



1
00:00:01,226 --> 00:00:02,256
>> Hi, welcome back

2
00:00:02,256 --> 00:00:04,556
to the International Space
Station Flight Control Room,

3
00:00:04,556 --> 00:00:06,496
the Mission Control Center in
Houston where we have again

4
00:00:06,496 --> 00:00:09,686
with us today Mario Runco,
an astronaut who we talked

5
00:00:09,686 --> 00:00:12,696
with earlier in the week
about that Venus transit

6
00:00:12,696 --> 00:00:15,386
and all the exciting
activities that were going

7
00:00:15,386 --> 00:00:16,536
on in association with that.

8
00:00:16,536 --> 00:00:18,726
He's back to give us a report
on how everything went.

9
00:00:18,846 --> 00:00:19,756
Thanks for coming back, Mario.

10
00:00:19,826 --> 00:00:20,926
>> Well, thanks for having me.

11
00:00:20,926 --> 00:00:23,276
And it has been a
very exciting week,

12

00:00:23,276 --> 00:00:26,586
the response was just
tremendous around the world,

13

00:00:26,586 --> 00:00:29,606
and locally here in Houston,
in the United States.

14

00:00:30,176 --> 00:00:33,616
I was impressed with
Don's performance not only

15

00:00:33,616 --> 00:00:36,286
in the quality of some
of his images but also

16

00:00:36,286 --> 00:00:37,446
in the sheer quantity.

17

00:00:38,266 --> 00:00:41,566
And he's a good photographer,
and in attempting

18

00:00:41,566 --> 00:00:44,366
to get good images,
photographers know

19

00:00:44,366 --> 00:00:49,176
that they need to snap a lot
to get that one premier image

20

00:00:49,176 --> 00:00:50,346
that just captures it.

21

00:00:50,976 --> 00:00:54,876
In the way of numbers, we got
down, at least as far as I know

22

00:00:54,876 --> 00:00:57,586
at this point, at
least about 1800 images

23
00:00:57,586 --> 00:01:01,576
of the transit throughout
the course of the six hours

24
00:01:01,576 --> 00:01:04,166
that it took place, and Don
was not up the whole time,

25
00:01:04,166 --> 00:01:05,206
just to remember that.

26
00:01:05,206 --> 00:01:07,866
He -- at the start,
took some images

27
00:01:07,866 --> 00:01:11,546
of the first contacts,
and then quit.

28
00:01:11,696 --> 00:01:14,676
And then came back
later when the --

29
00:01:14,826 --> 00:01:16,786
Venus was more or
less in the middle

30
00:01:16,786 --> 00:01:18,396
of the Sun, at the center point.

31
00:01:18,396 --> 00:01:22,316
And then again later
on when the third

32
00:01:22,316 --> 00:01:23,536
and fourth contacts took place.

33

00:01:24,066 --> 00:01:29,016

So he was up for short periods
of time, discreet times,

34

00:01:29,016 --> 00:01:32,156

and I might add too, that
Don was not the only one

35

00:01:32,286 --> 00:01:33,176

snapping photos.

36

00:01:33,176 --> 00:01:36,426

He had employed the rest of the
crew, they were all up as well.

37

00:01:36,836 --> 00:01:39,596

Don't tell anybody in the
control center about that.

38

00:01:40,546 --> 00:01:42,786

And so they were
all taking pictures,

39

00:01:42,786 --> 00:01:45,606

all enjoying the moment,
the historical event,

40

00:01:45,606 --> 00:01:46,916

the moment in time, if you will.

41

00:01:47,326 --> 00:01:50,526

And then they --
Don sent me a note,

42

00:01:50,526 --> 00:01:54,596

he says he found himself single
ship again, they had all kind

43

00:01:54,596 --> 00:01:55,976
of quit and went to bed
an left the work to Don.

44
00:01:56,096 --> 00:02:00,586
>> But you know, his enthusiasm
is certainly catching.

45
00:02:00,586 --> 00:02:03,346
It seems like a lot of people
were very interested in this.

46
00:02:03,346 --> 00:02:05,336
I think a lot of people
went out and watched,

47
00:02:05,336 --> 00:02:06,826
at least for a few minutes.

48
00:02:06,826 --> 00:02:11,056
And it just seemed like
everybody across the country

49
00:02:11,056 --> 00:02:14,666
and probably even around the
world was paying attention.

50
00:02:14,666 --> 00:02:16,426
>> And that seems
to be the case.

51
00:02:16,426 --> 00:02:20,766
I know myself here in Houston,
I had several hundreds of pairs

52
00:02:20,766 --> 00:02:25,886
of the solar filter glasses,
and I started passing them out,

53
00:02:25,886 --> 00:02:28,326

and I quickly ran out,
and I didn't have enough,

54

00:02:28,326 --> 00:02:31,436
unfortunately, for
everybody that wanted some.

55

00:02:31,436 --> 00:02:31,696
So --

56

00:02:31,696 --> 00:02:34,006
>> I think we're seeing
here, there's a video

57

00:02:34,006 --> 00:02:38,556
from the solar dynamics
observatory of the actual event.

58

00:02:39,006 --> 00:02:41,086
>> And that was --
these were spectacular.

59

00:02:41,086 --> 00:02:45,316
They had some great
images of the context

60

00:02:45,316 --> 00:02:46,636
of the entire transit.

61

00:02:46,876 --> 00:02:50,106
We can see the different
filters on the sun to bring

62

00:02:50,106 --> 00:02:52,416
out different aspects
of it, behind Venus.

63

00:02:53,016 --> 00:02:56,816
And Venus, unlike the weather
in some places on Earth,

64

00:02:56,816 --> 00:02:58,196
cooperated very well,
and was right

65

00:02:58,196 --> 00:03:00,736
on time and exited on time.

66

00:03:00,736 --> 00:03:03,366
And we won't be talking
about this again

67

00:03:03,366 --> 00:03:07,246
for 121-and-a-half
years, unfortunately.

68

00:03:07,536 --> 00:03:10,136
But there is, by the way, just
as an aside, there's a transit

69

00:03:10,136 --> 00:03:12,066
of Mercury that's
not so far off.

70

00:03:12,066 --> 00:03:12,566
>> Oh really?

71

00:03:12,566 --> 00:03:17,966
Okay. Will that be kind of the
same thing to see, or different?

72

00:03:17,966 --> 00:03:21,546
>> Along the same lines, Mercury
is of course much smaller

73

00:03:21,546 --> 00:03:25,476
and so it's not as big, it
might be harder to discern.

74

00:03:25,886 --> 00:03:30,506
Those of you who use the solar
filter glasses for a direct look

75

00:03:30,506 --> 00:03:33,246
at the sun and not through
some alternative means,

76

00:03:33,246 --> 00:03:37,936
it was hard to pick out
Venus at the start and finish

77

00:03:38,076 --> 00:03:39,986
because it was so close to the
edge, and if you didn't know

78

00:03:39,986 --> 00:03:42,106
where to look you may
not have found it.

79

00:03:42,106 --> 00:03:44,756
And Mercury may be a little
more difficult than that.

80

00:03:44,756 --> 00:03:47,496
>> Okay. Well I know -- I think
we have some specific photos you

81

00:03:47,496 --> 00:03:48,466
wanted to be sure and show,

82

00:03:48,466 --> 00:03:50,546
so I think we can get the
first one of those now?

83

00:03:50,726 --> 00:03:52,406
>> Great. The photos --

84

00:03:52,406 --> 00:03:55,136
yeah, these are a couple of

photos that Don had taken.

85

00:03:55,136 --> 00:03:58,156

And these are quite
telling in that the one

86

00:03:58,156 --> 00:04:01,846

on the left is taken
not during the transit

87

00:04:01,846 --> 00:04:04,166

but through the scratch
pane window,

88

00:04:04,166 --> 00:04:05,856

that was the cupola window

89

00:04:05,856 --> 00:04:07,396

without the scratch
pane removed.

90

00:04:07,756 --> 00:04:10,726

And you can see how the sun
is very much washed out.

91

00:04:10,726 --> 00:04:14,276

The one on the right is during
the transit through window one.

92

00:04:14,276 --> 00:04:16,196

And it had the scratch
pane removed.

93

00:04:16,196 --> 00:04:19,996

So it was rather fortuitous that
we were able to accomplish that

94

00:04:19,996 --> 00:04:21,496

and get the scratch
pane removed.

95

00:04:21,496 --> 00:04:23,176

And the one on the right
you can actually start

96

00:04:23,176 --> 00:04:26,796

to see some sun spots
show up in the image.

97

00:04:26,796 --> 00:04:29,656

And this is with the
762 diameter filter

98

00:04:29,936 --> 00:04:33,266

that makes the image look
-- the orange tinge to it.

99

00:04:33,266 --> 00:04:35,986

And this is the same
sort of filter that is

100

00:04:35,986 --> 00:04:39,696

in the solar filter glasses
that we have, that's a filter

101

00:04:39,696 --> 00:04:41,216

that is put on the
front end of the camera.

102

00:04:41,636 --> 00:04:44,216

>> Okay, and here's
the second one.

103

00:04:44,446 --> 00:04:45,646

>> The second one, and this is

104

00:04:45,646 --> 00:04:49,426

with the white light mylar solar
filter that Don had taken up.

105
00:04:49,756 --> 00:04:50,986
Again, the one on the left is

106
00:04:50,986 --> 00:04:55,316
with the scratch panes
barely any sun spots visible.

107
00:04:55,316 --> 00:04:58,176
And again this was not
taken during the transit,

108
00:04:58,176 --> 00:05:00,416
so you won't see the
spot of Venus on there.

109
00:05:00,766 --> 00:05:03,826
The one on the right was
taken during the transit.

110
00:05:04,356 --> 00:05:07,316
However you can see
the sun spots

111
00:05:07,316 --> 00:05:08,656
that do show up in the image.

112
00:05:09,596 --> 00:05:13,706
For orientation purposes, the
one on the left you can see --

113
00:05:13,706 --> 00:05:16,726
maybe the viewers at
home can't see this.

114
00:05:16,726 --> 00:05:20,786
But the two sun spots in the
middle lower right are the same.

115
00:05:20,786 --> 00:05:22,126

But they're in a
different orientation

116

00:05:22,126 --> 00:05:24,116

because the images are
clocked a little differently.

117

00:05:24,436 --> 00:05:25,506

They're the same as the ones

118

00:05:25,506 --> 00:05:27,596

in the middle lower
right, on the right image.

119

00:05:28,406 --> 00:05:33,186

But clearly the scratch panes
removed gave us a substantial

120

00:05:33,186 --> 00:05:34,826

benefit in the clarity
of the photos.

121

00:05:35,236 --> 00:05:36,416

I think we have one
more, do we not?

122

00:05:36,726 --> 00:05:38,656

>> Yes, here it is.

123

00:05:38,656 --> 00:05:42,506

>> Okay, this is a third
one where you can see --

124

00:05:42,506 --> 00:05:44,396

the one on the left
was the previous one

125

00:05:44,396 --> 00:05:45,726

with the scratch pane on.

126

00:05:45,726 --> 00:05:50,036

The middle one is actually
one of the Russian windows.

127

00:05:50,036 --> 00:05:53,396

And we can see that in
the Russian windows,

128

00:05:53,396 --> 00:05:55,846

they're good quality
optical windows as well.

129

00:05:56,056 --> 00:05:58,566

The sun spots begin
to show up there.

130

00:05:58,846 --> 00:06:02,416

And then the third one was
the first 762 nanometer.

131

00:06:02,416 --> 00:06:04,346

I wanted to get a comparison

132

00:06:04,346 --> 00:06:05,956

as to what the two
different images looked

133

00:06:05,956 --> 00:06:09,276

like between the two
different filters for everyone.

134

00:06:09,696 --> 00:06:13,446

So it was quite a success,
not only in enthusiasm,

135

00:06:13,446 --> 00:06:15,796

number of images,
and I believe --

136

00:06:15,796 --> 00:06:18,356

we haven't had time
to go through all

137

00:06:18,356 --> 00:06:20,696

of the 1800 images
Don had sent down,

138

00:06:21,076 --> 00:06:24,056

in that I think he
actually caught Venus

139

00:06:24,056 --> 00:06:26,636

at the contact points
when it was tangent

140

00:06:26,636 --> 00:06:28,616

to the edge of the sun.

141

00:06:28,616 --> 00:06:30,266

Maybe we could show
those at a later date,

142

00:06:30,266 --> 00:06:33,436

or publish those on line.

143

00:06:33,546 --> 00:06:36,506

We're hoping to review those
and find those, the best.

144

00:06:36,966 --> 00:06:38,936

And some of those we
might each be able

145

00:06:38,936 --> 00:06:41,366

to see the black drop effect
from the atmosphere of Venus

146

00:06:41,366 --> 00:06:42,836

that Don had mentioned

in his video.

147

00:06:43,336 --> 00:06:47,276

So still more to be done, like
all missions, if you will,

148

00:06:47,276 --> 00:06:50,326

when we do experimentation
and collect data, the --

149

00:06:50,646 --> 00:06:53,686

it takes a much longer time
to review the data and plow

150

00:06:53,686 --> 00:06:56,066

through what you've
got than it does

151

00:06:56,066 --> 00:06:58,776

to actually do the
experiment itself.

152

00:06:59,226 --> 00:07:01,006

>> Right. And I know
you can continue to go

153

00:07:01,006 --> 00:07:04,586

to venustransit.nasa.gov
to see the photos

154

00:07:04,586 --> 00:07:05,636

that are already on line.

155

00:07:05,636 --> 00:07:07,246

Not just from the
International Space Station,

156

00:07:07,246 --> 00:07:09,526

but a number of different
sources.

157

00:07:09,576 --> 00:07:11,126

So a lot of good
information there.

158

00:07:11,126 --> 00:07:13,426

Again, it's
venustransit.nasa.gov.

159

00:07:13,996 --> 00:07:16,666

And before we wrap up I assume
you went out and watched

160

00:07:16,666 --> 00:07:17,816

for a little while yourself?

161

00:07:17,816 --> 00:07:18,746

>> Yes, I did.

162

00:07:18,746 --> 00:07:19,866

I wouldn't have missed it.

163

00:07:19,866 --> 00:07:23,186

I actually was in the
studio right before hand

164

00:07:23,286 --> 00:07:24,736

with the NASA edge group.

165

00:07:25,296 --> 00:07:27,336

And fortunately my timing was

166

00:07:27,336 --> 00:07:29,046

such that I was able
to go outside.

167

00:07:29,046 --> 00:07:30,716

And fortunately for
us here in Houston

168

00:07:30,946 --> 00:07:34,036

that the skies were
clear, very much so.

169

00:07:34,036 --> 00:07:38,226

So I had visibility and I used
a telescope with a camera,

170

00:07:38,226 --> 00:07:40,656

got some personal images of it.

171

00:07:40,656 --> 00:07:42,366

And had the solar
filter of course,

172

00:07:42,366 --> 00:07:44,076

all the safety things,
I can still see.

173

00:07:44,076 --> 00:07:49,056

And it was -- it was
just a moment in time.

174

00:07:49,056 --> 00:07:53,376

And I was thinking what might
have been in James Cook's mind

175

00:07:53,376 --> 00:07:57,326

when he was viewing
it in Tahiti in 1769.

176

00:07:57,326 --> 00:08:00,856

It was just a spectacular,
you know, singular moment

177

00:08:00,936 --> 00:08:02,046

that I won't forget,

178

00:08:02,046 --> 00:08:04,776
and hopefully many others
will not forget either.

179
00:08:04,846 --> 00:08:06,166
>> We talked a little
bit last time

180
00:08:06,166 --> 00:08:11,346
about how it's not necessarily
the same scientific significance

181
00:08:11,346 --> 00:08:14,036
as it meant for the
earlier transits,

182
00:08:14,036 --> 00:08:17,116
but still obviously a lot
of interest in the photos.

183
00:08:17,116 --> 00:08:19,136
You want [Inaudible]
captures people's imagination?

184
00:08:19,326 --> 00:08:23,686
>> I think it puts them
at points in time that --

185
00:08:23,686 --> 00:08:26,616
and connects them, if you
will, with the cosmos,

186
00:08:26,616 --> 00:08:31,476
that's a big statement, I
understand, but as, you know,

187
00:08:31,476 --> 00:08:36,136
we here on Earth, this small
planet, in the big picture

188

00:08:36,136 --> 00:08:40,356
of things, pretty much
insignificant in --

189
00:08:40,356 --> 00:08:43,906
compared to the rest of
the universe, and this --

190
00:08:44,116 --> 00:08:46,406
this sort of thing connects
us with the universe

191
00:08:46,406 --> 00:08:49,306
because it goes to time scales

192
00:08:49,306 --> 00:08:52,446
that are beyond the lifetimes
of us as individuals.

193
00:08:52,726 --> 00:08:53,476
>> All right.

194
00:08:53,476 --> 00:08:55,326
Well thank you again for
coming out both times,

195
00:08:55,326 --> 00:08:57,836
we really appreciate it, I think
a lot of people enjoyed it,

196
00:08:57,836 --> 00:09:01,436
and we will hope to hear more
about these sorts of events