



1
00:00:00,516 --> 00:00:07,996
[Didgeridoo music]

2
00:00:08,496 --> 00:00:11,116
>> I'm Don Pettit, and
we have Dan Burbank here.

3
00:00:11,586 --> 00:00:13,196
We're on the International
Space Station,

4
00:00:13,616 --> 00:00:16,876
and we're doing a
demonstration with didgeridoos

5
00:00:17,236 --> 00:00:20,096
and oscillation of
spheres of water.

6
00:00:20,816 --> 00:00:25,826
And we've seen on an earlier
science episode what happens

7
00:00:26,086 --> 00:00:29,796
when I put a drop of water, or
actually, a fairly large sphere

8
00:00:29,796 --> 00:00:31,836
of water on the speaker,
and I drove it

9
00:00:31,836 --> 00:00:36,216
with pure sign wave
tones from my MP3 player.

10
00:00:36,776 --> 00:00:39,806
And it drove the water sphere,

11
00:00:39,806 --> 00:00:41,746

just some delightful
oscillations.

12

00:00:41,956 --> 00:00:46,596

And so what we're doing now is
live, real-time, no recording.

13

00:00:47,316 --> 00:00:49,466

We're going to drive
sphere oscillations

14

00:00:49,656 --> 00:00:56,846

with the melodious notes
from our orbital didgeridoo.

15

00:00:57,916 --> 00:01:00,446

Now, I didn't happen
to bring a didgeridoo

16

00:01:00,556 --> 00:01:02,156

with me on this mission.

17

00:01:02,156 --> 00:01:04,296

There's not a lot of room in
the Soyuz to put a didgeridoo,

18

00:01:04,496 --> 00:01:13,936

so we cobbled one up from
the space station vacuum

19

00:01:13,936 --> 00:01:14,816

cleaner hose.

20

00:01:15,326 --> 00:01:17,626

So I got play the didgeridoo.

21

00:01:17,626 --> 00:01:20,626

I'm not really that
much of a musician,

22

00:01:20,746 --> 00:01:23,076

and I certainly don't
look like one.

23

00:01:23,536 --> 00:01:26,166

And you know, the kind of
people that play didgeridoos,

24

00:01:26,166 --> 00:01:28,636

they look pretty
much like musicians,

25

00:01:29,596 --> 00:01:32,136

and maybe I'd better
do something

26

00:01:32,136 --> 00:01:34,876

so I look a little bit more
like a didgeridoo player.

27

00:01:34,876 --> 00:01:35,976

Stand by.

28

00:01:36,516 --> 00:01:47,576

[Silence]

29

00:01:48,076 --> 00:01:50,876

So I got a pair of scissors
and I made my crew shirt

30

00:01:51,346 --> 00:01:56,996

into a real musician
didgeridoo kind of attire.

31

00:01:57,746 --> 00:02:02,176

And so I can play
my didgeridoo now.

32

00:02:04,516 --> 00:02:30,566

[Didgeridoo music]

33

00:02:31,066 --> 00:02:34,336

It's a good thing we have
towels set up all around here

34

00:02:34,986 --> 00:02:35,906

to catch these flying drops.

35

00:02:36,516 --> 00:02:47,546

[Didgeridoo music]

36

00:02:48,046 --> 00:02:50,086

And watch this, now, I'm
going to make these big,

37

00:02:50,086 --> 00:02:53,056

and they're not going to
spall off as much water, now.

38

00:02:53,476 --> 00:02:54,656

That's kind of interesting.

39

00:02:56,516 --> 00:03:10,696

[Didgeridoo music]

40

00:03:11,196 --> 00:03:14,786

Now, let me change out
the right angle adaptor

41

00:03:14,786 --> 00:03:19,196

for the crevice tool, and
let's see how it sounds.

42

00:03:23,516 --> 00:03:39,746

[Didgeridoo music]

43

00:03:40,246 --> 00:03:44,766

And what we're going to

do, now, is we're going

44

00:03:45,056 --> 00:03:49,526

to hook two hoses together
and listen to the sound.

45

00:03:49,526 --> 00:03:51,476

Now, I'm going to be out
of the camera picture

46

00:03:51,476 --> 00:03:54,176

because this is a
long didgeridoo,

47

00:03:54,676 --> 00:03:57,726

but it makes a real cool sound.

48

00:03:57,726 --> 00:03:58,266

So listen.

49

00:04:04,516 --> 00:04:15,546

[Didgeridoo music]

50

00:04:16,046 --> 00:04:18,656

And when we're all done, we
can clean up space station

51

00:04:18,906 --> 00:04:22,146

and vacuum out all
the HEPA filters

52

00:04:22,326 --> 00:04:25,146

that collect all the little
dust bunnies and things

53

00:04:25,146 --> 00:04:26,886

that are generated
during the course

54

00:04:26,886 --> 00:04:28,136
of a week's worth of activity.

55

00:04:29,476 --> 00:04:30,566
>> In summary.

56

00:04:31,716 --> 00:04:34,486
So there's a lot of very
interesting science going

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00:04:34,486 --> 00:04:36,876
on here, and essentially
what you're doing is creating

58

00:04:37,216 --> 00:04:38,716
resonance down the
length of a hose.

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00:04:38,716 --> 00:04:42,276
And the hoses are kind of tuned
generally to a specific note.

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00:04:42,556 --> 00:04:46,396
And if you change the outlet
end of it here, you can change

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00:04:46,396 --> 00:04:49,406
where the nodes are in
that wave, for example.

62

00:04:49,656 --> 00:04:53,896
So we're hypothesizing that by
putting this right angle adaptor

63

00:04:53,896 --> 00:04:57,246
on it, that essentially, you're
cutting the frequency in half

64

00:04:57,466 --> 00:04:59,286
and making a higher pitch

65

00:04:59,286 --> 00:05:01,916

because you're essentially
anchoring a note here.

66

00:05:01,916 --> 00:05:03,076

There will be a note
at this end,

67

00:05:03,076 --> 00:05:04,516

and you'll essentially
have a standing wave

68

00:05:04,516 --> 00:05:06,566

down the length of this hose.

69

00:05:06,836 --> 00:05:08,716

With two hoses -- and
if you were to remove it

70

00:05:08,716 --> 00:05:10,976

and put the crevice
tool, our thinking is

71

00:05:11,206 --> 00:05:15,806

that you've now got a pitch of a
tone that's about half of that,

72

00:05:15,806 --> 00:05:16,866

so it's a much lower tone.

73

00:05:17,106 --> 00:05:19,866

And then if you attach
two ends of the hose,

74

00:05:19,866 --> 00:05:22,396

or two hoses together,
it's getting lower still.

75

00:05:22,586 --> 00:05:26,356

And so it's really interesting,
and it's also very interesting

76

00:05:26,356 --> 00:05:31,096

to see how the size of the
spheres is affected by the tone.

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00:05:31,096 --> 00:05:35,116

So the spheres are tuned, and
you can excite a mode in those,

78

00:05:35,116 --> 00:05:36,766

and it's dependent
upon the tone as well.

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00:05:36,766 --> 00:05:40,216

So it's an interesting mix of
science, music, a little bit

80

00:05:40,216 --> 00:05:44,056

of culture, and a little
bit of cleaning supplies

81

00:05:44,056 --> 00:05:45,126

from aboard the state station.

82

00:05:45,126 --> 00:05:49,446

So anyways, it's
always an interesting,

83

00:05:49,946 --> 00:05:51,466

interesting exercise.