1
00:00:00,996 --> 00:00:01,086
[Brandi Dean] Hi!

2
00:00:01,336 --> 00:00:02,236
Thanks so much.

3
00:00:02,296 --> 00:00:06,066
We're here today in Building 7
in one of our spacesuit labs.

4
00:00:06,226 --> 00:00:11,636
We've got Marc Ciupitu here with us to
talk about the spacewalk going on tomorrow

5
00:00:11,636 --> 00:00:14,946
with Anton Shkaplerov and Oleg Kononenko.

6
00:00:15,486 --> 00:00:24,926
Mark is the Lead EVA Manager for all Russian
spacewalks here with NASA and also a Flight

7
00:00:25,176 --> 00:00:28,056
and Increment Manager for EVAs as well.

8
00:00:28,056 --> 00:00:29,776
Right? Did I get that good?

9
00:00:29,776 --> 00:00:33,466
Okay. So he is going to tell us a little
bit about what that means, what he does,

10
00:00:33,466 --> 00:00:35,076
first of all and then we'll
talk about the spacewalk.

11
00:00:35,676 --> 00:00:36,476
[Marc Ciupitu] Well, what I do...

12

00:00:36,876 --> 00:00:37,386
First of all thanks.

13
00:00:37,636 --> 00:00:38,356
It's nice to be here...

14
00:00:38,816 --> 00:00:45,006
What I do was is oversee all aspects of EVA for
the office that includes operations, hardware,

15
00:00:45,576 --> 00:00:48,436
logistics and including safety as well.

16
00:00:49,246 --> 00:00:52,836
I also chair the Joint EVA Working Group
which is a bilateral U.S. and Russian group

17
00:00:53,286 --> 00:00:56,596
where we oversee all the
aspects of our EVAs together.

18
00:00:56,786 --> 00:01:01,526
So and we also try to resolve issues
that we have to work out together.

19
00:01:01,526 --> 00:01:03,056
That's my main duty.

20
00:01:03,456 --> 00:01:07,416
[Brandi] How much involvement does NASA have
when we have a Russian spacewalk coming up?

21
00:01:07,606 --> 00:01:11,246
[Marc] We do get involved pretty in-depth.

22
00:01:11,246 --> 00:01:17,246
We get all the information from
our Russian counterparts and we get

23

00:01:17,276 --> 00:01:21,826
that to the ISS Program office and make sure
everything is within requirements, etcetera.

24
00:01:22,346 --> 00:01:26,676
We also lend them some of
our tools for the EVAs.

25
00:01:26,746 --> 00:01:27,696
So we do get involved.

26
00:01:27,956 --> 00:01:31,196
[Brandi] So it's not like we can just kind of
sit back and kind of relax just because none

27
00:01:31,196 --> 00:01:32,546
of our crew members are going out.

28
00:01:32,886 --> 00:01:32,986
[Marc] No.

29
00:01:32,986 --> 00:01:33,386
Not at all.

30
00:01:33,856 --> 00:01:36,806
Our crew members do help out
to get prepared for EVAs.

31
00:01:37,136 --> 00:01:37,926
They get involved as well.

32
00:01:38,126 --> 00:01:38,406
[Brandi] Okay.

33
00:01:38,776 --> 00:01:40,776
So the spacewalk is tomorrow.

34
00:01:40,776 --> 00:01:43,606
What are they going ot be doing tomorrow

morning as they get ready for the spacewalk?

35
00:01:44,026 --> 00:01:49,696
[Marc] Well in the morning the crew will first
don their gear -- liquid cooling garments.

36
00:01:49,796 --> 00:01:55,006
[Brandi] And I think we actually have somebody
here, Russell, in a liquid cooling garments.

37
00:01:55,006 --> 00:02:00,396
And I think we can get a quick
look at what that actually is.

38
00:02:00,466 --> 00:02:05,766
[Marc] You see the liquid cooling
garment as tubes all the way up down

39
00:02:05,816 --> 00:02:07,116
through the knees around the arms.

40
00:02:07,646 --> 00:02:13,536
And basically what that does is allow the crew
to regulate cooling water through their LCGs.

41
00:02:13,776 --> 00:02:16,146
And that way they can regulate the temperature

42
00:02:16,146 --> 00:02:18,196
so they feel comfortable when
they work inside the suit.

43
00:02:18,726 --> 00:02:19,966
[Brandi] Yeah, I guess there's not...

44
00:02:20,126 --> 00:02:22,506
it gets pretty cold or pretty
hot in space depending

45

00:02:22,506 --> 00:02:23,906
on whether you're in the sun or in the shade.

46
00:02:24,156 --> 00:02:24,536
[Marc] That's correct.

47
00:02:24,596 --> 00:02:26,636
[Brandi] And this is how we
help them stay comfortable.

48
00:02:27,536 --> 00:02:27,626
[Marc] Yep.

49
00:02:28,176 --> 00:02:28,526
[Brandi] okay.

50
00:02:28,616 --> 00:02:29,436
Thank you so much Russell!

51
00:02:30,216 --> 00:02:36,196
[Marc] Once they have the gear on they
will ingress the airlock, close the hatch,

52
00:02:36,646 --> 00:02:37,856
do some leak checks of the hatch.

53
00:02:38,546 --> 00:02:46,066
They will ingress the suits, close the suits
and do some leak checks of the suits as well

54
00:02:46,316 --> 00:02:47,676
as the prime and backup airlocks.

55
00:02:48,036 --> 00:02:51,846
There will be a pre-breathe when they
get all the nitrogen out of their body.

56
00:02:52,426 --> 00:02:58,356
Start breathing pure oxygen and then they

will basically switch to autonomous power.

57
00:02:58,586 --> 00:03:01,686
Then get off the umbilicals,
open the hatch and go out EVA.

58
00:03:02,026 --> 00:03:03,946
[Brandi] So it sounds alot
like a U.S. spacewalk.

59
00:03:04,126 --> 00:03:04,626
[Marc] It's very similar.

60
00:03:04,826 --> 00:03:04,956
[Brandi] Yeah.

61
00:03:04,956 --> 00:03:06,566
Are there any major differences?

62
00:03:07,546 --> 00:03:07,836
[Marc] Uh.

63
00:03:08,346 --> 00:03:11,266
Some of the differences is
how they ingress the suits.

64
00:03:11,486 --> 00:03:13,086
The suits are built differently.

65
00:03:14,046 --> 00:03:15,206
So that's the process.

66
00:03:15,276 --> 00:03:15,796
A little different.

67
00:03:16,366 --> 00:03:18,576
The pre-breathe times are
also a little different.

68
00:03:18,686 --> 00:03:19,926
The suit pressure is no different.

69
00:03:20,326 --> 00:03:20,456
[Brandi] Yeah.

70
00:03:20,586 --> 00:03:22,366
And speaking of the suits we've got an Orlan,

71
00:03:22,366 --> 00:03:25,696
a Russian spacesuit here behind
us that we can take a look at.

72
00:03:25,696 --> 00:03:27,676
Maybe you can point out some
of the features on it.

73
00:03:27,876 --> 00:03:28,176
[Marc] Sure.

74
00:03:28,326 --> 00:03:33,506
Here in front you'll see an
electronics control panel.

75
00:03:34,226 --> 00:03:34,946
Top and left.

76
00:03:35,726 --> 00:03:40,316
And here you have a fluid
numeral hydraulic control panel.

77
00:03:41,636 --> 00:03:42,196
[Brandi] What does that do?

78
00:03:42,916 --> 00:03:47,476
[Marc] With this one the crew regulates the
oxygen inside the suit and also the cooling.

79

00:03:47,936 --> 00:03:51,246
This lever right here regulates the coolant
that gets with the liquid coolant garment.

80
00:03:52,566 --> 00:03:55,866
On the control panel they regulate
all their fans, their pumps,

81
00:03:56,056 --> 00:03:58,736
any messages, error messages and so on.

82
00:03:58,816 --> 00:03:58,956
[Brandi] Okay.

83
00:03:58,956 --> 00:04:01,986
And this suit is a little different than the
one they'll actually be wearing tomorrow.

84
00:04:01,986 --> 00:04:02,316
Right? [Marc] Correct.

85
00:04:02,346 --> 00:04:03,236
This is an Orlan-M.

86
00:04:03,626 --> 00:04:05,486
The suits on orbit are called Orlan-MK.

87
00:04:05,486 --> 00:04:07,496
The extra K is the computer.

88
00:04:07,666 --> 00:04:10,046
The suit on orbit now has a computer.

89
00:04:11,256 --> 00:04:15,706
So the crew has alot more interaction with
a computer rather than analogue before.

90
00:04:15,856 --> 00:04:15,976
[Brandi] Okay.

91
00:04:15,976 --> 00:04:18,516
Okay. So this is just an older version.

92
00:04:18,516 --> 00:04:20,946
A little bit upgraded on orbit for them to use.

93
00:04:21,076 --> 00:04:25,086
It looks very different from
the U.S. spacesuits.

94
00:04:25,086 --> 00:04:25,396
[Marc] Yes.

95
00:04:25,466 --> 00:04:28,836
The other thing to point out are
the two tethers you see here.

96
00:04:28,836 --> 00:04:34,756
The crew uses these two tethers to
translate outside ISS and they attach these

97
00:04:34,806 --> 00:04:37,576
to the handrails and they
translate acroos the ISS this way.

98
00:04:39,466 --> 00:04:39,726
[Brandi] Okay.

99
00:04:40,096 --> 00:04:45,966
So on the U.S. spacesuit you've got, kind
of the, bearing where the waist connects

100
00:04:45,966 --> 00:04:49,086
and then different, you know, connection points

101
00:04:49,086 --> 00:04:51,496
for the shoulders and wrists
and things like that.

102
00:04:51,496 --> 00:04:52,226
Right? [Marc] Correct.

103
00:04:52,226 --> 00:04:52,866
[Brandi] This is pretty different.

104
00:04:53,036 --> 00:04:56,676
[Marc] The Orlan is a one
size fits all spacesuit.

105
00:04:56,756 --> 00:04:57,076
[Brandi] Really?

106
00:04:57,536 --> 00:05:03,866
[Marc] All the crew does is they size
to their measurements using levers

107
00:05:03,866 --> 00:05:08,466
on the arms and on the legs and...

108
00:05:08,836 --> 00:05:09,276
[Brandi] Levers?

109
00:05:09,746 --> 00:05:10,446
Yeah. They have...

110
00:05:11,086 --> 00:05:14,956
The newer suit has a nice
little lever that they wear...

111
00:05:14,956 --> 00:05:16,436
[Brandi] Kind of cranks it shorter or longer...

112
00:05:16,436 --> 00:05:16,576
[Marc] Right.

113
00:05:16,576 --> 00:05:17,286

[Brandi] ...depending on what you need?

114
00:05:17,286 --> 00:05:19,046
[Marc] It lets it out or it tightens up...

115
00:05:19,086 --> 00:05:19,386
[Brandi] Okay.

116
00:05:19,386 --> 00:05:20,816
[Marc] ...depending on the
size of the crew members.

117
00:05:20,816 --> 00:05:21,266
[Brandi] Interesting.

118
00:05:21,576 --> 00:05:21,946
[Marc] Um.

119
00:05:22,126 --> 00:05:25,606
So all they really do, they
ingress the suit from the back.

120
00:05:25,606 --> 00:05:27,796
Let me show you here.

121
00:05:28,876 --> 00:05:29,946
This door opens up.

122
00:05:32,596 --> 00:05:38,876
The crew sits inside on the
lower part of the door.

123
00:05:39,836 --> 00:05:42,076
Gets the hands in through the arms.

124
00:05:43,096 --> 00:05:44,666
Ducks in. Make sure they don't hit their head

125

00:05:44,666 --> 00:05:46,376
and then they basically just
sit inside the suit.

126
00:05:46,376 --> 00:05:47,296
It's very convenient.

127
00:05:47,296 --> 00:05:47,616
[Brandi] Okay.

128
00:05:47,726 --> 00:05:50,886
And I know we're looking at rear
entry suits for our future spacesuits.

129
00:05:50,886 --> 00:05:52,526
Huh? [Marc] Going to the moon and Mars.

130
00:05:52,586 --> 00:05:52,956
That's true.

131
00:05:53,206 --> 00:05:53,466
[Brandi] Great.

132
00:05:53,666 --> 00:05:58,216
Okay. So, um, once you get in and I guess
close the door and it's all sealed up tight?

133
00:05:58,566 --> 00:06:02,086
[Marc] You close the door you
do have to attach the gloves.

134
00:06:02,146 --> 00:06:04,036
That's the only thing that they have to do.

135
00:06:04,146 --> 00:06:06,116
That's the last thing.

136
00:06:06,116 --> 00:06:11,446
They attach the gloves and

then they are ready to go.

137
00:06:12,016 --> 00:06:12,226
[Brandi] Okay.

138
00:06:12,226 --> 00:06:13,216
And that takes about how long?

139
00:06:13,346 --> 00:06:18,426
[Marc] The whole process from getting
inside the airlock to go out the door is

140
00:06:18,426 --> 00:06:19,426
about two-and-a-half, three hours.

141
00:06:19,656 --> 00:06:19,986
[Brandi] Okay.

142
00:06:20,356 --> 00:06:22,216
That's a long time to get
ready in the morning, huh?

143
00:06:22,216 --> 00:06:22,476
[Marc] That's right.

144
00:06:22,996 --> 00:06:24,856
[Brandi] But they've got alot of
work to do once they get out there.

145
00:06:25,036 --> 00:06:25,216
[Marc] Yes.

146
00:06:25,566 --> 00:06:28,006
Once they get out there...

147
00:06:28,006 --> 00:06:31,156
the spacewalk tomorrow, we'll
call it Russian EVA 30.

148
00:06:32,026 --> 00:06:33,286
They have two prime tasks.

149
00:06:33,976 --> 00:06:38,116
The first task is to relocate one of the
two cargo cranes they call the Strela.

150
00:06:38,556 --> 00:06:40,156
Which is a Russian word "arrow."

151
00:06:40,896 --> 00:06:44,686
They will relocate it from the docking
compartment up zenith to the MRM-2,

152
00:06:44,906 --> 00:06:46,716
the Mini-Research Module number 2.

153
00:06:47,096 --> 00:06:47,306
[Brandi] Okay.

154
00:06:47,826 --> 00:06:50,786
[Marc] That task is going to take
around three-and-a-half, four hours.

155
00:06:51,046 --> 00:06:52,216
It's a major part of the EVA.

156
00:06:53,276 --> 00:06:57,326
the reason they are relocating
it is to get it off the DC-1,

157
00:06:57,326 --> 00:06:59,346
which next year is going to be orbited.

158
00:06:59,506 --> 00:07:00,696
[Brandi] DC-1 is?

159
00:07:00,836 --> 00:07:01,776

[Marc] Docking compartment 1.

160
00:07:02,526 --> 00:07:04,486
Um, and the reason it's being deorbited is

161
00:07:04,546 --> 00:07:09,766
because the Russians are launching a new module
called the Multipurpose Laboratory Module, MLM.

162
00:07:10,526 --> 00:07:13,676
And it's going to be docked in the
same port that DC-1 is right now.

163
00:07:13,676 --> 00:07:13,886
[Brandi] Okay.

164
00:07:14,536 --> 00:07:17,376
[Marc] The other main task
is to install MOD shields.

165
00:07:17,696 --> 00:07:18,246
Five of those.

166
00:07:18,876 --> 00:07:21,656
[Brandi] And those are Micrometeoroid
Orbital Debris Shields.

167
00:07:21,656 --> 00:07:22,566
[Marc] That's correct.

168
00:07:23,456 --> 00:07:26,606
So five of those shields will be
installed on the service module

169
00:07:26,906 --> 00:07:32,766
and that should help decrease the risk
of MOD strikes penetrating the ISS.

170
00:07:33,256 --> 00:07:34,806

That task is about two hours.

171
00:07:35,626 --> 00:07:40,636
If there's time left the crew have planned
three get-aheads, each about 20 minutes each.

172
00:07:41,586 --> 00:07:46,406
One's a materials experiment called
Vynoslivost which means "endurance" in Russian.

173
00:07:47,046 --> 00:07:50,656
It will be installed on handrails on the MRM-2.

174
00:07:51,196 --> 00:07:58,716
The second is a biological experiment called
Test and the crew is actually going to try

175
00:07:58,716 --> 00:08:03,876
to see if there's microorganisms
living under the MLI on the vehicles.

176
00:08:05,036 --> 00:08:09,046
And the thrid get-ahead task
is to install some struts

177
00:08:09,046 --> 00:08:11,936
on the EVA ladder on the docking compartment.

178
00:08:12,416 --> 00:08:15,166
The EVA ladder has shown
that it's moving a little bit

179
00:08:15,166 --> 00:08:17,626
so the support structure will help it firm up.

180
00:08:18,006 --> 00:08:18,146
[Brandi] Sure.

181
00:08:18,326 --> 00:08:22,716

Okay. Alright, so uh, it's
supposed to be about six hours?

182
00:08:22,826 --> 00:08:26,326
[Marc] It's roughly six hours
according to the timeline.

183
00:08:26,326 --> 00:08:29,926
[Brandi] And you mentioned earlier sometimes
we loan them tools, U.S. tools to use.

184
00:08:29,926 --> 00:08:30,366
[Marc] That's correct.

185
00:08:30,366 --> 00:08:33,426
[Brandi] And one of the things going
along this time is helmet cameras.

186
00:08:33,776 --> 00:08:35,466
[Marc] So they do have helmet cameras.

187
00:08:35,586 --> 00:08:39,766
We use the...we lend them our lights
and the helmet cameras on each suit.

188
00:08:40,296 --> 00:08:43,366
So we'll be able to get some
really good views on EVA.

189
00:08:43,886 --> 00:08:46,876
We also...what you see here
we actually have a piece

190
00:08:47,076 --> 00:08:51,846
of hardware called the Orlan tether adapter that
the crew installs and with it they can use alot

191
00:08:51,846 --> 00:08:56,636
of our tool caddies, our retractable
tethers, etcetera, etcetera.

192
00:08:56,826 --> 00:08:59,646
And they also use our photo cameras,
digital still cameras as well.

193
00:09:00,276 --> 00:09:03,426
[Brandi] What will the rest of the crew
be doing inside while this is going on?

194
00:09:03,776 --> 00:09:09,456
[Marc] The other four crew members, two
of them will be isolated in the MRM-2

195
00:09:09,556 --> 00:09:11,926
because their Soyuz is docked to that module

196
00:09:12,216 --> 00:09:15,646
and that's Commander Burbank
and Flight Engineer Ivanishin.

197
00:09:16,416 --> 00:09:23,306
And our other two crew members
are Don Pettit and Andre Kuipers

198
00:09:23,306 --> 00:09:25,976
and they will be in the FGB during the EVA.

199
00:09:25,976 --> 00:09:30,276
[Brandi] And that's dictated by where
they're leaving the station for the spacewalk

200
00:09:30,276 --> 00:09:31,906
and what that cuts off from access?

201
00:09:32,136 --> 00:09:32,506
[Marc] Correct.

202
00:09:32,596 --> 00:09:34,796
Because the Soyuz is a rescue vehicle.

203
00:09:34,926 --> 00:09:36,046
So they need to be close to that.

204
00:09:36,436 --> 00:09:40,596
[Brandi] But they will be as much as they can,
kind of going about their regular business.

205
00:09:40,756 --> 00:09:44,666
[Marc] That is true they all have
activities planned during the EVA.

206
00:09:45,096 --> 00:09:51,276
And actually when we do the relocation of
the Strela if needed the crew can go and look

207
00:09:51,276 --> 00:09:55,516
and make sure and help guide them
if there are tight clearances.

208
00:09:55,766 --> 00:09:57,056
So they will be ready to support.