



1
00:00:05,380 --> 00:00:08,310
I'm Don Pettit.

2
00:00:08,310 --> 00:00:14,190
I'm on the International Space Station
We're going to look at how crew

3
00:00:14,190 --> 00:00:22,430
in orbit can drink beverages out of an open
container, not unlike what we do on Earth.

4
00:00:22,430 --> 00:00:34,690
This is a zero-g cup and
I'm putting some tea in it.

5
00:00:34,690 --> 00:00:39,920
We drink all our fluids from a bag, suck
them up out of bags through a straw.

6
00:00:39,920 --> 00:00:46,720
But this container uses capillary force
and container shape to make the fluid rise

7
00:00:46,720 --> 00:00:49,750
up the side and park itself
right next to the lip.

8
00:00:49,750 --> 00:00:54,490
Where now can casually sip your
tea or coffee, or whatever,

9
00:00:54,490 --> 00:00:56,430
and drink it like you would a normal cup.

10
00:00:56,430 --> 00:01:01,050
Now this shows, this shows a
very special aspect of this cup.

11
00:01:01,050 --> 00:01:04,200

It's got a cross section
with an acute angle to it.

12

00:01:04,200 --> 00:01:08,000

And the fluid wicks it up the acute angle.

13

00:01:08,000 --> 00:01:15,320

And if that angle is less than 2 times
the quantity 90 minus the contact angle,

14

00:01:15,320 --> 00:01:21,370

then it will flow into that channel
and park itself next to the top..

15

00:01:21,370 --> 00:01:25,180

So here I have my cup.

16

00:01:25,180 --> 00:01:29,590

And it's just floating there with the water
in it, and it's behaving like it should

17

00:01:29,590 --> 00:01:34,490

with the meniscus crawling up near
the lip, and now I'm able to drink it.

18

00:01:34,490 --> 00:01:42,390

And the more water I drink, the
more water that gets conducted

19

00:01:42,390 --> 00:01:45,840

up this open channel and
parks itself near the lip.

20

00:01:45,840 --> 00:01:53,220

And this is the same kind of
geometry and technology that we use

21

00:01:53,220 --> 00:01:56,240

for controlling fuel inside a rocket fuel tank.

22
00:01:56,240 --> 00:02:04,260
We have a series of vanes and it keeps the rocket propellant near the suction port so that

23
00:02:04,260 --> 00:02:07,850
when you're in a weightless environment, you can start your rocket engine

24
00:02:07,850 --> 00:02:09,970
without ingesting a big gas bubble.

25
00:02:09,970 --> 00:02:13,720
So you get a gas bubble in a rocket engine, they don't like that.

26
00:02:13,720 --> 00:02:21,440
So once you make these cups, then you can actually enjoy a beverage

27
00:02:21,440 --> 00:02:27,970
in a weightless environment much like we have beverages and enjoy them on Earth.

28
00:02:27,970 --> 00:02:32,900
And sucking all your fluids out a bag gets a little old after a while

29
00:02:32,900 --> 00:02:38,850
and just doesn't fit the human character in terms of sharing a meal.

30
00:02:38,850 --> 00:02:45,220
So here we are in the Node 1 with all our colleagues, cosmonauts, ESA astronauts.

31
00:02:45,220 --> 00:02:52,110
And I made six of these cups, and we're sitting here having a tea break during dinner,

32

00:02:52,110 --> 00:02:57,670
and we're discussing all kinds of
things, and behaving just like people do

33
00:02:57,670 --> 00:03:00,530
when they get together with their
friends or their colleagues,

34
00:03:00,530 --> 00:03:04,610
and drink beverages and eat a meal.

35
00:03:04,610 --> 00:03:09,400
And you can see we can control
these cups and sip our beverages

36
00:03:09,400 --> 00:03:12,540
without sloshing and spilling them around.

37
00:03:12,540 --> 00:03:18,680
There's mine, and see if I can't take
a sip, but it doesn't work if you try

38
00:03:18,680 --> 00:03:21,550
to take a sip through the camera.

39
00:03:25,250 --> 00:03:34,990
Now with six of these cups and our crew,
we can for the first time have a crew toast

40
00:03:34,990 --> 00:03:42,000
where this was filled I believe on Russian
Christmas or the day after Russian Christmas

41
00:03:42,000 --> 00:03:44,370
and we were taking a moment to celebrate.

42
00:03:44,370 --> 00:03:51,620
So here we go celebrating Russian
Christmas on orbit with a toast of tea.

43

00:03:52,720 --> 00:03:58,750

And all of this of course is brought about by
understanding capillary forces in the absence