



1
00:00:00,506 --> 00:00:23,656
[Silence]

2
00:00:24,156 --> 00:00:25,926
>> While NASA flies the
International Space Station some

3
00:00:25,926 --> 00:00:27,156
240 miles above earth,

4
00:00:27,156 --> 00:00:28,706
it is also operating a mission
63 feet below the surface

5
00:00:28,706 --> 00:00:29,216
of the Atlantic Ocean.

6
00:00:29,216 --> 00:00:31,356
NEMO is the NASA Extreme
Environment Missions Operations

7
00:00:31,356 --> 00:00:32,556
Program, and it has
its 16th crew

8
00:00:32,556 --> 00:00:34,206
on board the Aquarius
Research Habitat off the coast

9
00:00:34,206 --> 00:00:34,926
of Key Largo, Florida right now.

10
00:00:34,926 --> 00:00:36,826
This time they're simulating a
visit to an asteroid building

11
00:00:36,826 --> 00:00:38,586
on lessons learned from
NEMO 15 to test solutions

12

00:00:38,586 --> 00:00:40,096
to the engineering
challenges that'll be faced

13

00:00:40,096 --> 00:00:40,686
on such a mission.

14

00:00:40,686 --> 00:00:43,696
One member of NEMO 15 is also
on NEMO 16, and he's with us now

15

00:00:43,696 --> 00:00:44,786
to provide an update
on the mission.

16

00:00:44,786 --> 00:00:45,956
[Background noise] Dr.
Steve Squires in a professor

17

00:00:45,956 --> 00:00:46,916
of Astronomy at Cornell
University,

18

00:00:46,916 --> 00:00:48,106
is Chairman of the
NASA Advisory Council

19

00:00:48,106 --> 00:00:49,506
and is also principal
investigator

20

00:00:49,756 --> 00:00:52,736
for the Science Payloads on
the Mars exploration rovers.

21

00:00:53,446 --> 00:00:57,166
Steve, since we can see you,
would you explain where you are

22

00:00:57,166 --> 00:00:59,856

in the habitat and tell
us how much space there is

23

00:00:59,856 --> 00:01:01,266

to accommodate you
and your crewmates.

24

00:01:02,646 --> 00:01:03,706

>> [Background noise]

Sure, I'd be glad to.

25

00:01:03,706 --> 00:01:06,186

Right now I'm in what
we call the main loft.

26

00:01:06,246 --> 00:01:10,366

This is kind of our
primary area for any kind

27

00:01:10,366 --> 00:01:13,416

of group activities, eating,

28

00:01:13,646 --> 00:01:16,586

food preparation,
that sort of stuff.

29

00:01:16,586 --> 00:01:19,606

This is where we have our daily
briefing and that kind of thing.

30

00:01:19,606 --> 00:01:21,976

Aquarius is a pretty cozy place.

31

00:01:22,056 --> 00:01:23,526

It's roughly the size

32

00:01:23,586 --> 00:01:26,686

of a school bus maybe even

a little smaller than that.

33

00:01:27,176 --> 00:01:28,556

Six people in here
for two weeks,

34

00:01:28,556 --> 00:01:29,746

we get to know each
other pretty well.

35

00:01:30,336 --> 00:01:33,056

So it's a small volume, but it's
certainly more than adequate

36

00:01:33,056 --> 00:01:33,896

for what we're doing down here.

37

00:01:34,496 --> 00:01:36,296

>> I mentioned that
this visit is intended

38

00:01:36,296 --> 00:01:38,436

to simulate a visit
to an asteroid.

39

00:01:38,986 --> 00:01:42,176

For starters, is -- is
the size of the habitat

40

00:01:42,236 --> 00:01:44,516

and the isolation
important to that simulation?

41

00:01:45,036 --> 00:01:47,376

>> Yeah, [background noise]
I think it is important

42

00:01:47,376 --> 00:01:48,406

to that simulation.

43

00:01:48,406 --> 00:01:50,546

When a crew goes to an asteroid,

44

00:01:50,546 --> 00:01:53,516

it's going to be
a small vehicle.

45

00:01:53,516 --> 00:01:55,296

They're going to be
in tight quarters,

46

00:01:55,296 --> 00:01:58,586

maybe even tighter than,
what we're in here.

47

00:01:58,586 --> 00:02:00,286

Yeah, the isolation
is a big part of it.

48

00:02:00,286 --> 00:02:04,316

We're doing most of this mission
with a 50-second time delay

49

00:02:04,496 --> 00:02:07,426

between us and mission control.

50

00:02:07,426 --> 00:02:09,786

When a crew goes to an asteroid,
they're going to be so far

51

00:02:09,786 --> 00:02:12,276

from earth that it
might take 10, 20, 50,

52

00:02:12,326 --> 00:02:15,816

60 seconds for a radio signal
traveling at the speed of light

53

00:02:16,006 --> 00:02:18,516

to get to that asteroid
and to that crew

54

00:02:18,516 --> 00:02:20,496

and then a comparable
time to get back.

55

00:02:20,946 --> 00:02:24,076

And so we're simulating that and
that does provide a real sense

56

00:02:24,076 --> 00:02:27,376

of isolation while
we're down here.

57

00:02:27,636 --> 00:02:29,896

>> That -- that the
communications delay is one

58

00:02:29,896 --> 00:02:32,996

of the primary things that
you folks are looking at here.

59

00:02:33,426 --> 00:02:36,776

Is a 50 -- 5-0 second
communications delay,

60

00:02:36,776 --> 00:02:38,236

is that what you've been
working on throughout?

61

00:02:40,186 --> 00:02:41,696

>> Yeah, we've been
using 50 seconds

62

00:02:41,696 --> 00:02:43,106

for almost all the mission.

63

00:02:43,106 --> 00:02:47,226

We had one day where we were

doing some emergency scenarios

64

00:02:47,226 --> 00:02:49,416

where we would have a
simulated emergency on board,

65

00:02:49,816 --> 00:02:52,706

a need to interact with say
a doctor, a flight surgeon

66

00:02:52,706 --> 00:02:56,106

on the ground and for
some of those we --

67

00:02:56,106 --> 00:02:58,436

one of those we did a
five-minute time delay and one

68

00:02:58,436 --> 00:03:00,206

of those we did a
10-minute time delay.

69

00:03:00,426 --> 00:03:01,636

It really isolates you.

70

00:03:01,636 --> 00:03:05,056

You know, if you've got a very
dynamic emergent situation going

71

00:03:05,056 --> 00:03:07,996

on and you know you try
to talk to mission control

72

00:03:07,996 --> 00:03:09,846

and you get an answer
back 20 minutes later,

73

00:03:10,736 --> 00:03:12,296

you're basically on your own.

74

00:03:12,336 --> 00:03:14,326

>> I was wondering, have
you found that talking --

75

00:03:14,706 --> 00:03:16,816

you've changed how you
talk to mission control

76

00:03:16,816 --> 00:03:19,396

because of those delays and
the way they talk to you.

77

00:03:19,396 --> 00:03:20,296

>> It has changed things --

78

00:03:20,476 --> 00:03:23,666

yeah it has changed
things quite a bit.

79

00:03:23,666 --> 00:03:26,616

When you are talking to them
typically what you'll do is

80

00:03:26,616 --> 00:03:29,616

you'll say, "Mission
control this is Aquarius,

81

00:03:29,616 --> 00:03:31,246

we'll have a message coming
to you in 10 seconds."

82

00:03:31,746 --> 00:03:33,856

That way, they've got 10
seconds to kind of get ready,

83

00:03:33,856 --> 00:03:37,086

get a heads up to know
that the message is coming.

84

00:03:37,086 --> 00:03:40,256

We find ourselves
using text a lot.

85

00:03:40,316 --> 00:03:43,876

Texting is a good way to
communicate back and forth

86

00:03:43,876 --> 00:03:45,136

when you have a time delay.

87

00:03:45,366 --> 00:03:47,876

It's very much like texting
in any other setting.

88

00:03:48,526 --> 00:03:52,436

So yeah, our interactions with
Mission Control are different.

89

00:03:52,436 --> 00:03:53,596

They're also more limited.

90

00:03:53,596 --> 00:03:55,646

There's not as much back
and forth because again,

91

00:03:56,116 --> 00:03:57,606

if we're doing a
simulated space walk,

92

00:03:57,766 --> 00:04:01,156

which is a pretty dynamic thing,
rather than them you know,

93

00:04:01,156 --> 00:04:03,816

sort of talking to us
as we're doing the job,

94

00:04:04,256 --> 00:04:07,656

most of the communications

is just within those of us

95

00:04:07,696 --> 00:04:10,626
down here, the crew members who
are outside, the crew members

96

00:04:10,626 --> 00:04:11,906
who are inside the habitat.

97

00:04:11,986 --> 00:04:14,866
>> Do you find -- do you take
things upon yourselves more

98

00:04:14,866 --> 00:04:17,306
rather than asking for
permission or help?

99

00:04:18,796 --> 00:04:21,696
>> Yeah and it's
typically becomes necessary

100

00:04:21,806 --> 00:04:23,216
to take more initiative.

101

00:04:23,216 --> 00:04:25,806
I think that's very
representative of what's going

102

00:04:25,806 --> 00:04:27,546
to happen to a crew that
goes to an asteroid,

103

00:04:28,086 --> 00:04:29,566
a crew that goes to Mars.

104

00:04:29,846 --> 00:04:32,696
Anybody who goes far from home,
you're going to be much more --

105

00:04:32,696 --> 00:04:34,666

you're going to have to
be much more independent.

106

00:04:35,566 --> 00:04:38,676

>> The communication delays as
well as the crew size are two

107

00:04:38,676 --> 00:04:41,186

of the main areas of
focus for your mission.

108

00:04:41,566 --> 00:04:44,936

The third one is restraint
and translation techniques.

109

00:04:44,936 --> 00:04:48,226

Can you tell me why that's
applicable, particularly

110

00:04:48,436 --> 00:04:51,116

to an asteroid mission?

111

00:04:51,226 --> 00:04:53,476

>> You know, honestly I think
that's the most important,

112

00:04:53,476 --> 00:04:56,046

most crucial thing that
we're doing down here.

113

00:04:56,046 --> 00:04:58,576

When you get to an asteroid
you're going to be going

114

00:04:58,576 --> 00:05:00,066

to an object that's small.

115

00:05:00,066 --> 00:05:03,126

Most of the asteroids that we're

talking about sending crews

116

00:05:03,216 --> 00:05:05,576

to are at most a
kilometer or two in size.

117

00:05:05,626 --> 00:05:07,686

They're little size --
they're little objects.

118

00:05:08,246 --> 00:05:10,306

What that mean is -- means
is they effectively have

119

00:05:10,306 --> 00:05:10,746

no gravity.

120

00:05:11,146 --> 00:05:14,246

So you're doing a space
walk, you're in 0G

121

00:05:14,246 --> 00:05:15,556

when you're interacting
with these things.

122

00:05:16,236 --> 00:05:17,956

Now we have lots of experience

123

00:05:17,956 --> 00:05:19,376

with crewmembers
doing space walks,

124

00:05:19,446 --> 00:05:21,706

for example outside the
international space station,

125

00:05:22,086 --> 00:05:23,686

but asteroids don't
have handrails.

126

00:05:24,516 --> 00:05:28,546

Asteroids are bumpy, irregular,
unpredictable surfaces

127

00:05:28,816 --> 00:05:35,376

and so how you do scientific
exploration in 0G on the surface

128

00:05:35,376 --> 00:05:37,886

of an asteroid is something
that no one knows how to do.

129

00:05:38,006 --> 00:05:39,796

And really what this mission is

130

00:05:39,796 --> 00:05:42,056

about primarily is
learning how to do that.

131

00:05:42,056 --> 00:05:44,956

And so we're trying a whole
bunch of different techniques

132

00:05:45,566 --> 00:05:48,206

for moving, for anchoring
ourselves,

133

00:05:48,286 --> 00:05:53,286

for moving around once we're
anchored down onto the surface,

134

00:05:53,286 --> 00:05:56,616

positioning ourselves, things
we call worksite stabilization;

135

00:05:56,706 --> 00:05:58,166

getting into a stable
environment

136

00:05:58,226 --> 00:05:59,996

where you can interact
with the surface.

137

00:06:00,556 --> 00:06:02,686

We're trying out a bunch
of those techniques

138

00:06:02,756 --> 00:06:04,306

to see what works
well and what doesn't.

139

00:06:04,716 --> 00:06:06,226

>> Can you give me a couple --

140

00:06:06,226 --> 00:06:08,626

a few examples of what
you've been doing out there,

141

00:06:09,046 --> 00:06:10,536

how you've been trying
to simulate that?

142

00:06:11,836 --> 00:06:15,766

>> Sure. One thing
that we assume --

143

00:06:15,766 --> 00:06:18,186

and we don't know how this
is going to actually happen,

144

00:06:18,186 --> 00:06:19,726

but we'll assume that some kind

145

00:06:19,726 --> 00:06:21,536

of anchoring technique
can be developed

146

00:06:21,536 --> 00:06:25,186

where you can fasten something

solidly to the asteroid surface.

147

00:06:25,776 --> 00:06:27,336

So then imagine if
you've got a couple

148

00:06:27,336 --> 00:06:30,586

of anchor points you can
string up a line effectively,

149

00:06:30,586 --> 00:06:32,036

a tight rope between them.

150

00:06:32,416 --> 00:06:33,736

We call that a translation line

151

00:06:33,736 --> 00:06:35,586

and you can move
over hand-over-hand.

152

00:06:35,586 --> 00:06:38,256

You can tether yourself to it to
keep yourself safely in place.

153

00:06:38,846 --> 00:06:40,796

So that's an example of one kind

154

00:06:40,796 --> 00:06:42,346

of translation technique
that we would use.

155

00:06:42,626 --> 00:06:45,006

>> Those same things have been
done on space stations before

156

00:06:45,006 --> 00:06:47,606

and on space shuttles,
translating along that line?

157

00:06:48,596 --> 00:06:50,296
We haven't had to...

158
00:06:50,946 --> 00:06:52,616
>> Yeah, the difference
is you have to have --

159
00:06:52,616 --> 00:06:54,536
you have to put that
line in place yourself

160
00:06:54,536 --> 00:06:57,766
because the asteroid
doesn't provide it for you.

161
00:06:57,966 --> 00:07:00,186
Another thing that we're using
are what we call jet packs.

162
00:07:00,386 --> 00:07:03,356
But basically, it's a -- it's
a back-mounted thruster package

163
00:07:03,356 --> 00:07:04,876
that you can use to translate.

164
00:07:04,876 --> 00:07:06,206
You can use to fly around.

165
00:07:06,476 --> 00:07:09,356
Those are great for
covering long distances very,

166
00:07:09,356 --> 00:07:10,886
very quickly -- very, very good.

167
00:07:10,886 --> 00:07:14,036
But of course, once you get to
a worksite you've got no way

168

00:07:14,036 --> 00:07:14,956

to stabilize yourself.

169

00:07:15,096 --> 00:07:16,626

You have -- you know
if you hit a rock

170

00:07:16,626 --> 00:07:18,786

with a hammer you're just going
to go drifting off into space.

171

00:07:19,656 --> 00:07:23,166

One that we all like very
much is we have these small

172

00:07:23,166 --> 00:07:25,876

submarines down here --
one-person submarines.

173

00:07:26,306 --> 00:07:31,106

What those do is they simulate a
small space exploration vehicle

174

00:07:31,106 --> 00:07:36,086

that you can take with you to an
asteroid and you can use those

175

00:07:36,226 --> 00:07:39,036

to position what's
called a foot-restraint.

176

00:07:39,076 --> 00:07:41,086

This is something you
can clip your feet into,

177

00:07:41,526 --> 00:07:43,326

gives you a solid
stable platform.

178

00:07:43,326 --> 00:07:47,106

The submarine will take you to
the position you want to be at,

179

00:07:47,566 --> 00:07:49,626

will settle into a
stable configuration,

180

00:07:49,626 --> 00:07:51,266

you clip your feet into
this foot restraint,

181

00:07:51,506 --> 00:07:53,676

you've got both hands free
and then you just go to work.

182

00:07:54,256 --> 00:07:56,766

And that's turned out to be
a very effective technique.

183

00:07:57,436 --> 00:07:59,946

>> I would imagine that
the difficulty comes

184

00:07:59,946 --> 00:08:02,486

in making the submarine
hold its position then.

185

00:08:04,176 --> 00:08:05,986

>> Yeah, having to hold --

186

00:08:05,986 --> 00:08:08,136

the submarine hold its
position would be the hard part.

187

00:08:08,136 --> 00:08:10,276

The way you would do that
in space is you would do it

188

00:08:10,276 --> 00:08:12,056

with a position hold capability

189

00:08:12,056 --> 00:08:13,986
on the asteroid control
system on the spacecraft.

190

00:08:13,986 --> 00:08:16,306
So it's using thrusters
to stabilize itself

191

00:08:16,306 --> 00:08:17,706
and keep itself solidly
in place.

192

00:08:18,376 --> 00:08:19,956
The way we do it and
the way we simulate

193

00:08:20,226 --> 00:08:22,406
that with the submarines
is they just simply settle

194

00:08:22,406 --> 00:08:23,116
down on the bottom.

195

00:08:23,946 --> 00:08:26,626
>> And you hope that you can
count on that on the asteroid?

196

00:08:28,056 --> 00:08:30,026
>> Well, you're not going
to be able to settle

197

00:08:30,026 --> 00:08:31,056
down onto the asteroid.

198

00:08:31,056 --> 00:08:33,276
The asteroid doesn't have
gravity to hold you in place.

199

00:08:33,276 --> 00:08:35,616

So when you get to the asteroid
you're going to have to depend

200

00:08:35,616 --> 00:08:37,746

on the spacecraft to be
able to position itself

201

00:08:38,156 --> 00:08:39,246

and hold itself in place.

202

00:08:39,316 --> 00:08:43,666

So now, we've got a set
of specific requirements

203

00:08:44,316 --> 00:08:46,186

that we can give the
engineers and say, "Okay,

204

00:08:46,236 --> 00:08:48,076

we need a space craft
that can do this."

205

00:08:49,076 --> 00:08:52,256

>> We haven't mentioned it
specifically, but I assume

206

00:08:52,256 --> 00:08:54,156

that you're going
outside on dives

207

00:08:54,476 --> 00:08:56,426

to simulate the working
in weightlessness.

208

00:08:57,796 --> 00:08:59,176

>> Yeah that's correct.

209

00:08:59,176 --> 00:09:01,446

We're doing simulated space walks.

210

00:09:01,446 --> 00:09:03,466

As we speak right now, there's one underway.

211

00:09:03,466 --> 00:09:06,036

I don't know maybe you can even hear it in the background.

212

00:09:06,146 --> 00:09:09,716

Camia Uey and Donnie Metcalf-Lindenberger are outside

213

00:09:10,496 --> 00:09:13,296

simulating a space walk right now while I'm talking to you.

214

00:09:13,726 --> 00:09:16,276

We do two simulated space walks per day.

215

00:09:16,516 --> 00:09:19,356

We send two crew members out at a time typically

216

00:09:19,356 --> 00:09:21,006

for about three, three-and-a-half hours.

217

00:09:21,476 --> 00:09:22,896

So we do one pair out in the morning

218

00:09:22,956 --> 00:09:23,956

and one pair out in the afternoon.

219

00:09:24,796 --> 00:09:26,126

>> I mentioned that
you were a member

220
00:09:26,126 --> 00:09:27,646
of the previous NEMO crew.

221
00:09:27,986 --> 00:09:30,876
Can you give me a sense of how
some of the lessons that you

222
00:09:30,876 --> 00:09:34,636
and your previous crewmates
learned are being explored,

223
00:09:34,746 --> 00:09:36,866
examined, or exploited
on this mission?

224
00:09:38,546 --> 00:09:42,726
>> Yeah we learned an
enormous amount on NEMO 15,

225
00:09:42,726 --> 00:09:46,206
my previous experience down
here and that has all been put

226
00:09:46,206 --> 00:09:47,726
into action on NEMO 16.

227
00:09:48,126 --> 00:09:51,046
On NEMO 15 for example, we
did have translation lines,

228
00:09:51,156 --> 00:09:53,516
but they were little
flimsy things.

229
00:09:53,516 --> 00:09:55,586
Imagine a clothesline
kind of thing.

230

00:09:55,586 --> 00:09:58,186

And they were floppy and you
couldn't really stabilize off

231

00:09:58,186 --> 00:09:58,966

of them.

232

00:09:58,966 --> 00:10:00,326

It wasn't a good way

233

00:10:00,526 --> 00:10:02,466

to stabilize yourself
once you moved around.

234

00:10:03,136 --> 00:10:04,766

So lesson learned from that one,

235

00:10:04,766 --> 00:10:06,716

we've got basically
really tight,

236

00:10:07,636 --> 00:10:10,336

tightly tensioned climbing ropes
effectively that we can use

237

00:10:10,336 --> 00:10:12,486

to move around and
those are far superior

238

00:10:13,056 --> 00:10:15,756

to what we used on NEMO 15.

239

00:10:15,986 --> 00:10:19,306

The tools for collecting
samples are all better.

240

00:10:20,766 --> 00:10:22,496

Regularly we learn -- now

the only thing that happened

241

00:10:22,496 --> 00:10:25,446
on NEMO 15, on NEMO
15, we had a hurricane.

242

00:10:25,776 --> 00:10:28,946
A hurricane came through and
a mission that was supposed

243

00:10:28,946 --> 00:10:31,856
to be 13 days long got cut
short after just six days.

244

00:10:32,406 --> 00:10:36,726
So on NEMO 15 we never got to
even try out the submarine stuff

245

00:10:36,726 --> 00:10:39,176
and -- so that's been a big
lesson learned on this mission,

246

00:10:39,176 --> 00:10:41,896
is the value of working
with a small space craft

247

00:10:41,896 --> 00:10:43,026
that are simulated
by the submarine.

248

00:10:43,736 --> 00:10:46,876
>> On the subject of
submarines, you had a blog post

249

00:10:46,916 --> 00:10:49,356
that you just published about
your work with submarines.

250

00:10:49,356 --> 00:10:52,086
NEMO 16 has been making

a big effort with a lot

251

00:10:52,086 --> 00:10:55,276
of different social media
outlets and live video streams

252

00:10:55,276 --> 00:10:56,706
to share the mission
with people.

253

00:10:57,066 --> 00:11:02,346
How did the sub mission go
yesterday or two days ago?

254

00:11:02,896 --> 00:11:05,336
>> Yeah I think --
I think yesterday

255

00:11:05,336 --> 00:11:09,356
and the day before you know, I
got to do NEMO 15 and NEMO 16

256

00:11:09,356 --> 00:11:12,046
and I think the past two days
have been the best two days

257

00:11:12,366 --> 00:11:14,216
of NEMO that I've
ever experienced.

258

00:11:14,886 --> 00:11:20,776
One of our habitat technicians
down here is James Talosec.

259

00:11:20,776 --> 00:11:23,786
James is an incredibly
experienced diver.

260

00:11:23,786 --> 00:11:26,046
He's got 20 years of

professional dive experience,

261

00:11:26,406 --> 00:11:28,536

12 years down here at Aquarius.

262

00:11:28,946 --> 00:11:31,676

He said that yesterday was the most complicated thing he's seen

263

00:11:31,676 --> 00:11:33,846

anybody try to do in the water.

264

00:11:33,846 --> 00:11:35,496

We had two submarines in the water.

265

00:11:35,496 --> 00:11:38,946

We had two aquanauts out of jet packs.

266

00:11:39,096 --> 00:11:42,766

We had at some point, 9, 10, 11 different support divers

267

00:11:42,766 --> 00:11:45,486

in the water managing tethers, managing umbilicals

268

00:11:46,016 --> 00:11:47,556

and we just nailed it.

269

00:11:47,886 --> 00:11:48,886

Everything went right.

270

00:11:48,986 --> 00:11:50,156

We got everything done.

271

00:11:50,156 --> 00:11:51,296

We collected all the data.

272

00:11:51,396 --> 00:11:55,326

I think we've definitively
shown how well that combination

273

00:11:55,326 --> 00:11:57,056

of submarines and
jet packs works.

274

00:11:57,516 --> 00:12:01,006

It's -- it's been just
a fantastic mission

275

00:12:01,006 --> 00:12:03,696

and the last two days in
particular have just been

276

00:12:03,696 --> 00:12:06,826

for me, the high point of both
of my NEMO missions together.

277

00:12:07,566 --> 00:12:09,926

>> What's left on the
agenda for this flight?

278

00:12:10,096 --> 00:12:12,756

What else do you folks
have to do before you come

279

00:12:12,756 --> 00:12:13,536

up at the end of the week?

280

00:12:14,926 --> 00:12:17,956

>> Well, we've got two more
days worth of EVAs today

281

00:12:17,956 --> 00:12:20,686

and tomorrow, two more days
of simulated space walks.

282

00:12:21,286 --> 00:12:24,056

And the nice thing is, at this point, we've learned so much

283

00:12:24,096 --> 00:12:27,246

that now -- now we can try other things

284

00:12:27,246 --> 00:12:29,086

that we might not have thought of before.

285

00:12:29,086 --> 00:12:31,376

I wouldn't call it quite improvisation,

286

00:12:31,946 --> 00:12:33,426

but its experimentation.

287

00:12:33,906 --> 00:12:37,146

Before we came down here, we had a set of specific tasks

288

00:12:37,206 --> 00:12:38,486

that we wanted to achieve.

289

00:12:38,946 --> 00:12:42,846

We've really achieved most of those and so now we've got time

290

00:12:42,846 --> 00:12:45,786

on the schedule to build on what we've learned,

291

00:12:46,106 --> 00:12:47,216

try some new things,

292

00:12:47,216 --> 00:12:50,126

try different techniques using

them together in combinations

293

00:12:50,126 --> 00:12:52,316
and ways we might not have
thought of previously --

294

00:12:52,786 --> 00:12:55,756
experiment, take advantage
of the opportunity.

295

00:12:55,756 --> 00:12:56,666
We're down here.

296

00:12:57,066 --> 00:12:58,416
We've got everything filed in.

297

00:12:58,416 --> 00:12:59,646
We've really found a groove.

298

00:12:59,646 --> 00:13:01,466
We know what we're doing,
we're doing it well,

299

00:13:01,466 --> 00:13:02,886
and so now we can try a bunch

300

00:13:02,886 --> 00:13:05,016
of different things
and see what works.

301

00:13:05,266 --> 00:13:07,386
>> You're already
implementing some

302

00:13:07,386 --> 00:13:08,606
of the lessons you've
learned here...

303

00:13:10,396 --> 00:13:10,856

>> Exactly.

304

00:13:10,996 --> 00:13:12,076

>> ...before this is even over.

305

00:13:12,686 --> 00:13:14,566

Well, Steve, good luck with the rest of the mission.

306

00:13:14,566 --> 00:13:17,246

We appreciate your taking a few minutes to bring us

307

00:13:17,246 --> 00:13:18,446

up to speed on what's going on.

308

00:13:19,716 --> 00:13:20,916

>> Thanks very much -- enjoyed doing it.

309

00:13:21,426 --> 00:13:25,046

>> NEMO 16 crewmember, Dr. Steve Squires of Cornell University.

310

00:13:25,466 --> 00:13:28,146

You can find out a lot more about what Steve

311

00:13:28,146 --> 00:13:30,176

and his crewmates have been doing on the floor

312

00:13:30,176 --> 00:13:31,096

of the Atlantic Ocean.

313

00:13:31,486 --> 00:13:33,986

They have blog posts and pictures, the whole thing.