June 9, 2024
RESULTS PRESENTATION

ASIAN TRY
ZERO-G

OLOID'S MOVEMENT in MICROGRAVITY

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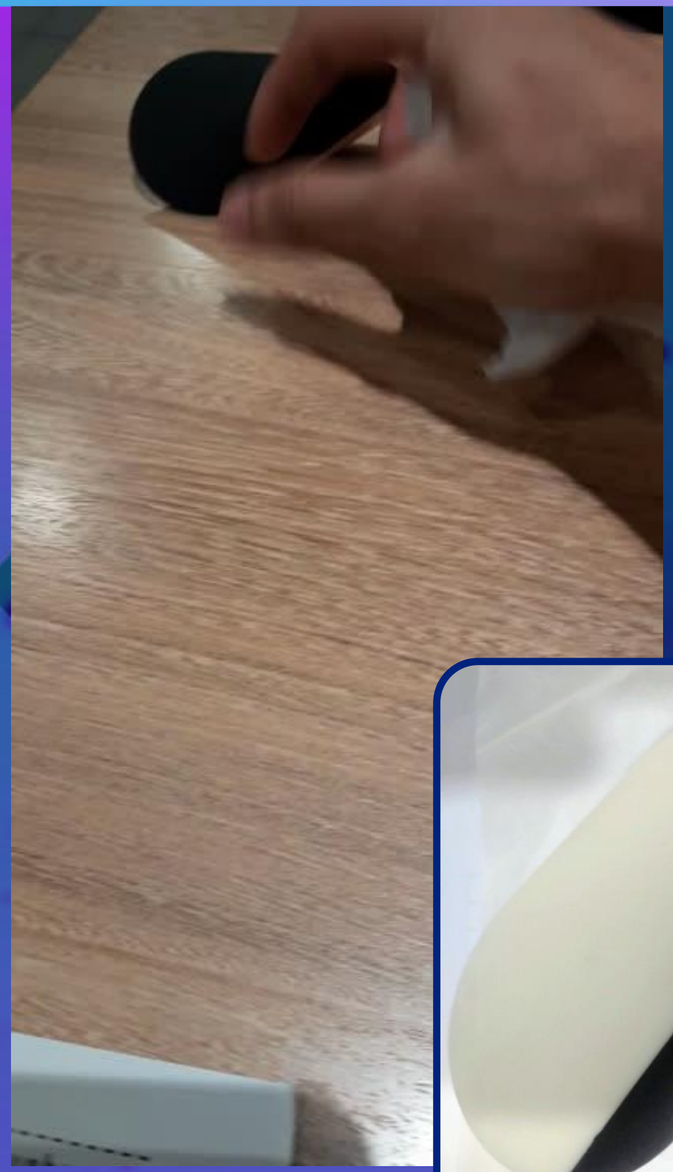
Oloid's Movement in Microgravity



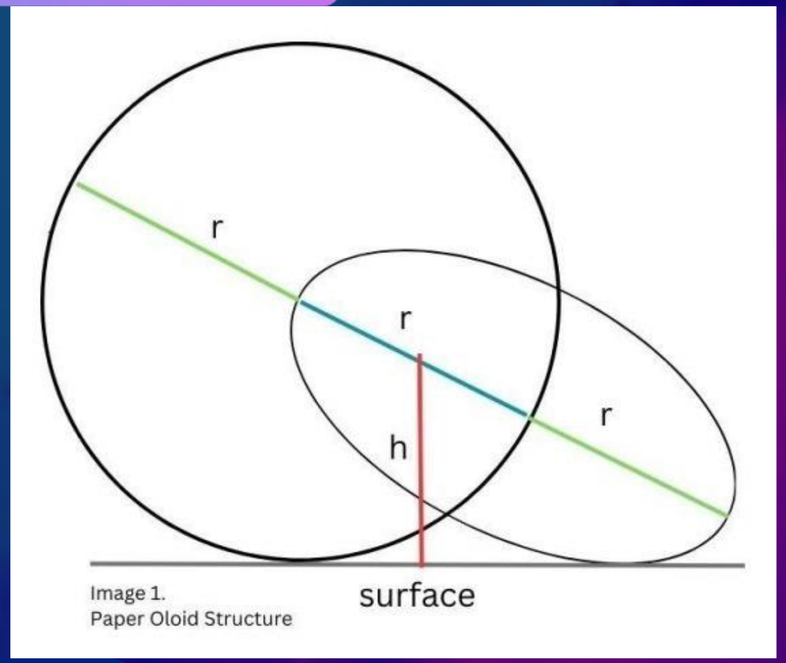


Image 1.
Paper Oloid Structure

Paul Schatz created this three dimensional geometric shape in 1929. The oloid is also known as a two-circle roller (TCR).

The oloid's staggering action makes it perfect for stirring and agitating liquids.

Oloid's Movement in Microgravity

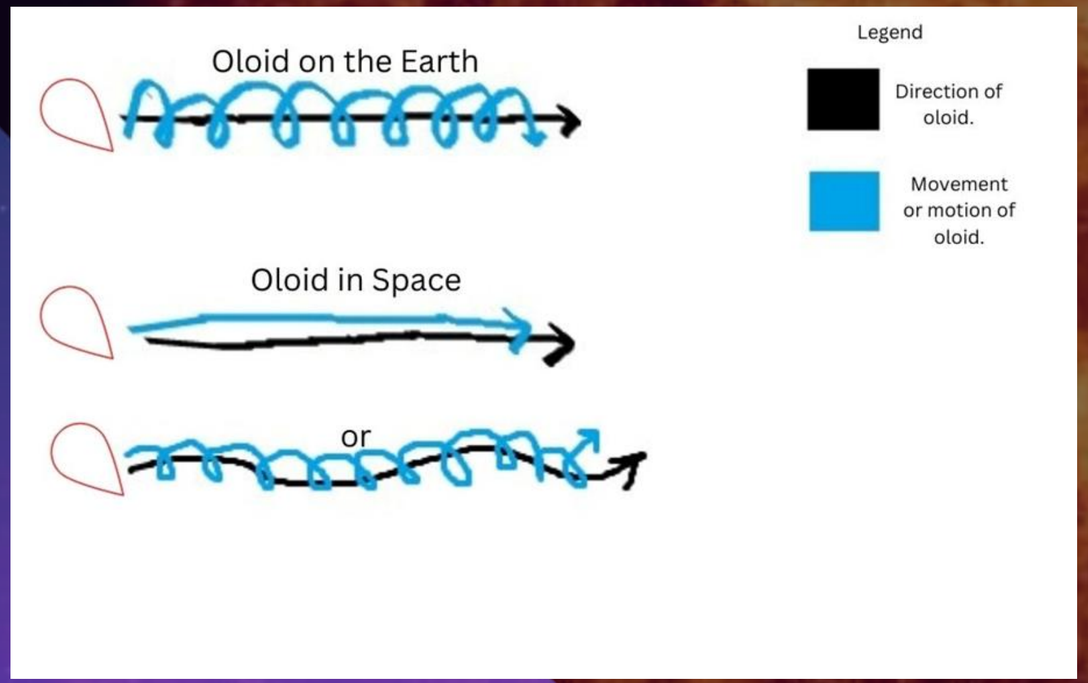
Difference between the maximum and the minimum height:

$$\Delta h = r\left(\frac{\sqrt{2}}{2} - 3\,\frac{\sqrt{3}}{8}\right) \approx 0.0576r$$

Variables:

Δh is the difference between the maximum and minimum height (m).

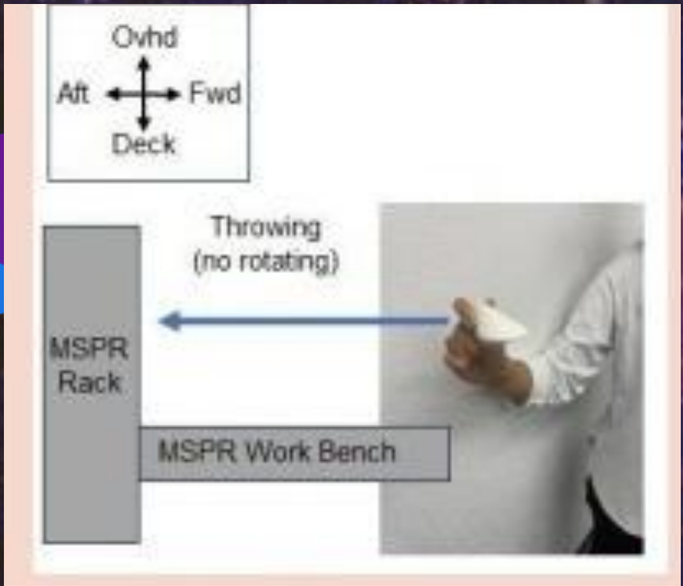
r is the oloid's circular arcs radius (m).



According to Sonett, oloid is a geometrically developable shape object with a characteristic of lemniscate or a rhythmically pulsating figure-eight movement. The center of gravity of oloid stays at a constant distant making it smoothly moves. Since in space is zero or microgravity, the movement of the oloid will be affected.

RESULTS
Discussion

1st procedure

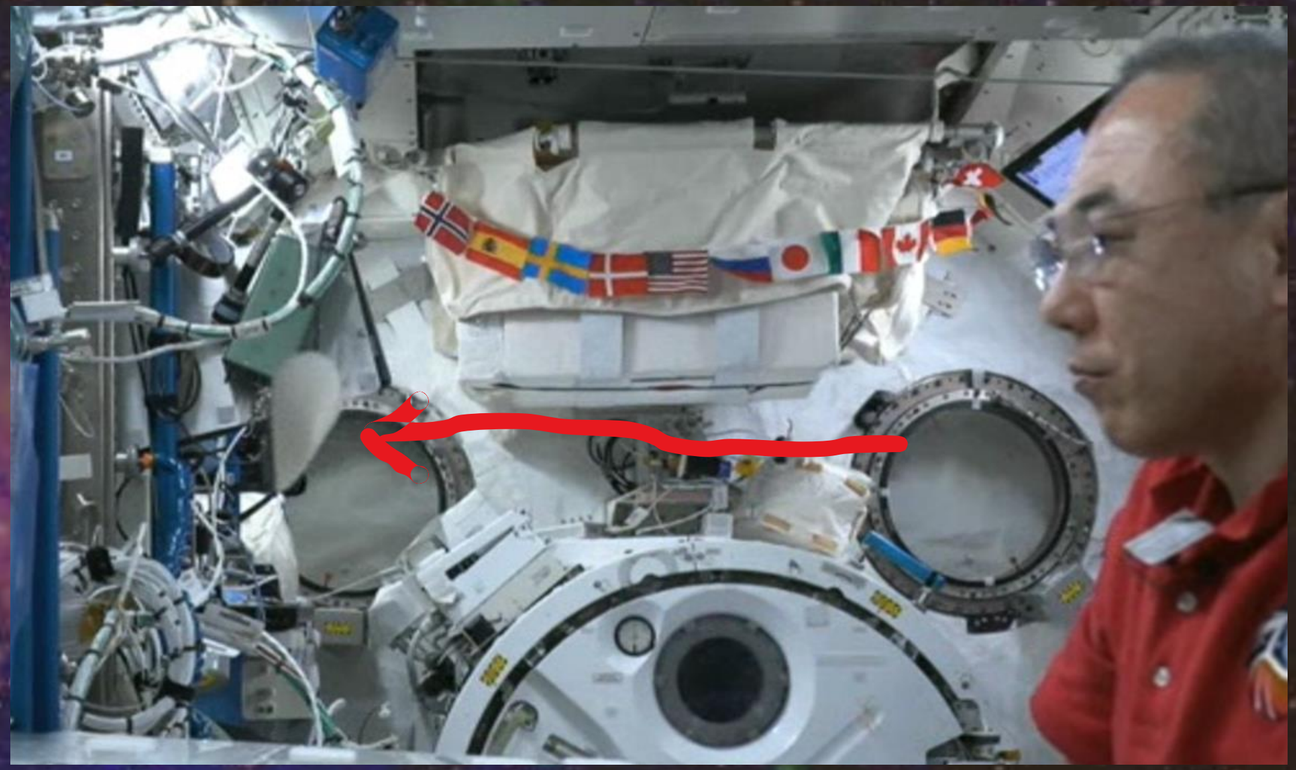


(C) Image from ATZG 2023 Presentation Guide

Gently throw Oloid without rotation above MSPR WB.

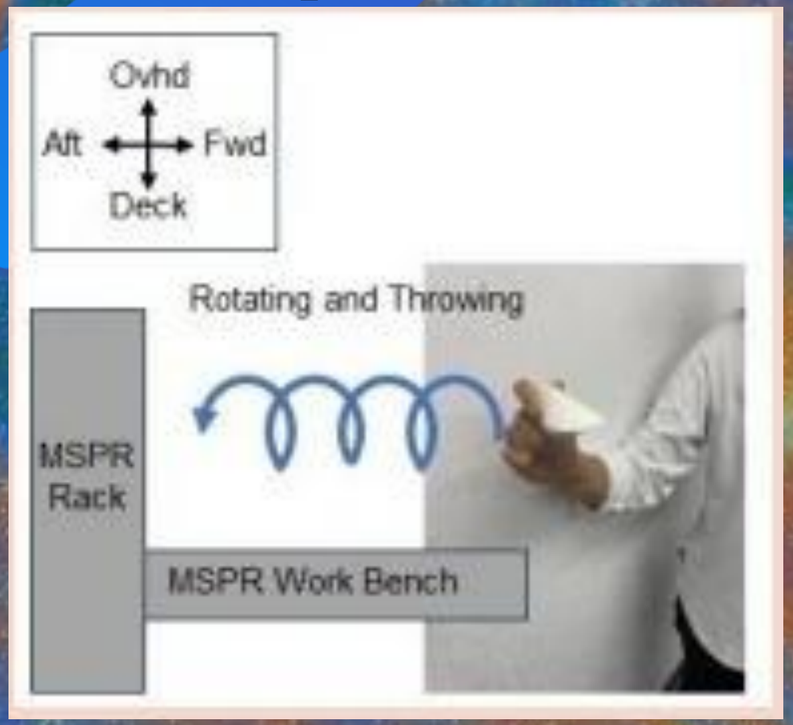
Catch Oloid before it hits MSPR Rack.

Repeat the procedure 3 times.



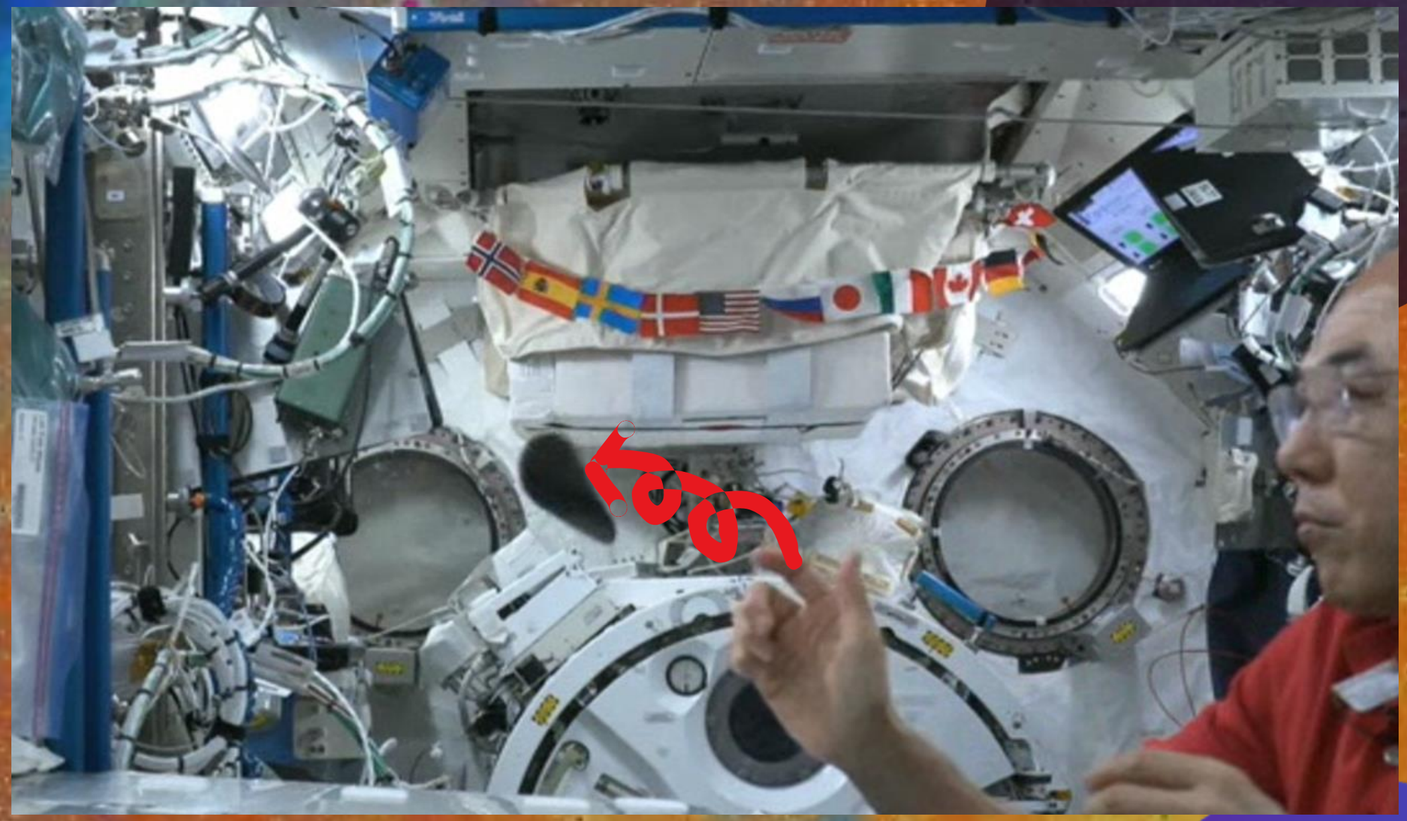
The motion in the 1st procedure exhibited a straight path movement.

2nd procedure



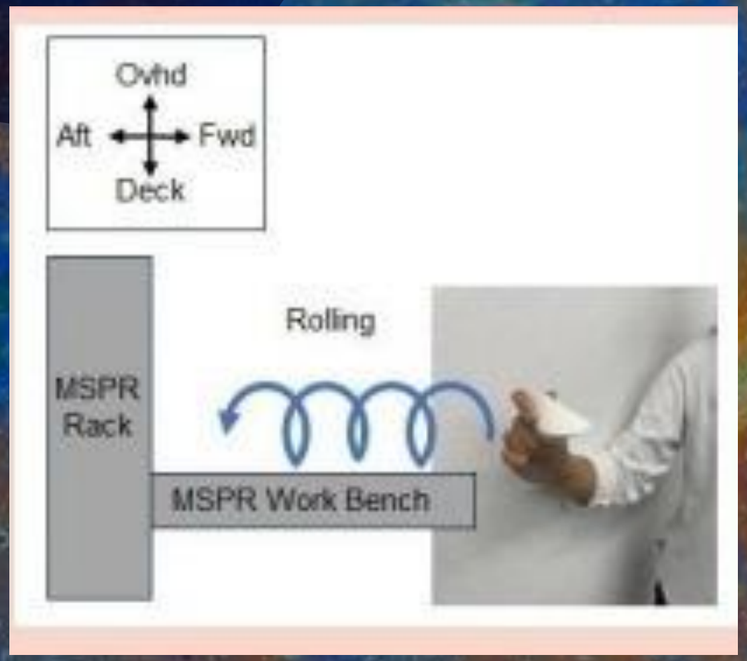
(C) Image from ATZG 2023 Presentation Guide

Gently throw Oloid with rotation above MSPR WB.
Catch Oloid before it hits MSPR Rack.
Repeat the steps 3 times.



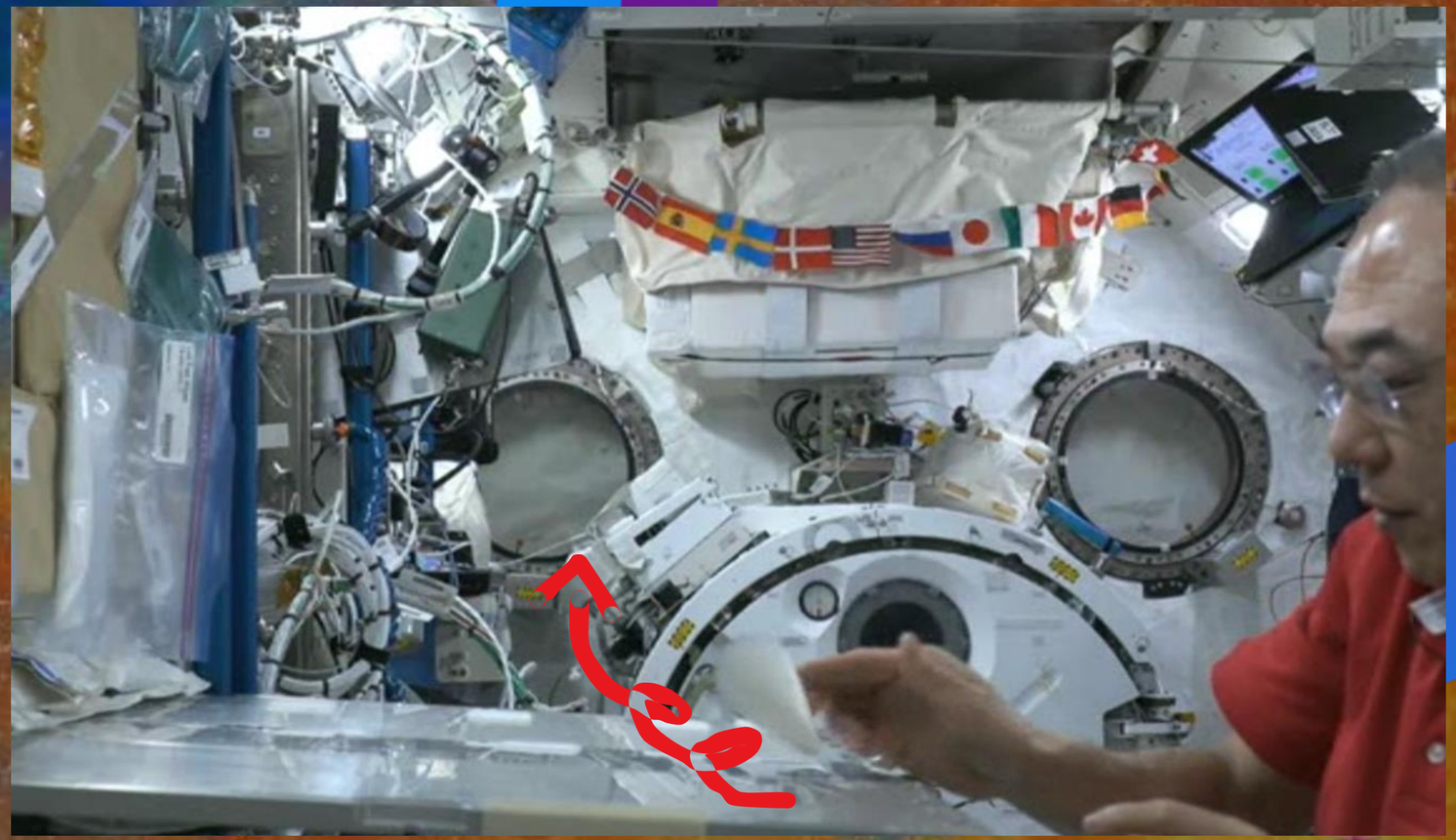
In the 2nd procedure, the oloid continuously rotating as the force applies to it,

3rd procedure

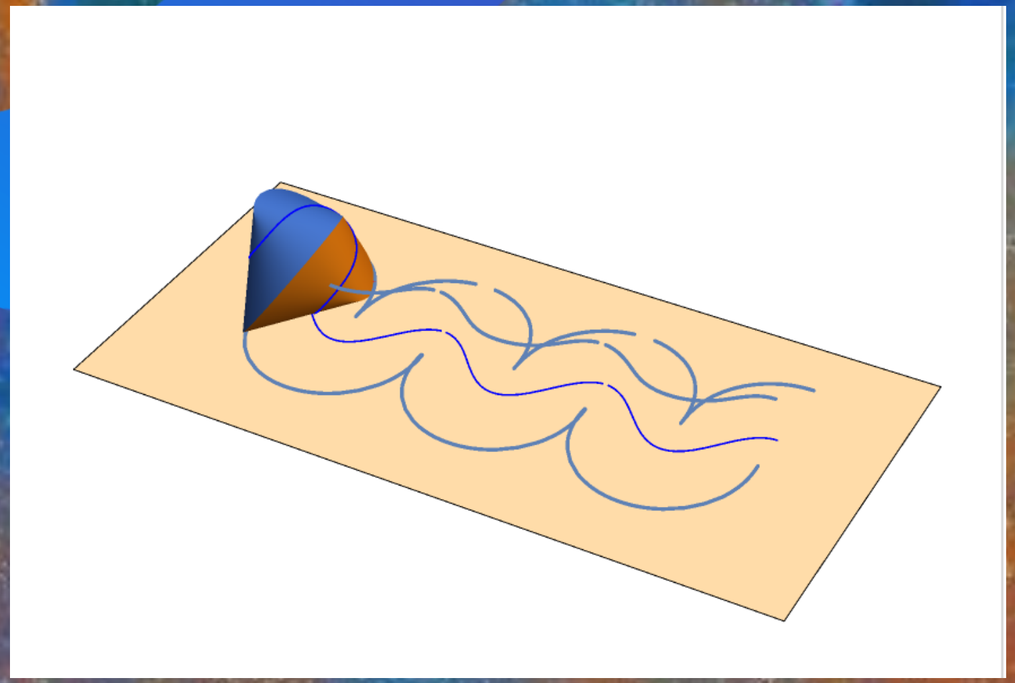


(C) Image from ATZG 2023 Presentation Guide

Gently roll Oloid on MSPR WB.
Catch Oloid before it hits MSPR Rack.
Repeat the steps 3 times.



In the 3rd procedure, the oloid rotate in an upward direction.



Oloid illustration on a surface (Earth/Ground setting)

The oloid's movement exhibited a straight path when thrown without rotating since there is no surface interacting it. Also, when the oloid rolled on MSPR WB the direction moved upward.
In addition, the force applied in moving the oloid contributed in its behavior.

Overall, microgravity alters the behavior of the central mass of an object by removing the influence of gravity, leading to a different motion of the object.

Sources:

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Nishihara, A. "Oloid." http://www1.ttcn.ne.jp/~a-nishi/oloid/z_oloid.html.

Nishihara, A. "Rolling Two Circle Roller." http://www1.ttcn.ne.jp/~a-nishi/oloid/z_ani_1.html.

Schatz, P. "Das Oloid als Wälzkörper." §14 in Rythmusforschung und Technik. Stuttgart: Verlag Freies Geistesleben, 1975.