:06:41,600

if you guys are out there and you're on

140

00:06:47,410 --> 00:06:43,790

Facebook remember to use the same

141

00:06:49,270 --> 00:06:47,420

hashtag it's Nemo 19 and we've got

142

00:06:52,990 --> 00:06:49,280

people in the room here helping me

143

00:06:55,510 --> 00:06:53,000

gather them so our first question comes

144

00:06:57,970 --> 00:06:55,520

from Alberta science teacher

145

00:07:00,280 --> 00:06:57,980

Amanda thank Jeremy might have been in

146

00:07:02,500 --> 00:07:00,290

contact with her before she says one of

147

00:07:05,710 --> 00:07:02,510

my students wanted to know what is the

148

00:07:11,410 --> 00:07:05,720

biggest danger you face and/or what will

149

00:07:14,650 --> 00:07:11,420

you do if you spring a leak yeah it the

150

00:07:17,890 --> 00:07:14,660

biggest danger we face is actually not

151  
00:07:20,440 --> 00:07:17,900  
the fish but having to go to the surface

152  
00:07:22,720 --> 00:07:20,450  
because we're saturated down here with

153  
00:07:24,700 --> 00:07:22,730  
nitrogen our bodies have been absorbing

154  
00:07:27,400 --> 00:07:24,710  
more nitrogen into our blood in our

155  
00:07:28,900 --> 00:07:27,410  
tissue than we normally have at the

156  
00:07:30,960 --> 00:07:28,910  
surface and if we try to go to the

157  
00:07:35,710 --> 00:07:30,970  
surface

158  
00:07:40,510 --> 00:07:35,720  
those pump balloon expands and you can

159  
00:07:42,640 --> 00:07:40,520  
cause us either to me or me or or more

160  
00:07:44,950 --> 00:07:42,650  
acutely death and actually kill you

161  
00:07:47,530 --> 00:07:44,960  
so if we do have an emergency here in

162  
00:07:49,390 --> 00:07:47,540  
Aquarius we have a fire we have some

163  
00:07:50,920 --> 00:07:49,400

sort of leak major leak and we have to

164

00:07:52,810 --> 00:07:50,930

evacuate it's going to get pretty

165

00:07:54,280 --> 00:07:52,820

serious for all of us together we're

166

00:07:56,590 --> 00:07:54,290

going to be working real close as a team

167

00:07:58,450 --> 00:07:56,600

to try and get everyone outside the

168

00:08:00,130 --> 00:07:58,460

habitat we have we have a whole bunch of

169

00:08:02,160 --> 00:08:00,140

different emergency plans but one of

170

00:08:04,750 --> 00:08:02,170

them involves going outside and

171

00:08:07,510 --> 00:08:04,760

pre-breathing some different gas in a

172

00:08:09,220 --> 00:08:07,520

little air bubble we have just beside

173

00:08:12,370 --> 00:08:09,230

the habitat let's say there was a fire

174

00:08:14,620 --> 00:08:12,380

and Airness full of smoke we go there we

175

00:08:16,690 --> 00:08:14,630

free breathe some gas well a boat a

176  
00:08:19,510 --> 00:08:16,700  
rescue boat comes out and when it gets

177  
00:08:21,640 --> 00:08:19,520  
here we all go to the surface we get in

178  
00:08:23,920 --> 00:08:21,650  
a small chamber on the boat really small

179  
00:08:26,650 --> 00:08:23,930  
and like we'll be like this in their

180  
00:08:28,420 --> 00:08:26,660  
boat on to each other and then we get

181  
00:08:31,390 --> 00:08:28,430  
dragged in to shore and then we spend

182  
00:08:34,240 --> 00:08:31,400  
about another 16 hours in a chamber on

183  
00:08:36,160 --> 00:08:34,250  
shore getting back to surface pressure

184  
00:08:37,660 --> 00:08:36,170  
so that we could walk outside again and

185  
00:08:40,240 --> 00:08:37,670  
still be alive so very

186  
00:08:46,030 --> 00:08:40,250  
complex procedure to handle very

187  
00:08:48,250 --> 00:08:46,040  
dangerous environment thanks Jeremy okay

188  
00:08:50,710 --> 00:08:48,260

so our next question is also from

189

00:08:54,430 --> 00:08:50,720

Twitter and it just came in in it's Ali

190

00:08:56,740 --> 00:08:54,440

wheeler and she says hi are the

191

00:08:59,470 --> 00:08:56,750

aquanauts eating the same diet as you

192

00:09:02,740 --> 00:08:59,480

will in space and what other simulations

193

00:09:04,690 --> 00:09:02,750

do you have on Nemo 19 The Glitch Creek

194

00:09:06,370 --> 00:09:04,700

from Twitter also asked what you guys

195

00:09:14,740 --> 00:09:06,380

were eating and she wanted to know if it

196

00:09:17,500 --> 00:09:14,750

was seafood we have all kinds of food

197

00:09:19,600 --> 00:09:17,510

down here you know but one thing that

198

00:09:21,130 --> 00:09:19,610

really helps is we actually have a lot

199

00:09:23,080 --> 00:09:21,140

of freeze-dried stuff here's an example

200

00:09:25,750 --> 00:09:23,090

of the particular time ago beef

201  
00:09:28,420 --> 00:09:25,760  
stroganoff a good old apple crisp for

202  
00:09:29,860 --> 00:09:28,430  
dessert which is actually very similar

203  
00:09:32,050 --> 00:09:29,870  
to a lot of food we have on Space

204  
00:09:33,970 --> 00:09:32,060  
Station which is freeze-dried where you

205  
00:09:35,410 --> 00:09:33,980  
know this weighs nothing you know here

206  
00:09:37,150 --> 00:09:35,420  
on earth and so therefore doesn't take

207  
00:09:40,030 --> 00:09:37,160  
much rocket fuel to get it up to orbit

208  
00:09:41,980 --> 00:09:40,040  
and going 16 you know 17,500 miles an

209  
00:09:44,350 --> 00:09:41,990  
hour so it's a lot easier to take this

210  
00:09:46,020 --> 00:09:44,360  
up and then put water into it once we

211  
00:09:49,870 --> 00:09:46,030  
get it straight

212  
00:09:51,400 --> 00:09:49,880  
got water heater down here we put into

213  
00:09:52,780 --> 00:09:51,410

our food and they get up fresh but we

214

00:09:55,060 --> 00:09:52,790

also have ringing off the shelf stuff

215

00:09:57,430 --> 00:09:55,070

which is similar to a face where you can

216

00:10:00,280 --> 00:09:57,440

ask Joe comfort food things you like and

217

00:10:03,070 --> 00:10:00,290

all like that there's going to jump

218

00:10:07,420 --> 00:10:03,080

marker and I think so in the get so far

219

00:10:10,180 --> 00:10:07,430

stack but it is a very similar down here

220

00:10:12,160 --> 00:10:10,190

in that you can't just go to the oven

221

00:10:14,950 --> 00:10:12,170

and you'll eat something up or ghost

222

00:10:17,530 --> 00:10:14,960

overcast gas grill and they make food of

223

00:10:20,220 --> 00:10:17,540

it have to be packaged that's easily

224

00:10:26,440 --> 00:10:20,230

transportable Dennis Lee asked me easily

225

00:10:28,990 --> 00:10:26,450

Google offer the crew the cookies only

226

00:10:30,700 --> 00:10:29,000

these and was there is a surprise for

227

00:10:32,590 --> 00:10:30,710

the tune up tonight you're supposed to

228

00:10:37,519 --> 00:10:32,600

be a surprise but we're not ruined now

229

00:10:44,790 --> 00:10:41,160

cool night Olivia space food from the

230

00:10:46,920 --> 00:10:44,800

space station that is you implemented

231

00:10:51,630 --> 00:10:46,930

expectation in this food is provided by

232

00:10:54,960 --> 00:10:51,640

Asia and developed by France by French

233

00:11:00,110 --> 00:10:54,970

cook led to all so uh we have a special

234

00:11:04,050 --> 00:11:00,120

dinner a French kiddo Isis like cattle

235

00:11:05,640 --> 00:11:04,060

between us Lego exactly

236

00:11:17,510 --> 00:11:05,650

that doesn't have to do with the

237

00:11:20,880 --> 00:11:17,520

anyone's birthday coming up perhaps um

238

00:11:23,940 --> 00:11:20,890

so the other part of that question was

239

00:11:26,250 --> 00:11:23,950

she wanted to know what other

240

00:11:29,760 --> 00:11:26,260

simulations that you're doing during

241

00:11:33,480 --> 00:11:29,770

Nemo 19 so maybe some of the tests that

242

00:11:36,720 --> 00:11:33,490

you guys are doing well from a European

243

00:11:38,430 --> 00:11:36,730

perspective that Nemo 19 is a really

244

00:11:41,010 --> 00:11:38,440

exciting mission because we're testing

245

00:11:43,019 --> 00:11:41,020

some of the technology that we've been

246

00:11:45,240 --> 00:11:43,029

developing and that I'll actually be

247

00:11:48,090 --> 00:11:45,250

using on the space station next year and

248

00:11:50,910 --> 00:11:48,100

this is some mobile technology that

249

00:11:56,340 --> 00:11:50,920

involves smart phones smart tablets

250

00:11:58,380 --> 00:11:56,350

integrated with a heads up make the way

251  
00:12:00,840 --> 00:11:58,390  
we work on board space nation more

252  
00:12:03,000 --> 00:12:00,850  
effective and more efficient because as

253  
00:12:04,829 --> 00:12:03,010  
it is now they're all everything we do

254  
00:12:07,560 --> 00:12:04,839  
is procedure based right now it's on

255  
00:12:10,019 --> 00:12:07,570  
laptop but if we can integrate that with

256  
00:12:11,640 --> 00:12:10,029  
wearable technologies and we can work in

257  
00:12:14,180 --> 00:12:11,650  
a heads up hands-free type of

258  
00:12:16,610 --> 00:12:14,190  
environment on top of that we try to

259  
00:12:19,400 --> 00:12:16,620  
integrate cameras and real-time

260  
00:12:22,079 --> 00:12:19,410  
communications so that we can be in

261  
00:12:25,110 --> 00:12:22,089  
contact with experts on the ground of

262  
00:12:26,970 --> 00:12:25,120  
scientists on the ground in real-time so

263  
00:12:29,220 --> 00:12:26,980

that they can follow along and they can

264

00:12:31,320 --> 00:12:29,230

come with suggestions and help as we're

265

00:12:32,910 --> 00:12:31,330

working because a lot of people know

266

00:12:35,190 --> 00:12:32,920

they they think of astronauts and

267

00:12:37,769 --> 00:12:35,200

scientists but in reality what we are is

268

00:12:39,810 --> 00:12:37,779

a glorified laboratory technician we are

269

00:12:41,970 --> 00:12:39,820

really that extended hands of the

270

00:12:44,130 --> 00:12:41,980

scientists on earth who propose the

271

00:12:46,860 --> 00:12:44,140

experiments and who are the real experts

272

00:12:49,429 --> 00:12:46,870

and we're just we're doing their work in

273

00:12:51,139 --> 00:12:49,439

space so if we have contact to them

274

00:12:54,199 --> 00:12:51,149

on the ground while we're doing it we

275

00:13:00,049 --> 00:12:54,209

can really be a crew to work that we do

276

00:13:01,879 --> 00:13:00,059

in space great okay um so along those

277

00:13:04,849 --> 00:13:01,889

same lines I'm going to go ahead and

278

00:13:07,039 --> 00:13:04,859

throw it to Herve and ask him a little

279

00:13:08,929 --> 00:13:07,049

bit about the heads up tests that you

280

00:13:10,699 --> 00:13:08,939

guys are doing since you have a big part

281

00:13:11,960 --> 00:13:10,709

in that and I know people are kind of

282

00:13:18,619 --> 00:13:11,970

curious when they see wearing those

283

00:13:21,019 --> 00:13:18,629

glasses so sick if you went to only a

284

00:13:23,389 --> 00:13:21,029

function so this ends up experiment yogi

285

00:13:27,499 --> 00:13:23,399

is the Facebook prototyping of this

286

00:13:30,409 --> 00:13:27,509

mobile device Android software that can

287

00:13:32,629 --> 00:13:30,419

be used by an astronaut when it's and

288

00:13:37,279 --> 00:13:32,639

busy performing an activity and

289

00:13:40,039 --> 00:13:37,289

motivated so the each of the crew member

290

00:13:43,539 --> 00:13:40,049

with the state and the configuration is

291

00:13:46,809 --> 00:13:43,549

we have a kind of pencil displayed

292

00:13:50,509 --> 00:13:46,819

displaying the procedure where we can

293

00:13:53,449 --> 00:13:50,519

buy a bar with voice command go through

294

00:13:55,789 --> 00:13:53,459

different steps of the procedure which

295

00:13:57,829 --> 00:13:55,799

prevent our overall that we have to go

296

00:14:00,319 --> 00:13:57,839

buy the laptop where the processor is

297

00:14:03,259 --> 00:14:00,329

displayed and routes up and across time

298

00:14:06,199 --> 00:14:03,269

translation displays and we can stay at

299

00:14:08,509 --> 00:14:06,209

the same location in addition we have

300

00:14:10,549 --> 00:14:08,519

this video conferencing capability

301  
00:14:14,419 --> 00:14:10,559  
whether you give any drop or anything

302  
00:14:16,639 --> 00:14:14,429  
going not really okay we can ask the

303  
00:14:18,590 --> 00:14:16,649  
specialist on the ground and they can

304  
00:14:22,669 --> 00:14:18,600  
also purchase

305  
00:14:25,969 --> 00:14:22,679  
also dot and follow what we are doing so

306  
00:14:32,649 --> 00:14:25,979  
it's a new technology configuration what

307  
00:14:37,340 --> 00:14:32,659  
this is aiming for only proof is find

308  
00:14:39,319 --> 00:14:37,350  
solutions to improve the even more the

309  
00:14:40,369 --> 00:14:39,329  
operation that we can hold on the space

310  
00:14:43,969 --> 00:14:40,379  
station

311  
00:14:46,309 --> 00:14:43,979  
contribute to that applause and why we

312  
00:14:50,149 --> 00:14:46,319  
tested here then this prototyping and

313  
00:14:52,789 --> 00:14:50,159

our combination we have followed around

314

00:14:56,569 --> 00:14:52,799

the final version that the free tasting

315

00:14:59,449 --> 00:14:56,579

space has deep in space by areas so what

316

00:15:00,679 --> 00:14:59,459

we are doing now is really for the

317

00:15:02,790 --> 00:15:00,689

improvement of the space station

318

00:15:06,610 --> 00:15:02,800

operation

319

00:15:09,850 --> 00:15:06,620

great thanks uh so I got a good one here

320

00:15:16,329 --> 00:15:09,860

from Carmen Austin who writes us through

321

00:15:19,749 --> 00:15:16,339

Google+ and through Twitter um and her

322

00:15:22,509 --> 00:15:19,759

question is what other space analog

323

00:15:26,019 --> 00:15:22,519

missions have you guys participated in

324

00:15:27,610 --> 00:15:26,029

either together or individually and how

325

00:15:31,059 --> 00:15:27,620

do they compare to Nemo and that one's

326

00:15:32,829 --> 00:15:31,069

really experience of exciting because we

327

00:15:34,930 --> 00:15:32,839

know there's another analog going on

328

00:15:38,530 --> 00:15:34,940

right now that some of you guys have

329

00:15:41,199 --> 00:15:38,540

taken part in but more importantly she

330

00:15:46,480 --> 00:15:41,209

really wants to know which button down

331

00:15:48,249 --> 00:15:46,490

there summons Godzilla we haven't seen

332

00:15:51,430 --> 00:15:48,259

the Godzilla bunny and either that or

333

00:15:53,170 --> 00:15:51,440

our mark are or have to hear if I've

334

00:15:56,499 --> 00:15:53,180

shown it to us I'm not sure if you trust

335

00:15:58,360 --> 00:15:56,509

us with America we want to start pushing

336

00:16:01,360 --> 00:15:58,370

by the delivery I'll get you oh we start

337

00:16:03,340 --> 00:16:01,370

touching their equipment other analogs

338

00:16:05,559 --> 00:16:03,350

great question because we're always

339

00:16:08,129 --> 00:16:05,569

trying to find ways to get people

340

00:16:12,759 --> 00:16:08,139

comfortable or exposed to the same

341

00:16:14,079 --> 00:16:12,769

physical you know types of challenges

342

00:16:15,999 --> 00:16:14,089

they'll be facing when they go to space

343

00:16:17,590 --> 00:16:16,009

I mean the number one thing in fact it

344

00:16:20,319 --> 00:16:17,600

is completely different than anything

345

00:16:21,999 --> 00:16:20,329

you've ever experienced and so you can

346

00:16:23,920 --> 00:16:22,009

do something here on earth completely

347

00:16:25,720 --> 00:16:23,930

different that's something they you know

348

00:16:28,120 --> 00:16:25,730

teach you a little more insight a little

349

00:16:29,610 --> 00:16:28,130

more stress and you're able to see how

350

00:16:31,660 --> 00:16:29,620

you will perform in that environment

351

00:16:32,889 --> 00:16:31,670

sort of the over the years we've used

352

00:16:36,189 --> 00:16:32,899

the National Outdoor Leadership School

353

00:16:39,840 --> 00:16:36,199

with the majors replacing Canyonlands in

354

00:16:43,269 --> 00:16:39,850

the Wind River Range of Wyoming

355

00:16:44,110 --> 00:16:43,279

kayaking and looking sea kayaking and

356

00:16:47,199 --> 00:16:44,120

things like that

357

00:16:50,350 --> 00:16:47,209

we've also an evil going out for 14

358

00:16:52,059 --> 00:16:50,360

years and the difference between your

359

00:16:53,379 --> 00:16:52,069

Noel's are out in the field and your

360

00:16:55,569 --> 00:16:53,389

camping and you carry everything with

361

00:16:57,670 --> 00:16:55,579

you that's a really great stretch my

362

00:16:59,290 --> 00:16:57,680

heart imploded physical challenge but

363

00:17:00,129 --> 00:16:59,300

you know if something goes wrong you

364

00:17:01,420 --> 00:17:00,139

just stay put

365

00:17:03,340 --> 00:17:01,430

be on the satphone you call somebody

366

00:17:04,870 --> 00:17:03,350

come picked out the most different

367

00:17:06,669 --> 00:17:04,880

because we're down stick your feet over

368

00:17:09,730 --> 00:17:06,679

the ocean and you can just go to the

369

00:17:13,140 --> 00:17:09,740

surface I mean the question earlier you

370

00:17:15,579 --> 00:17:13,150

know you we have to do a desaturation

371

00:17:17,919 --> 00:17:15,589

decompression for seven

372

00:17:19,230 --> 00:17:17,929

or can go to the surface so that's not

373

00:17:21,039 --> 00:17:19,240

often so you're definitely in a

374

00:17:24,220 --> 00:17:21,049

life-threatening situation if there's

375

00:17:26,529 --> 00:17:24,230

any issues that but also another analog

376

00:17:31,110 --> 00:17:26,539

adhesive started three years ago was the

377

00:17:34,630 --> 00:17:31,120

caves analog very actually during the

378

00:17:37,840 --> 00:17:34,640

caves of the Sardinia of the island off

379

00:17:39,250 --> 00:17:37,850

of Ely and you'll get range that you do

380

00:17:42,190 --> 00:17:39,260

get emo for the person and then you

381

00:17:44,680 --> 00:17:42,200

actually spend before week in the Sun

382

00:17:46,570 --> 00:17:44,690

Greuther kata complex where you start

383

00:17:49,659 --> 00:17:46,580

out for the base camp two mile and a

384

00:17:52,360 --> 00:17:49,669

half from the surface and then you

385

00:17:55,450 --> 00:17:52,370

explore out actually the areas of the

386

00:17:57,010 --> 00:17:55,460

cave have not been mapped before so even

387

00:17:59,560 --> 00:17:57,020

on top of the brand new experience

388

00:18:01,330 --> 00:17:59,570

you're actually going places and doing

389

00:18:02,860 --> 00:18:01,340

exploration tasks so you have any

390

00:18:05,289 --> 00:18:02,870

element of excitement as well as the

391

00:18:06,580 --> 00:18:05,299

element of a that's a big dark hole down

392

00:18:08,139 --> 00:18:06,590

there and I need to make sure that I'm

393

00:18:10,480 --> 00:18:08,149

tethered on with my equipment and my

394

00:18:13,180 --> 00:18:10,490

climbing gear is adjusted properly so I

395

00:18:15,850 --> 00:18:13,190

don't have a great type of accent so

396

00:18:20,019 --> 00:18:15,860

both Creek caves and emo have phenomenal

397

00:18:21,279 --> 00:18:20,029

analogs with the fear of death is every

398

00:18:22,870 --> 00:18:21,289

part of your day you're not taking care

399

00:18:24,700 --> 00:18:22,880

of your equipment your life depends on

400

00:18:25,810 --> 00:18:24,710

it you got to bring your food in bring

401  
00:18:27,250 --> 00:18:25,820  
your food out you got to worry about

402  
00:18:29,320 --> 00:18:27,260  
working together in a closed environment

403  
00:18:30,880 --> 00:18:29,330  
with your crew members and I wouldn't be

404  
00:18:32,710 --> 00:18:30,890  
other people get stressed this new

405  
00:18:34,779 --> 00:18:32,720  
environment for them how do we get along

406  
00:18:37,870 --> 00:18:34,789  
I respond how do you want to problems

407  
00:18:39,909 --> 00:18:37,880  
how do you make make the city and the

408  
00:18:41,470 --> 00:18:39,919  
thing that emo has the cage doesn't is

409  
00:18:44,080 --> 00:18:41,480  
we have a mission controllers going here

410  
00:18:45,789 --> 00:18:44,090  
24/7 it operates just like what on the

411  
00:18:48,070 --> 00:18:45,799  
space station they're sending us stuff

412  
00:18:49,360 --> 00:18:48,080  
we're working on computer we're going

413  
00:18:51,340 --> 00:18:49,370

and doing these experiments and heads

414

00:18:54,279 --> 00:18:51,350

off and just-in-time training it allows

415

00:18:56,529 --> 00:18:54,289

us to really have a more ISS like like

416

00:18:58,899 --> 00:18:56,539

environment here down on the ocean so

417

00:19:03,460 --> 00:18:58,909

all great analogs and so hopefully

418

00:19:06,760 --> 00:19:03,470

you're Andy's DeVivo hand cave we and

419

00:19:08,289 --> 00:19:06,770

myself both been caves and ego and from

420

00:19:10,240 --> 00:19:08,299

having had the opportunity to fly in

421

00:19:11,470 --> 00:19:10,250

space once on a shuttle mission I can

422

00:19:13,659 --> 00:19:11,480

tell you both these analog for

423

00:19:16,840 --> 00:19:13,669

phenomenal preparation for developing

424

00:19:18,519 --> 00:19:16,850

the space so it seems less foreign and

425

00:19:19,539 --> 00:19:18,529

less strange when you get there and so

426

00:19:24,159 --> 00:19:19,549

will hopefully give you a lot more

427

00:19:25,420 --> 00:19:24,169

effective is you get up there thanks

428

00:19:28,480 --> 00:19:25,430

Randy

429

00:19:32,110 --> 00:19:28,490

okay so we got a question through

430

00:19:36,570 --> 00:19:32,120

Google+ from Sean Squire he's a space

431

00:19:39,370 --> 00:19:36,580

Tweep that we act with a lot on Twitter

432

00:19:42,430 --> 00:19:39,380

he says have you felt any effects from

433

00:19:44,740 --> 00:19:42,440

the saturation is the gas mixture there

434

00:19:48,220 --> 00:19:44,750

different than at the surface to avoid

435

00:19:50,650 --> 00:19:48,230

oxygen toxicity or similar effects so

436

00:19:52,150 --> 00:19:50,660

you might want to explain what about the

437

00:19:58,690 --> 00:19:52,160

saturation diving that you guys are

438

00:20:01,450 --> 00:19:58,700

doing - yeah so I mean my first time

439

00:20:03,670 --> 00:20:01,460

here I haven't noticed any real effects

440

00:20:05,350 --> 00:20:03,680

on my body so for my crewmates and

441

00:20:07,750 --> 00:20:05,360

pointed out the fact that by my voice

442

00:20:09,640 --> 00:20:07,760

has changed because the density in the

443

00:20:12,310 --> 00:20:09,650

air here is much more dense for about

444

00:20:15,010 --> 00:20:12,320

three times the pressure that we would

445

00:20:16,840 --> 00:20:15,020

be at sea level and so the way the voice

446

00:20:18,160 --> 00:20:16,850

moves or the Airways over your vocal

447

00:20:19,930 --> 00:20:18,170

ords is different than it would be at

448

00:20:22,540 --> 00:20:19,940

sea them so they make it fun of me a

449

00:20:24,460 --> 00:20:22,550

little bit for that so that's awesome

450

00:20:27,520 --> 00:20:24,470

instead of Barry White he sounds like

451  
00:20:32,290 --> 00:20:27,530  
outlet yeah and it hasn't changed his

452  
00:20:34,690 --> 00:20:32,300  
accent yeah I still sound Canadian so

453  
00:20:36,310 --> 00:20:34,700  
that's all good

454  
00:20:38,620 --> 00:20:36,320  
it looks like it's still working I

455  
00:20:40,870 --> 00:20:38,630  
thought it was frozen okay the other the

456  
00:20:42,730 --> 00:20:40,880  
other thing we talked about down here

457  
00:20:44,530 --> 00:20:42,740  
while we're working on it today actually

458  
00:20:46,750 --> 00:20:44,540  
was just maintaining a breathable

459  
00:20:49,060 --> 00:20:46,760  
atmosphere for us so one of the tasks we

460  
00:20:50,920 --> 00:20:49,070  
have to do regularly is remove the

461  
00:20:52,750 --> 00:20:50,930  
carbon dioxide from the air we have a

462  
00:20:55,120 --> 00:20:52,760  
special chemical down here that we do

463  
00:20:57,160 --> 00:20:55,130

that with and so we we change that

464

00:20:59,020 --> 00:20:57,170

regularly so that we can keep removing

465

00:21:00,550 --> 00:20:59,030

carbon dioxide similar to what we have

466

00:21:02,530 --> 00:21:00,560

to do on Space Station to keep our

467

00:21:04,510 --> 00:21:02,540

atmosphere the same but the composition

468

00:21:08,140 --> 00:21:04,520

down here is the same as it would be up

469

00:21:10,390 --> 00:21:08,150

on top it's still 21% oxygen plus or

470

00:21:16,660 --> 00:21:10,400

minus maybe a little bit less just the

471

00:21:19,270 --> 00:21:16,670

higher pressure okay great I have to

472

00:21:20,710 --> 00:21:19,280

unmute everyone so now because I I you

473

00:21:25,690 --> 00:21:20,720

know don't want you guys hear me make

474

00:21:27,550 --> 00:21:25,700

funny noises so on this question I have

475

00:21:30,180 --> 00:21:27,560

another one from the Alberta science

476

00:21:33,550 --> 00:21:30,190

teacher her students had several and

477

00:21:36,910 --> 00:21:33,560

this one is what is your oxygen source

478

00:21:38,510 --> 00:21:36,920

your freshwater your in your food you

479

00:21:40,610 --> 00:21:38,520

guys already talked about the food

480

00:21:48,680 --> 00:21:40,620

I wanted to know if it is similar to the

481

00:21:49,850 --> 00:21:48,690

space station so anyone yeah well so one

482

00:21:51,410 --> 00:21:49,860

way that we're a little bit different

483

00:21:53,300 --> 00:21:51,420

than the space station is that obviously

484

00:21:56,060 --> 00:21:53,310

we're much closer to Earth so we're not

485

00:21:59,510 --> 00:21:56,070

completely cut off who you have a life

486

00:22:02,570 --> 00:21:59,520

support buoy on the surface of the ocean

487

00:22:04,790 --> 00:22:02,580

and we have a available cable speak to

488

00:22:08,540 --> 00:22:04,800

cable going from that buoy down to us

489

00:22:12,080 --> 00:22:08,550

that's us with yeah with electrical

490

00:22:16,670 --> 00:22:12,090

power with communications and with the

491

00:22:18,980 --> 00:22:16,680

our atmosphere breathing supply now we

492

00:22:23,720 --> 00:22:18,990

are self-sufficient in case that the

493

00:22:25,850 --> 00:22:23,730

cable should get cut I mean it's a an

494

00:22:28,310 --> 00:22:25,860

environment where there are hurricanes

495

00:22:30,530 --> 00:22:28,320

and they're having I think cases in the

496

00:22:33,920 --> 00:22:30,540

past where they yeah life support buoy

497

00:22:36,410 --> 00:22:33,930

has been cut off and so we do have a

498

00:22:39,470 --> 00:22:36,420

battery supply backup battery supply and

499

00:22:41,150 --> 00:22:39,480

enough air to keep us alive in case the

500

00:22:42,410 --> 00:22:41,160

life-support we should become

501  
00:22:45,700 --> 00:22:42,420  
disconnected from it

502  
00:22:48,290 --> 00:22:45,710  
but for the most part we we get our

503  
00:22:50,570 --> 00:22:48,300  
supplies from the surface through the

504  
00:22:58,370 --> 00:22:50,580  
this umbilical cable to the life support

505  
00:23:01,520 --> 00:22:58,380  
buoy also I think that FIU posted a

506  
00:23:03,110 --> 00:23:01,530  
photo of a cross-section of the cable

507  
00:23:05,450 --> 00:23:03,120  
that runs down from the life support

508  
00:23:10,280 --> 00:23:05,460  
buoy if anybody wants to go check that

509  
00:23:11,960 --> 00:23:10,290  
out on Twitter so let's go to since

510  
00:23:15,590 --> 00:23:11,970  
we're talking about the habitat we have

511  
00:23:18,230 --> 00:23:15,600  
a question here from Rasmus on Twitter

512  
00:23:20,990 --> 00:23:18,240  
and he wants to know how does the

513  
00:23:25,270 --> 00:23:21,000

kitchen work down there is it like on

514

00:23:30,280 --> 00:23:27,970

yeah the kitchen is what we the same

515

00:23:33,280 --> 00:23:30,290

desktop slight differences royal form we

516

00:23:35,770 --> 00:23:33,290

have a microwave oven so when we have

517

00:23:40,900 --> 00:23:35,780

support what our distributors will like

518

00:23:44,020 --> 00:23:40,910

the kind that where at the way where it

519

00:23:49,240 --> 00:23:44,030

will just keep might want to flush flush

520

00:23:52,230 --> 00:23:49,250

the thank you think purchasing you can

521

00:23:54,970 --> 00:23:52,240

apply that approach and actually this

522

00:23:57,790 --> 00:23:54,980

by-product into the surface and due to

523

00:24:01,600 --> 00:23:57,800

the difference of pressure the water is

524

00:24:03,460 --> 00:24:01,610

directly set out back surfaces from this

525

00:24:05,380 --> 00:24:03,470

fight so we play on the different of

526

00:24:07,690 --> 00:24:05,390

pressure between the pressure inside

527

00:24:10,030 --> 00:24:07,700

avatar and the pressure other surface

528

00:24:12,580 --> 00:24:10,040

just brush the water on the thing and

529

00:24:14,500 --> 00:24:12,590

that's actually an important point you

530

00:24:17,200 --> 00:24:14,510

have to remember to close that valve

531

00:24:19,300 --> 00:24:17,210

indicate if you leave that Val open all

532

00:24:20,770 --> 00:24:19,310

the air here will start going out

533

00:24:23,230 --> 00:24:20,780

through the sink and the water will

534

00:24:25,690 --> 00:24:23,240

start coming up through the wet portions

535

00:24:27,400 --> 00:24:25,700

soon the habitat will be submerged so

536

00:24:30,810 --> 00:24:27,410

you got to make sure after you push the

537

00:24:36,850 --> 00:24:34,690

I've also heard that it burps a big

538

00:24:38,170 --> 00:24:36,860

bubble of air every once in a while and

539

00:24:42,370 --> 00:24:38,180

it's kind of interesting to be on the

540

00:24:45,430 --> 00:24:42,380

surface when that big bubble comes up so

541

00:24:49,960 --> 00:24:45,440

this question comes from Google+ and

542

00:24:52,480 --> 00:24:49,970

Robert Copeland asks um Randy mentioned

543

00:24:54,850 --> 00:24:52,490

earlier in an interview that the mission

544

00:24:57,910 --> 00:24:54,860

would simulate the comms delay between

545

00:24:59,650 --> 00:24:57,920

Mars and Earth how's that going we're

546

00:25:03,160 --> 00:24:59,660

there adjustments and communications

547

00:25:07,990 --> 00:25:03,170

protocol needed to reduce issues cost by

548

00:25:09,730 --> 00:25:08,000

the delay Robert Hale great question it

549

00:25:11,710 --> 00:25:09,740

was our first day with Conville a five

550

00:25:13,270 --> 00:25:11,720

minutes each ways with ten minutes

551  
00:25:15,340 --> 00:25:13,280  
overall we ask a question Mission

552  
00:25:18,580 --> 00:25:15,350  
Control we can expect an answer no

553  
00:25:21,310 --> 00:25:18,590  
earlier than that 10 minutes later and

554  
00:25:22,690 --> 00:25:21,320  
with it you know lust to area re v8 even

555  
00:25:25,330 --> 00:25:22,700  
everybody got together ahead of

556  
00:25:27,580 --> 00:25:25,340  
cognitive how can we do this and the

557  
00:25:30,100 --> 00:25:27,590  
method which we started practicing today

558  
00:25:32,680 --> 00:25:30,110  
on the EBA was no go to work site do

559  
00:25:35,470 --> 00:25:32,690  
particular said or go to another work

560  
00:25:38,120 --> 00:25:35,480  
site and as they look at the details or

561  
00:25:39,830 --> 00:25:38,130  
the questions for that first work site

562  
00:25:41,570 --> 00:25:39,840  
we're working second point so the by the

563  
00:25:42,980 --> 00:25:41,580

time we finish the second we can go back

564

00:25:44,840 --> 00:25:42,990

to the first one and they now they'll be

565

00:25:46,790 --> 00:25:44,850

able to send us answers or instructions

566

00:25:48,950 --> 00:25:46,800

and so what to do that first weren't son

567

00:25:50,570 --> 00:25:48,960

so it worked out pretty well and we look

568

00:25:52,910 --> 00:25:50,580

forward to executed another day of that

569

00:25:55,790 --> 00:25:52,920

tomorrow realizing that the ten-minute

570

00:25:57,830 --> 00:25:55,800

kondal a is really only about a half the

571

00:26:00,230 --> 00:25:57,840

distance between here tomorrow it was a

572

00:26:03,400 --> 00:26:00,240

actual marching probably be about twenty

573

00:26:05,720 --> 00:26:03,410

minutes of a round-trip transmission and

574

00:26:08,330 --> 00:26:05,730

so we're trying to find out and what

575

00:26:09,800 --> 00:26:08,340

level this con delay become really

576

00:26:11,840 --> 00:26:09,810

untenable you can't expect to do

577

00:26:13,340 --> 00:26:11,850

real-time operations and you really

578

00:26:15,170 --> 00:26:13,350

would just want to just give the crew

579

00:26:17,000 --> 00:26:15,180

their intent and their instructions for

580

00:26:19,880 --> 00:26:17,010

the day expect to just be autonomous and

581

00:26:21,770 --> 00:26:19,890

report back at the end of the day or we

582

00:26:23,690 --> 00:26:21,780

find a slot where you know we actually

583

00:26:26,510 --> 00:26:23,700

make this happen just we plan our our

584

00:26:28,160 --> 00:26:26,520

work such that we can you know expect

585

00:26:30,050 --> 00:26:28,170

those that delays and intercede crew

586

00:26:32,720 --> 00:26:30,060

back so we don't want to do is send a

587

00:26:34,610 --> 00:26:32,730

crew to Mars Phobos moving anywhere else

588

00:26:37,060 --> 00:26:34,620

and I'm just sitting around waiting to

589

00:26:40,820 --> 00:26:37,070

get Joe an answer for Mission Control

590

00:26:43,220 --> 00:26:40,830

hey just in case you were still unsure

591

00:26:44,750 --> 00:26:43,230

about how cool this place was I don't

592

00:26:46,220 --> 00:26:44,760

know if you noticed while Randy was

593

00:26:48,410 --> 00:26:46,230

talking look we had a feeding frenzy

594

00:26:52,600 --> 00:26:48,420

right outside the window I don't know if

595

00:27:00,680 --> 00:26:55,130

because you guys are the human aquarium

596

00:27:03,740 --> 00:27:00,690

now right okay um so Laura Austin on

597

00:27:06,680 --> 00:27:03,750

Google+ has a question for Jeremy and

598

00:27:08,870 --> 00:27:06,690

she wants to know how does Nemo 19

599

00:27:12,620 --> 00:27:08,880

mission relate to your role as an

600

00:27:14,750 --> 00:27:12,630

astronaut well there's so many different

601  
00:27:17,060 --> 00:27:14,760  
ways maybe I'll just talk about two

602  
00:27:18,530 --> 00:27:17,070  
quick ones but one thing that's really

603  
00:27:20,720 --> 00:27:18,540  
important you know I talk to school

604  
00:27:22,250 --> 00:27:20,730  
groups a lot and I mentioned this one of

605  
00:27:24,680 --> 00:27:22,260  
the most important aspects when you're

606  
00:27:26,480 --> 00:27:24,690  
you're picking astronauts to send it on

607  
00:27:29,240 --> 00:27:26,490  
mission to space a lot of raishin

608  
00:27:31,040 --> 00:27:29,250  
mission is is how they work together as

609  
00:27:33,260 --> 00:27:31,050  
a team their teamwork skills how they

610  
00:27:35,720 --> 00:27:33,270  
treat other people if you're a lot six

611  
00:27:37,580 --> 00:27:35,730  
people in a tin can for six months how

612  
00:27:39,920 --> 00:27:37,590  
they relate to one another how honest

613  
00:27:42,200 --> 00:27:39,930

they are with one another how much they

614

00:27:45,200 --> 00:27:42,210

look out for the rest of their teammates

615

00:27:47,210 --> 00:27:45,210

is really really important and so these

616

00:27:48,890 --> 00:27:47,220

experiences are really important for us

617

00:27:51,130 --> 00:27:48,900

to learn a little bit about ourselves so

618

00:27:52,990 --> 00:27:51,140

I'm off every one of the experience

619

00:27:54,700 --> 00:27:53,000

I learned a little bit about myself I'm

620

00:27:56,470 --> 00:27:54,710

not perfect and there's things I do and

621

00:27:58,360 --> 00:27:56,480

I notice uh you know that bothers him

622

00:28:00,580 --> 00:27:58,370

once in a while and I'm like yeah I

623

00:28:01,960 --> 00:28:00,590

could do a better job of that and so

624

00:28:03,940 --> 00:28:01,970

these experiences are worth while

625

00:28:06,550 --> 00:28:03,950

there's something else that I noticed on

626

00:28:09,940 --> 00:28:06,560

this mission that that I think is useful

627

00:28:12,310 --> 00:28:09,950

this is a completely new spaceship for

628

00:28:14,440 --> 00:28:12,320

us there's a querías habitat never been

629

00:28:15,940 --> 00:28:14,450

in it it's you can only you can't visit

630

00:28:17,980 --> 00:28:15,950

it or train on it before you come here

631

00:28:20,680 --> 00:28:17,990

you get here it's the first time you see

632

00:28:22,450 --> 00:28:20,690

it and as I was coming into this habitat

633

00:28:24,490 --> 00:28:22,460

and I was being interviewed and showing

634

00:28:26,230 --> 00:28:24,500

touch this do that don't touch this this

635

00:28:28,180 --> 00:28:26,240

is the emergency this and this divert

636

00:28:29,950 --> 00:28:28,190

and see that I was thinking well this is

637

00:28:31,960 --> 00:28:29,960

what it's going to be like for me when I

638

00:28:33,340 --> 00:28:31,970

get to a new spacecraft or I get to the

639

00:28:34,510 --> 00:28:33,350

International Space Station it's all

640

00:28:36,670 --> 00:28:34,520

going to be new it's all going to be

641

00:28:38,440 --> 00:28:36,680

weird and this is really cool

642

00:28:41,470 --> 00:28:38,450

experiencing today for example up in

643

00:28:44,230 --> 00:28:41,480

here 48 hours and it's been really wavy

644

00:28:46,810 --> 00:28:44,240

on the ocean up until today and kind of

645

00:28:48,580 --> 00:28:46,820

calmed down and today I noticed that the

646

00:28:50,590 --> 00:28:48,590

air was bubbling under the habitat at a

647

00:28:52,450 --> 00:28:50,600

very constant rate there's a little bit

648

00:28:55,120 --> 00:28:52,460

louder a little bit more constant so I

649

00:28:56,740 --> 00:28:55,130

came back inside and I went to mark and

650

00:28:58,330 --> 00:28:56,750

I asked him hey what's going on why is

651  
00:28:59,710 --> 00:28:58,340  
it like this and it all it sounds

652  
00:29:01,210 --> 00:28:59,720  
different to me today that I was

653  
00:29:02,920 --> 00:29:01,220  
yesterday and he said well it's

654  
00:29:04,690 --> 00:29:02,930  
completely normal it's just a different

655  
00:29:06,340 --> 00:29:04,700  
day it's not waiting and so these are

656  
00:29:08,260 --> 00:29:06,350  
the tips to think that an operational

657  
00:29:12,250 --> 00:29:08,270  
environment you're you're getting used

658  
00:29:16,090 --> 00:29:12,260  
to a new place it's awesome

659  
00:29:20,040 --> 00:29:16,100  
um okay well cut along the same lines as

660  
00:29:22,510 --> 00:29:20,050  
that rosie johnson from twitter asked a

661  
00:29:25,990 --> 00:29:22,520  
kind of a general question that a lot of

662  
00:29:28,780 --> 00:29:26,000  
people would like to know she's actually

663  
00:29:31,600 --> 00:29:28,790

a planetary science PhD student but she

664

00:29:34,510 --> 00:29:31,610

wants to be an astronaut so she wants to

665

00:29:36,970 --> 00:29:34,520

know what are the steps to becoming an

666

00:29:39,950 --> 00:29:36,980

astronaut

667

00:29:43,820 --> 00:29:39,960

well getting a PhD in planetary science

668

00:29:46,970 --> 00:29:43,830

is certainly a to start there seems to

669

00:29:49,820 --> 00:29:46,980

be four kind of general areas that most

670

00:29:53,450 --> 00:29:49,830

passed on top is ever background either

671

00:29:56,750 --> 00:29:53,460

you're a professional pilot either as a

672

00:30:00,050 --> 00:29:56,760

from the military or civilian world or

673

00:30:03,740 --> 00:30:00,060

you are an engineer or a scientist or a

674

00:30:05,570 --> 00:30:03,750

medical doctor those are the kind of

675

00:30:07,340 --> 00:30:05,580

general areas that you need to have as a

676

00:30:10,700 --> 00:30:07,350

background but a top of that there's a

677

00:30:12,590 --> 00:30:10,710

lot of other things to eat I think for

678

00:30:14,120 --> 00:30:12,600

me my opinion one of those important

679

00:30:16,250 --> 00:30:14,130

things needs to have some kind of

680

00:30:18,200 --> 00:30:16,260

operational experience and then that's

681

00:30:20,300 --> 00:30:18,210

why you know a lot of do come

682

00:30:22,460 --> 00:30:20,310

from a military background and that's

683

00:30:26,090 --> 00:30:22,470

because they have this this operational

684

00:30:27,830 --> 00:30:26,100

experience but I think if you don't come

685

00:30:29,960 --> 00:30:27,840

from the military if you're a scientist

686

00:30:32,420 --> 00:30:29,970

or engineer it's important to somehow go

687

00:30:36,410 --> 00:30:32,430

out and find some way of getting this

688

00:30:37,820 --> 00:30:36,420

operational experience it could be could

689

00:30:40,880 --> 00:30:37,830

be something as simple as backcountry

690

00:30:42,410 --> 00:30:40,890

camping mountain climbing volunteer

691

00:30:43,820 --> 00:30:42,420

firefighters there's so many different

692

00:30:46,550 --> 00:30:43,830

ways good you just need to find

693

00:30:49,100 --> 00:30:46,560

something you like to do that challenges

694

00:30:50,990 --> 00:30:49,110

you it's great to be academic and study

695

00:30:52,430 --> 00:30:51,000

but you have to get out there do some

696

00:30:54,440 --> 00:30:52,440

things that push your limits a little

697

00:30:56,480 --> 00:30:54,450

bit where you have to make some

698

00:30:57,650 --> 00:30:56,490

decisions that affect your life you're

699

00:31:00,110 --> 00:30:57,660

off whether you live or die

700

00:31:01,550 --> 00:31:00,120

those are great experiences to have and

701  
00:31:04,130 --> 00:31:01,560  
kind of one of the main things that you

702  
00:31:05,780 --> 00:31:04,140  
look I really look for whether it's ISA

703  
00:31:09,410 --> 00:31:05,790  
or candor in the world is well-rounded

704  
00:31:10,730 --> 00:31:09,420  
people you can't be all you've ever

705  
00:31:11,930 --> 00:31:10,740  
wanted to do is just go into space and

706  
00:31:12,740 --> 00:31:11,940  
you have nothing else in your life

707  
00:31:14,540 --> 00:31:12,750  
outside of that

708  
00:31:16,940 --> 00:31:14,550  
you know the view we've got professional

709  
00:31:19,700 --> 00:31:16,950  
costume musician ridiculous you know

710  
00:31:21,530 --> 00:31:19,710  
climb Mount Everest we've got you know

711  
00:31:25,010 --> 00:31:21,540  
medical doctor people you know one of

712  
00:31:27,440 --> 00:31:25,020  
the guys I flew it and then a PhD from

713  
00:31:29,420 --> 00:31:27,450

MIT and he became them with a harder to

714

00:31:31,670 --> 00:31:29,430

get a medical doctor give it oncologist

715

00:31:33,890 --> 00:31:31,680

so just wide variety of interests

716

00:31:35,180 --> 00:31:33,900

intelligent people took that educational

717

00:31:36,860 --> 00:31:35,190

experience they had and put it to

718

00:31:39,760 --> 00:31:36,870

practice and that's really what the

719

00:31:42,350 --> 00:31:39,770

other talk about we call it operation

720

00:31:45,080 --> 00:31:42,360

certainly you know the last astronaut

721

00:31:48,800 --> 00:31:45,090

class they had a selection a 2013 a year

722

00:31:50,090 --> 00:31:48,810

ago in the US or some 60 700 or so

723

00:31:52,940 --> 00:31:50,100

thousand applicants

724

00:31:55,700 --> 00:31:52,950

or which they took eight people and so

725

00:31:57,980 --> 00:31:55,710

really a lot of people that want to be

726

00:31:59,630 --> 00:31:57,990

part of the space program they're not

727

00:32:01,760 --> 00:31:59,640

trying to be a spark just apply in space

728

00:32:03,320 --> 00:32:01,770

because you realize that if you're going

729

00:32:05,270 --> 00:32:03,330

to astronaut here with your time part of

730

00:32:07,130 --> 00:32:05,280

space is about this much you're kind of

731

00:32:08,360 --> 00:32:07,140

an astronaut that we want to give up be

732

00:32:10,790 --> 00:32:08,370

part of the space program just like the

733

00:32:13,220 --> 00:32:10,800

other you know in the u.s. 80,000 people

734

00:32:15,170 --> 00:32:13,230

are that either can build a hardware

735

00:32:17,330 --> 00:32:15,180

write the software to build a space

736

00:32:18,830 --> 00:32:17,340

ships fuel-efficient whatever you can

737

00:32:21,290 --> 00:32:18,840

think of every single one of those

738

00:32:23,150 --> 00:32:21,300

people has to do their job the ask

739

00:32:24,710 --> 00:32:23,160

Transco do their job at the very end

740

00:32:27,470 --> 00:32:24,720

that they feel part where it's actually

741

00:32:29,720 --> 00:32:27,480

in space so you know whether or not you

742

00:32:32,210 --> 00:32:29,730

come an astronaut or not we still need

743

00:32:33,560 --> 00:32:32,220

really smart dedicated you know people

744

00:32:35,240 --> 00:32:33,570

they want to be part of our space

745

00:32:38,150 --> 00:32:35,250

programs need every single one of them

746

00:32:40,820 --> 00:32:38,160

can make it all work it may be a

747

00:32:42,980 --> 00:32:40,830

relevant comment from sister down here

748

00:32:45,320 --> 00:32:42,990

and they encourage habitat and other

749

00:32:48,800 --> 00:32:45,330

important thing is who would five other

750

00:32:52,270 --> 00:32:48,810

people put up with living with me for a

751

00:32:56,990 --> 00:32:52,280

week under the water or in space fish

752

00:33:01,250 --> 00:32:57,000

yeah was a I'm still hard about people

753

00:33:03,440 --> 00:33:01,260

off the island don't worry about that

754

00:33:05,950 --> 00:33:03,450

yeah I'm waiting for you guys to come

755

00:33:09,410 --> 00:33:05,960

out with your buffs and your torches um

756

00:33:11,810 --> 00:33:09,420

well so can you tell us a little bit

757

00:33:13,480 --> 00:33:11,820

about the two other crew members that

758

00:33:16,460 --> 00:33:13,490

aren't on camera right now because

759

00:33:23,140 --> 00:33:16,470

they're very important and I would like

760

00:33:29,150 --> 00:33:25,700

hello English hey guys

761

00:33:34,010 --> 00:33:29,160

the gentleman was the hat is honor down

762

00:33:35,330 --> 00:33:34,020

here since Nemo was conceived and I

763

00:33:37,540 --> 00:33:35,340

think there's some of these giant

764

00:33:41,180 --> 00:33:37,550

groupers that are about as old as kid

765

00:33:43,970 --> 00:33:41,190

but he knows everything about you around

766

00:33:47,930 --> 00:33:43,980

here that was am i right never like 210

767

00:33:50,180 --> 00:33:47,940

days you spent out 211th today i

768

00:33:53,360 --> 00:33:50,190

accumulated time living in the habitat

769

00:33:55,070 --> 00:33:53,370

and I did participate in Nemo one all

770

00:33:57,290 --> 00:33:55,080

those many years ago and a few other

771

00:33:59,990 --> 00:33:57,300

NEEMO missions between I think this made

772

00:34:01,610 --> 00:34:00,000

me my fourth or third or fourth NEEMO

773

00:34:05,720 --> 00:34:01,620

mission and I was hot people want house

774

00:34:07,490 --> 00:34:05,730

to operate right it's true pleasure we

775

00:34:09,680 --> 00:34:07,500

got our other expert Ryan here who's

776

00:34:13,340 --> 00:34:09,690

about to become a lead app technician

777

00:34:15,350 --> 00:34:13,350

for fairness as well he's out there

778

00:34:17,840 --> 00:34:15,360

running around doing the fair leaning

779

00:34:19,100 --> 00:34:17,850

for Alliance today use nothing look you

780

00:34:20,870 --> 00:34:19,110

know the whole time we were out there

781

00:34:22,159 --> 00:34:20,880

and then some make sure everything was

782

00:34:24,020 --> 00:34:22,169

cleaned up at our proper configuration

783

00:34:26,240 --> 00:34:24,030

so we could do our simulations on the

784

00:34:29,240 --> 00:34:26,250

spacewalk but if you like that say right

785

00:34:31,940 --> 00:34:29,250

um I've been with the program for about

786

00:34:35,900 --> 00:34:31,950

eight years I started here as an intern

787

00:34:39,950 --> 00:34:35,910

for evo 11 also an intern for Nemo 12

788

00:34:42,320 --> 00:34:39,960

and I've been here ever since this will

789

00:34:46,940 --> 00:34:42,330

be I'm coming up on around ninety days

790

00:34:50,030 --> 00:34:46,950

total inside Aquarius um and this is my

791

00:34:56,300 --> 00:34:50,040

eighth mission your first name Oh inside

792

00:34:57,650 --> 00:34:56,310

first NEEMO mission inside I didn't

793

00:34:59,570 --> 00:34:57,660

realize it was your first one inside

794

00:35:01,880 --> 00:34:59,580

that's great

795

00:35:04,880 --> 00:35:01,890

I was lucky enough to meet Ryan my first

796

00:35:06,650 --> 00:35:04,890

NEEMO mission which was 15 and he was

797

00:35:08,810 --> 00:35:06,660

the very first person I did an on-camera

798

00:35:11,210 --> 00:35:08,820

interview with I always have to say that

799

00:35:13,550 --> 00:35:11,220

one because uh it was very

800

00:35:15,800 --> 00:35:13,560

nerve-wracking since I have you guys

801  
00:35:20,780 --> 00:35:15,810  
here we have a question from someone on

802  
00:35:21,650 --> 00:35:20,790  
Google+ name Gok tube and you're gonna

803  
00:35:23,300 --> 00:35:21,660  
love it

804  
00:35:26,090 --> 00:35:23,310  
he wants to know how hard it is for

805  
00:35:28,850 --> 00:35:26,100  
individuals with resources to construct

806  
00:35:29,660 --> 00:35:28,860  
their own Do It Yourself Aquarius

807  
00:35:34,080 --> 00:35:29,670  
habitat

808  
00:35:36,480 --> 00:35:34,090  
oh it's harder than you may think

809  
00:35:38,940 --> 00:35:36,490  
and it's very expensive but essentially

810  
00:35:41,070 --> 00:35:38,950  
this is just a big recompression chamber

811  
00:35:43,230 --> 00:35:41,080  
and like you said earlier it's about the

812  
00:35:45,900 --> 00:35:43,240  
size of a yellow school bus but it's a

813  
00:35:48,330 --> 00:35:45,910

steel cylinder that has to be rated a

814

00:35:51,360 --> 00:35:48,340

certain high pressures and then having a

815

00:35:54,630 --> 00:35:51,370

most difficult parts of it is penetrator

816

00:35:57,300 --> 00:35:54,640

to penetrate through the hole and bring

817

00:36:00,030 --> 00:35:57,310

electrical systems in and ver plumbing

818

00:36:01,920 --> 00:36:00,040

things like that if you culture or make

819

00:36:05,730 --> 00:36:01,930

man-made holes through the pressure

820

00:36:08,130 --> 00:36:05,740

shell that's a source of leaks so it has

821

00:36:10,170 --> 00:36:08,140

to be perfectly engineered so you can't

822

00:36:12,570 --> 00:36:10,180

have leaks around that so the wiring it

823

00:36:14,460 --> 00:36:12,580

comes in through here it's a big money

824

00:36:16,290 --> 00:36:14,470

business out there in the oceanographic

825

00:36:18,780 --> 00:36:16,300

world for making these kind of

826  
00:36:21,840 --> 00:36:18,790  
penetrators that's another big cost and

827  
00:36:23,820 --> 00:36:21,850  
just the infrastructure itself inside is

828  
00:36:25,220 --> 00:36:23,830  
pretty expensive but there are believe

829  
00:36:27,300 --> 00:36:25,230  
it or not there's a couple of

830  
00:36:29,880 --> 00:36:27,310  
do-it-yourselfers out there that do

831  
00:36:31,350 --> 00:36:29,890  
shallow water habitats without main

832  
00:36:33,480 --> 00:36:31,360  
there's one in the Chesapeake Bay I've

833  
00:36:36,810 --> 00:36:33,490  
read about a couple of these but the

834  
00:36:38,520 --> 00:36:36,820  
more really shallow water underwater

835  
00:36:41,040 --> 00:36:38,530  
halfpence so good luck with it but be

836  
00:36:42,750 --> 00:36:41,050  
very very careful because the ocean or

837  
00:36:46,320 --> 00:36:42,760  
lakes and water can be very unforgiving

838  
00:36:48,510 --> 00:36:46,330

if it's done improperly a great question

839

00:36:50,130 --> 00:36:48,520

it might be better to rent this one and

840

00:36:52,770 --> 00:36:50,140

rent these guys they know what they're

841

00:36:55,470 --> 00:36:52,780

doing you know we're talking about

842

00:36:57,480 --> 00:36:55,480

emergency plans earlier and these guys

843

00:36:59,280 --> 00:36:57,490

are the emergency plan if anything

844

00:37:00,750 --> 00:36:59,290

really goes wrong down here the other

845

00:37:02,520 --> 00:37:00,760

four of us it is going to be big eyes

846

00:37:03,480 --> 00:37:02,530

looking at them and wait for them to

847

00:37:06,480 --> 00:37:03,490

tell us what to do

848

00:37:08,550 --> 00:37:06,490

so we don't mess it up well you know now

849

00:37:13,710 --> 00:37:08,560

the next question has to be what do you

850

00:37:16,410 --> 00:37:13,720

do during an emergency well it depends

851  
00:37:18,030 --> 00:37:16,420  
on the emergency and the type of real

852  
00:37:20,490 --> 00:37:18,040  
emergencies we can have here the most

853  
00:37:22,620 --> 00:37:20,500  
dangerous ones are flooding and in a

854  
00:37:24,720 --> 00:37:22,630  
more particularly expire or if we can

855  
00:37:26,520 --> 00:37:24,730  
leave the contaminated air our air

856  
00:37:29,370 --> 00:37:26,530  
supply that we're breathing right now

857  
00:37:32,400 --> 00:37:29,380  
gets contaminated with carbon dioxide or

858  
00:37:35,400 --> 00:37:32,410  
co2 carbon dioxide that can be a real

859  
00:37:37,290 --> 00:37:35,410  
problem but a fire itself that can cause

860  
00:37:38,850 --> 00:37:37,300  
electrical fires in your house we just

861  
00:37:40,950 --> 00:37:38,860  
can't run out the door and if there is

862  
00:37:42,960 --> 00:37:40,960  
any kind of fire it's going to give off

863  
00:37:45,600 --> 00:37:42,970

those fumes and anything we breathe in

864

00:37:47,280 --> 00:37:45,610

here it's to nap I was more toxic that

865

00:37:47,820 --> 00:37:47,290

it would be at the surface so graphic

866

00:37:50,220 --> 00:37:47,830

and having a

867

00:37:52,290 --> 00:37:50,230

Erez run demonstrating we have these

868

00:37:54,210 --> 00:37:52,300

emergency breathing masks that we would

869

00:37:55,530 --> 00:37:54,220

go on that has its separate source of

870

00:37:58,200 --> 00:37:55,540

air than what we are breathing right now

871

00:38:00,000 --> 00:37:58,210

so the biggest issues are that and we

872

00:38:02,160 --> 00:38:00,010

train for it when the first day that

873

00:38:03,330 --> 00:38:02,170

these jets again we have a session where

874

00:38:05,430 --> 00:38:03,340

we talked about the different training

875

00:38:08,040 --> 00:38:05,440

they don't do the steps that right I

876

00:38:10,200 --> 00:38:08,050

will do but they know that there there's

877

00:38:12,750 --> 00:38:10,210

someone aware the steps especially the

878

00:38:15,720 --> 00:38:12,760

evacuation process to get on out of here

879

00:38:17,790 --> 00:38:15,730

if we have to have a safe haven outside

880

00:38:20,790 --> 00:38:17,800

of the habitat we can go through the

881

00:38:22,020 --> 00:38:20,800

fire and flooding are the people biggest

882

00:38:23,640 --> 00:38:22,030

issues but we know how to deal with

883

00:38:26,300 --> 00:38:23,650

these are one of those and we have an

884

00:38:30,390 --> 00:38:26,310

escape plan if we needed to we could

885

00:38:33,990 --> 00:38:30,400

solve the problem ourselves others

886

00:38:36,840 --> 00:38:34,000

dangers uh well not specifically inside

887

00:38:40,350 --> 00:38:36,850

the hammock fit but while the diversity

888

00:38:43,050 --> 00:38:40,360

operates are out on the reef um we have

889

00:38:46,740 --> 00:38:43,060

a standby diver at the ready at all

890

00:38:48,660 --> 00:38:46,750

times during their EPA's on that way if

891

00:38:51,450 --> 00:38:48,670

any of it makes pretty any trouble like

892

00:38:54,270 --> 00:38:51,460

they they get trapped outside um they

893

00:38:57,990 --> 00:38:54,280

have a loss of air or some other danger

894

00:38:59,490 --> 00:38:58,000

marine life happens to keep them from

895

00:39:02,070 --> 00:38:59,500

being able to make their way safely back

896

00:39:07,290 --> 00:39:02,080

into the habitat then we will be able to

897

00:39:09,300 --> 00:39:07,300

go out there in a system that's uh if

898

00:39:14,040 --> 00:39:09,310

they hit the button that summons

899

00:39:15,390 --> 00:39:14,050

Godzilla right okay well since we're

900

00:39:20,270 --> 00:39:15,400

talking about being outside of the

901  
00:39:25,290 --> 00:39:20,280  
habitat and we've got a question from

902  
00:39:29,730 --> 00:39:25,300  
lost in space on Twitter and they want

903  
00:39:33,810 --> 00:39:29,740  
to know do you simulate simulate space

904  
00:39:35,250 --> 00:39:33,820  
walks on the Nemo 19 mission and maybe

905  
00:39:38,280 --> 00:39:35,260  
you want to tell them a little bit about

906  
00:39:40,440 --> 00:39:38,290  
the ABA tools that you guys are testing

907  
00:39:45,240 --> 00:39:40,450  
out there

908  
00:39:45,770 --> 00:39:45,250  
oh thanks guys thanks sorry wow thank

909  
00:39:48,630 --> 00:39:45,780  
you

910  
00:39:50,550 --> 00:39:48,640  
yes we have been simulating spacewalks

911  
00:39:53,010 --> 00:39:50,560  
in fact every day we have a spacewalk

912  
00:39:54,660 --> 00:39:53,020  
simulation or two that we do and

913  
00:39:56,550 --> 00:39:54,670

specifically we're looking at two

914

00:39:58,380 --> 00:39:56,560

different things during this mission one

915

00:40:00,990 --> 00:39:58,390

we want to understand how we're going to

916

00:40:03,270 --> 00:40:01,000

take a core sample on another planetary

917

00:40:05,310 --> 00:40:03,280

body so let's say we do get to an

918

00:40:07,470 --> 00:40:05,320

asteroid how are we going to dig down

919

00:40:10,260 --> 00:40:07,480

one meter to the surface with some sort

920

00:40:11,670 --> 00:40:10,270

of surface drill and pull out a core so

921

00:40:13,290 --> 00:40:11,680

we can really find out what the

922

00:40:16,110 --> 00:40:13,300

asteroids made of we would apply this

923

00:40:18,420 --> 00:40:16,120

same the same technology on Mars on the

924

00:40:19,980 --> 00:40:18,430

moon for example so we actually have

925

00:40:22,050 --> 00:40:19,990

this amazing throw that they put

926  
00:40:24,000 --> 00:40:22,060  
together this underwater drill then

927  
00:40:26,310 --> 00:40:24,010  
we're using to simulate that process and

928  
00:40:27,630 --> 00:40:26,320  
we're doing testing on okay are we able

929  
00:40:29,760 --> 00:40:27,640  
to do this in a weightless environment

930  
00:40:32,610 --> 00:40:29,770  
are we able to do this in a one-thirty

931  
00:40:34,500 --> 00:40:32,620  
environment like we would have on Mars

932  
00:40:35,820 --> 00:40:34,510  
and so we're doing that on these

933  
00:40:39,240 --> 00:40:35,830  
spacewalks the other thing we're doing

934  
00:40:42,090 --> 00:40:39,250  
is in alignment with the company that

935  
00:40:43,770 --> 00:40:42,100  
Conrad was talking about is as we go out

936  
00:40:46,290 --> 00:40:43,780  
on these traverses we're exploring

937  
00:40:46,830 --> 00:40:46,300  
imagine we're on Mars and we go for a

938  
00:40:51,030 --> 00:40:46,840

walk

939

00:40:53,100 --> 00:40:51,040

this place before we're getting all this

940

00:40:56,790 --> 00:40:53,110

footage back here on earth after a

941

00:40:57,990 --> 00:40:56,800

10-minute delay in travel and all of the

942

00:40:59,700 --> 00:40:58,000

scientists on the ground saying whoa

943

00:41:01,290 --> 00:40:59,710

whoa we need to know about that or he

944

00:41:03,540 --> 00:41:01,300

left that behind or we got to go back

945

00:41:06,360 --> 00:41:03,550

and so we're going on these traverses

946

00:41:08,130 --> 00:41:06,370

and in Mission Control here during their

947

00:41:10,650 --> 00:41:08,140

seeing the pictures 10 minutes after we

948

00:41:12,240 --> 00:41:10,660

go by them and so we're practicing all

949

00:41:15,420 --> 00:41:12,250

of these techniques about how we handle

950

00:41:16,950 --> 00:41:15,430

that and so we have any comp system down

951  
00:41:19,110 --> 00:41:16,960  
here where normally we would just talk

952  
00:41:21,390 --> 00:41:19,120  
and someone gives us the answer imagine

953  
00:41:23,220 --> 00:41:21,400  
if we missed it and we were like say

954  
00:41:24,870 --> 00:41:23,230  
again it would take another 10 minutes

955  
00:41:26,910 --> 00:41:24,880  
for the information you got to Soeey

956  
00:41:29,130 --> 00:41:26,920  
we kind of have a voicemail instead of

957  
00:41:30,720 --> 00:41:29,140  
regular radio communication we get these

958  
00:41:32,520 --> 00:41:30,730  
voicemails that we can play over and

959  
00:41:35,820 --> 00:41:32,530  
over again if we need to we use text

960  
00:41:37,020 --> 00:41:35,830  
that we can read as required so that's

961  
00:41:38,820 --> 00:41:37,030  
what we're doing on these spacewalks

962  
00:41:41,340 --> 00:41:38,830  
it's kind of fun and for us

963  
00:41:43,680 --> 00:41:41,350

they really are spacewalks this form you

964

00:41:45,600 --> 00:41:43,690

know just like in space we get up to

965

00:41:46,920 --> 00:41:45,610

people go out we suit them up we put

966

00:41:48,630 --> 00:41:46,930

them they get on their wetsuits put

967

00:41:51,210 --> 00:41:48,640

these big bulky helmets on and we make

968

00:41:52,860 --> 00:41:51,220

sure we do all the pressure checks on

969

00:41:54,360 --> 00:41:52,870

the make sure they're working and then

970

00:41:56,640 --> 00:41:54,370

we put them out the door they go on us

971

00:41:59,790 --> 00:41:56,650

walk so really cool simulation for us

972

00:42:01,920 --> 00:41:59,800

and it could be quite a complex task

973

00:42:03,540 --> 00:42:01,930

because the I mean program today did it

974

00:42:05,010 --> 00:42:03,550

all all four of us two of us were

975

00:42:07,500 --> 00:42:05,020

outside on a spacewalk

976

00:42:09,450 --> 00:42:07,510

Jeremy was a constant radio

977

00:42:12,060 --> 00:42:09,460

communication from inside going through

978

00:42:15,780 --> 00:42:12,070

the procedure is helping us out and ma

979

00:42:18,230 --> 00:42:15,790

was flying this underwater robot cameras

980

00:42:20,790 --> 00:42:18,240

that was helping to kind of get the

981

00:42:22,950 --> 00:42:20,800

situational awareness of what was going

982

00:42:25,170 --> 00:42:22,960

on outside so it was a complex process

983

00:42:27,780 --> 00:42:25,180

that involved all four of us today and

984

00:42:29,760 --> 00:42:27,790

you know he makes the calculate know

985

00:42:32,460 --> 00:42:29,770

that it isn't just Mission Control

986

00:42:33,960 --> 00:42:32,470

delaying stuff to us it's delayed to

987

00:42:35,430 --> 00:42:33,970

them as well and everybody's in this

988

00:42:37,710 --> 00:42:35,440

play of this problems we need to figure

989

00:42:44,390 --> 00:42:37,720

out how to operate as a team comically

990

00:42:50,910 --> 00:42:47,400

okay great I keep having to find the

991

00:42:52,320 --> 00:42:50,920

mute button um so since we're talking

992

00:42:58,140 --> 00:42:52,330

about all the hard work that you guys

993

00:43:00,480 --> 00:42:58,150

are doing Jamie from Twitter asked what

994

00:43:02,520 --> 00:43:00,490

do you guys do for exercise in the

995

00:43:04,470 --> 00:43:02,530

undersea habitat and I'm kind of

996

00:43:06,450 --> 00:43:04,480

wondering is what you just talked about

997

00:43:07,440 --> 00:43:06,460

for our EBA sounds like a lot of

998

00:43:09,870 --> 00:43:07,450

exercise to me

999

00:43:12,910 --> 00:43:09,880

so give any extra exercise that you guys

1000

00:43:19,440 --> 00:43:14,740

though we don't do anything else I mean

1001

00:43:23,560 --> 00:43:19,450

it's already my row it's like a lollipop

1002

00:43:25,810 --> 00:43:23,570

well I'm going smaller and you can be

1003

00:43:29,520 --> 00:43:25,820

more painful because we're equals what I

1004

00:43:33,990 --> 00:43:29,530

type and also we have a call like hey

1005

00:43:37,060 --> 00:43:34,000

let's get up I mean with that you know

1006

00:43:37,570 --> 00:43:37,070

cook stick and get ready for the next

1007

00:43:42,010 --> 00:43:37,580

day

1008

00:43:45,730 --> 00:43:42,020

oh I think with honor that the water

1009

00:43:47,440 --> 00:43:45,740

aerobics today yeah so honor like it

1010

00:43:49,300 --> 00:43:47,450

likes to do water aerobics in our web

1011

00:43:51,280 --> 00:43:49,310

port which is where we go in and out of

1012

00:43:52,900 --> 00:43:51,290

the water works I'm signing a little

1013

00:43:54,610 --> 00:43:52,910

more than these guys we don't get out in

1014

00:43:57,730 --> 00:43:54,620

the water as much so we do have exercise

1015

00:44:01,000 --> 00:43:57,740

fans and Ryan's a big push up chin up

1016

00:44:02,770 --> 00:44:01,010

guy body exercise so we do our subway

1017

00:44:06,790 --> 00:44:02,780

guys do a little bit know the techs do

1018

00:44:09,430 --> 00:44:06,800

cuz we're inside a little more that's

1019

00:44:12,880 --> 00:44:09,440

great ok I didn't know you did that part

1020

00:44:15,010 --> 00:44:12,890

- um I think last year they won of the

1021

00:44:18,010 --> 00:44:15,020

just-in-time training type of things

1022

00:44:19,780 --> 00:44:18,020

they did involved building and some

1023

00:44:22,090 --> 00:44:19,790

exercise equipment so they actually had

1024

00:44:25,120 --> 00:44:22,100

to exercise while they were while they

1025

00:44:26,980 --> 00:44:25,130

were down there um we've also got

1026

00:44:29,500 --> 00:44:26,990

another question from Carmen Austin that

1027

00:44:35,210 --> 00:44:29,510

wanted to know that if it was up to you

1028

00:44:46,040 --> 00:44:43,070

logger I want to save lettuce yeah yeah

1029

00:44:50,010 --> 00:44:46,050

till water oats us off the island

1030

00:44:52,290 --> 00:44:50,020

Oh Ryan and I just did the gusto mission

1031

00:44:54,960 --> 00:44:52,300

we were down here for 31 days we came

1032

00:44:56,190 --> 00:44:54,970

out of the 32nd day although it wasn't a

1033

00:44:59,430 --> 00:44:56,200

problem for either one of us but I think

1034

00:45:03,360 --> 00:44:59,440

we both agreed by the 32nd day we were

1035

00:45:09,390 --> 00:45:03,370

ready to come out I bet there was quite

1036

00:45:14,240 --> 00:45:09,400

a lot that you missed like the Sun lay a

1037

00:45:18,380 --> 00:45:14,250

dog almond family first of course yeah

1038

00:45:20,580 --> 00:45:18,390

yeah yeah this poor guy that spacecraft

1039

00:45:21,660 --> 00:45:20,590

are sweet to think about it because

1040

00:45:25,170 --> 00:45:21,670

probably a once in a lifetime

1041

00:45:28,800 --> 00:45:25,180

opportunity to be down here and that's

1042

00:45:30,330 --> 00:45:28,810

your LS your Andy yeah as I'm just gonna

1043

00:45:31,770 --> 00:45:30,340

feel it the first time they get you do

1044

00:45:36,270 --> 00:45:31,780

it again yeah

1045

00:45:38,130 --> 00:45:36,280

these are veteran Aquanaut Oh time so we

1046

00:45:38,790 --> 00:45:38,140

think he might pass aside it's still

1047

00:45:41,670 --> 00:45:38,800

touch and go

1048

00:45:44,010 --> 00:45:41,680

we're not here I mean there's definitely

1049

00:45:47,400 --> 00:45:44,020

always that driving it home and see

1050

00:45:48,510 --> 00:45:47,410

family and so it'll be fun to leave but

1051  
00:45:49,770 --> 00:45:48,520  
it'll be a little bit hard to leave

1052  
00:45:51,420 --> 00:45:49,780  
knowing you're probably not going to get

1053  
00:45:55,950 --> 00:45:51,430  
to come back and and live down here

1054  
00:45:56,850 --> 00:45:55,960  
again it's true so we have one time for

1055  
00:46:01,760 --> 00:45:56,860  
one more question

1056  
00:46:04,770 --> 00:46:01,770  
and this one comes from Ozzie on Google+

1057  
00:46:06,900 --> 00:46:04,780  
and he asks besides the tea dress linked

1058  
00:46:09,720 --> 00:46:06,910  
to the internet the space station has

1059  
00:46:11,640 --> 00:46:09,730  
ham radio on board for off hours hobby

1060  
00:46:13,140 --> 00:46:11,650  
use and to communicate with

1061  
00:46:15,840 --> 00:46:13,150  
schoolchildren on the ground

1062  
00:46:19,200 --> 00:46:15,850  
is there a ham radio available on board

1063  
00:46:22,530 --> 00:46:19,210

FEMA there is not a ham radio on board

1064

00:46:26,480 --> 00:46:22,540

and ship fish you know it's up to a ship

1065

00:46:28,980 --> 00:46:26,490

of ehm we have internet capability of

1066

00:46:31,550 --> 00:46:28,990

the Internet Protocol phone with a

1067

00:46:34,290 --> 00:46:31,560

direct we supply the most voice over IP

1068

00:46:36,150 --> 00:46:34,300

so the really good connectivity down

1069

00:46:37,380 --> 00:46:36,160

here such as the hammer you know of

1070

00:46:39,330 --> 00:46:37,390

course she's not one of those things

1071

00:46:41,430 --> 00:46:39,340

we've been I don't know how get one of

1072

00:46:42,930 --> 00:46:41,440

those big huge towers on top of the the

1073

00:46:45,720 --> 00:46:42,940

support we would really work out

1074

00:46:47,220 --> 00:46:45,730

finishing high C so it's not that you

1075

00:46:52,650 --> 00:46:47,230

know it would work out so well

1076  
00:46:56,370 --> 00:46:52,660  
and skypeing yay get to Skype with family

1077  
00:46:58,980 --> 00:46:56,380  
maybe um okay well we're sorry that we

1078  
00:47:01,050 --> 00:46:58,990  
didn't get to everyone's questions but

1079  
00:47:04,050 --> 00:47:01,060  
we're hopeful that we'll get to answer

1080  
00:47:06,810 --> 00:47:04,060  
them through the social media outlets if

1081  
00:47:10,140 --> 00:47:06,820  
we didn't get to them this concludes our

1082  
00:47:12,990 --> 00:47:10,150  
first-ever Nemo Google hangout thank you

1083  
00:47:15,810 --> 00:47:13,000  
guys for doing it it was great um it's

1084  
00:47:17,849 --> 00:47:15,820  
my first hangout as well um thank you

1085  
00:47:20,670 --> 00:47:17,859  
everyone for joining us and following

1086  
00:47:22,349 --> 00:47:20,680  
the mission and please continue and keep

1087  
00:47:26,099 --> 00:47:22,359  
sending the questions we'll get to you

1088  
00:47:30,540 --> 00:47:26,109

and for more information about go to

1089

00:47:33,480 --> 00:47:30,550

NASA govt slash mission underscore pages

1090

00:47:37,589 --> 00:47:33,490

slash Nemo you can get to all of our

1091

00:47:40,260 --> 00:47:37,599

social media sites from there or just

1092

00:47:43,710 --> 00:47:40,270

follow us on Twitter that's a really

1093

00:47:45,050 --> 00:47:43,720

great way to keep in touch um and we