Interaction Design & Virtual Reality

Liwei chan 詹力韋
Assistant Prof.

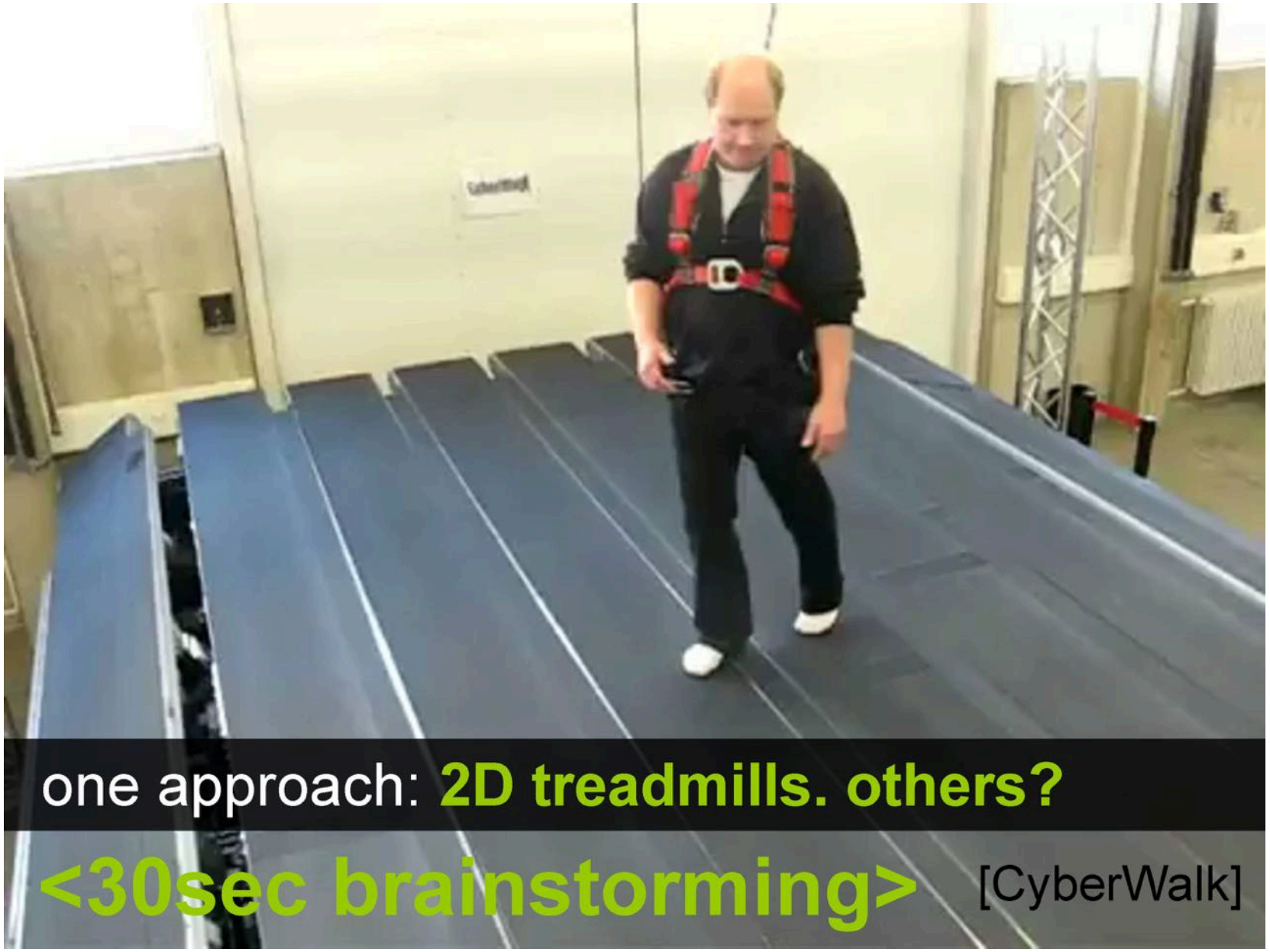
2016.11.25

Actuating Human

Content adapted from

Prof. Patrick Baudisch Anne Roudaut
hciR
hasso-plattner institute

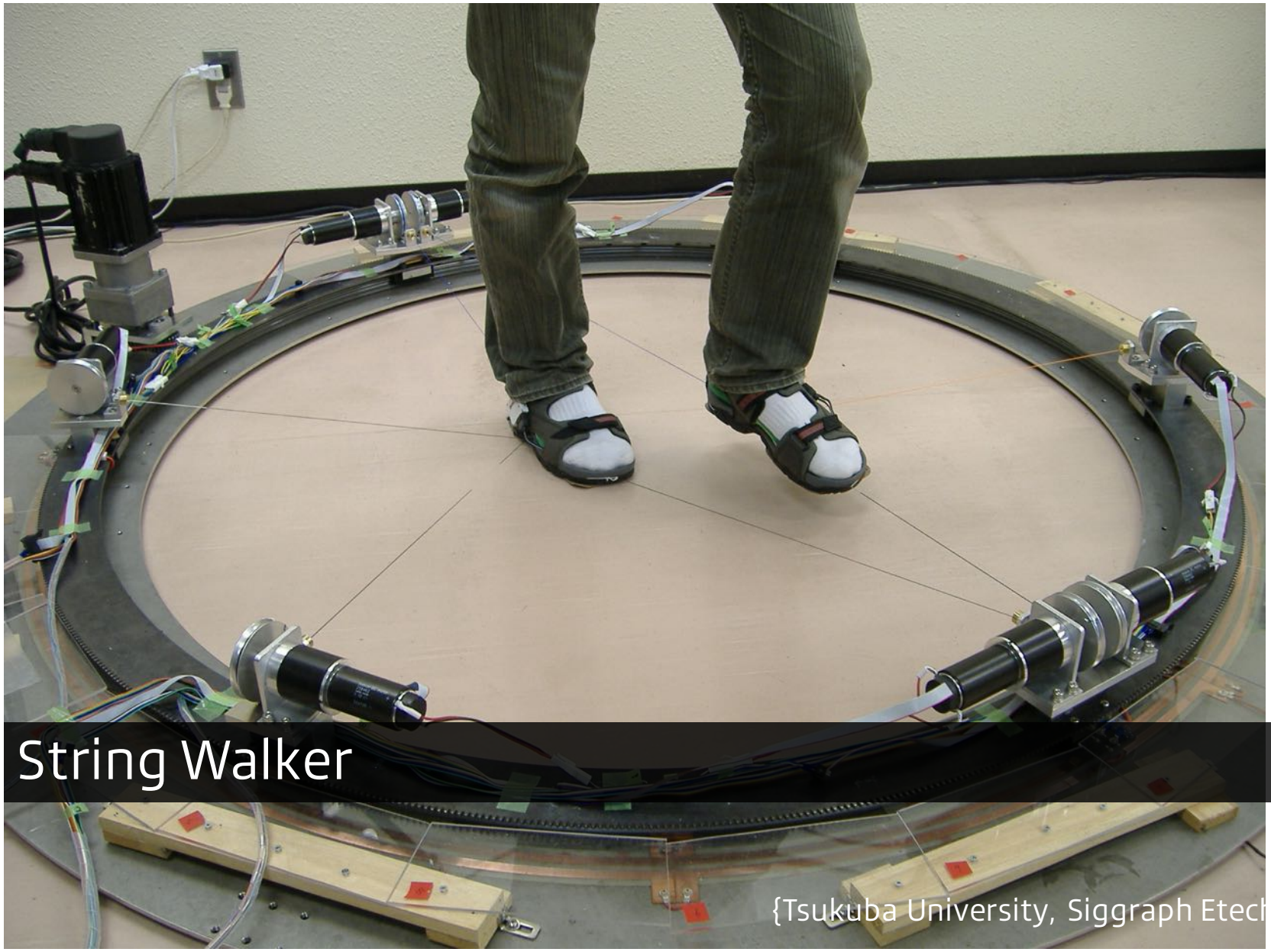
letting them walk


one approach: 2D treadmills. others?
<30sec brainstorming>
[CyberWalk]


hamster wheels


II
I
circula Floor
[Tsukuba University, Siggraph Etech 2004]


http://robot.watch.impress.co.jp/



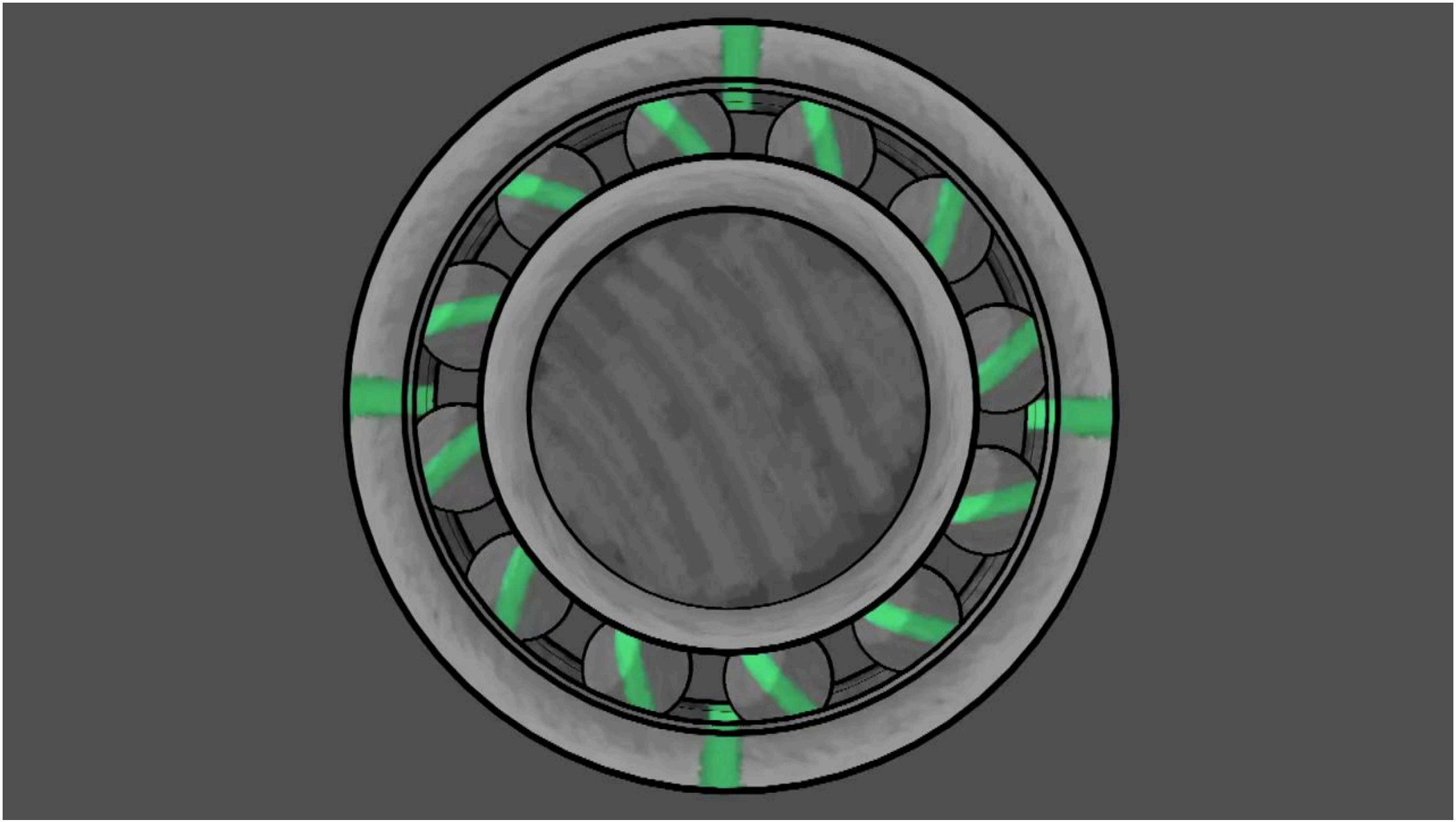
String Walker

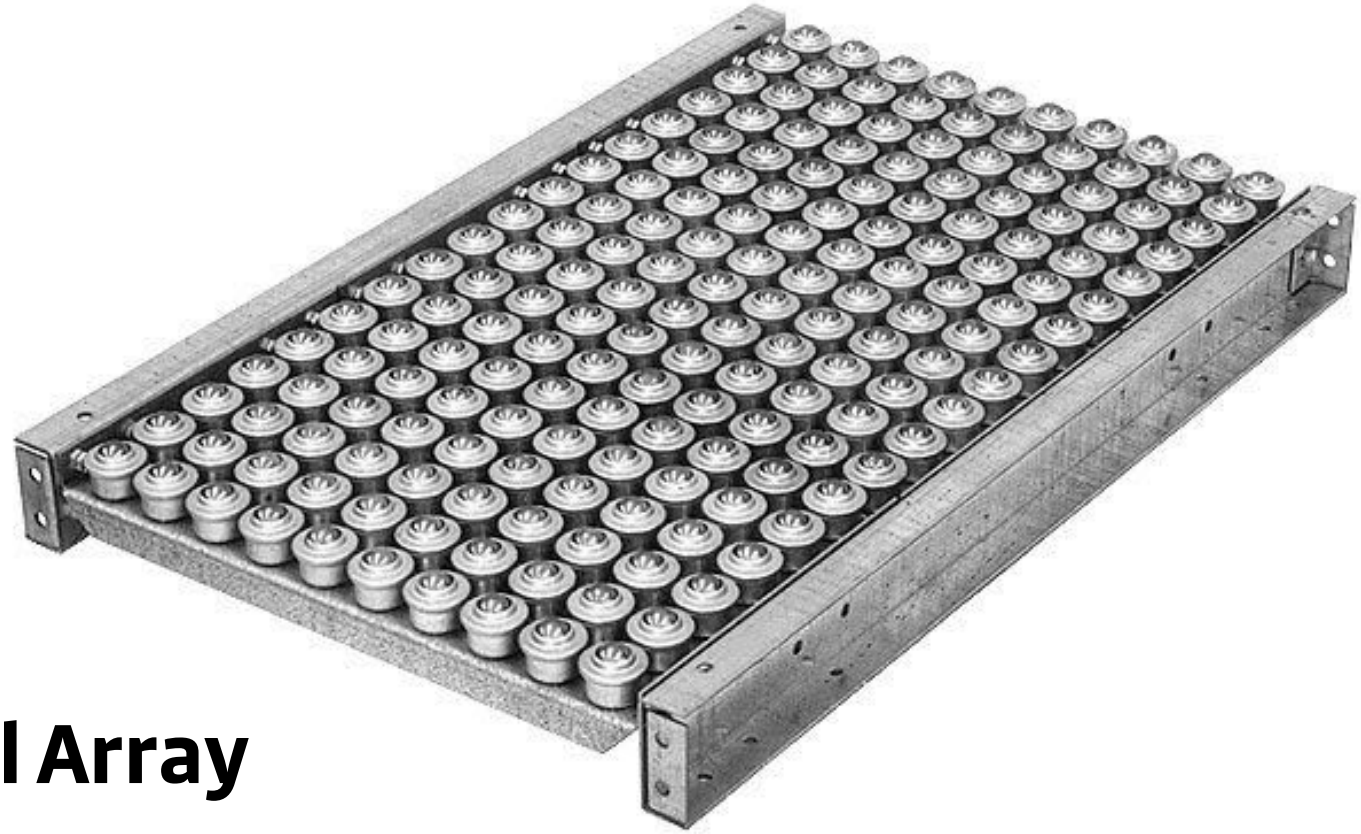
{Tsukuba University, Siggraph Etech


String Walker
{Tsukuba University, Siggraph Etech 2007]

al Reality roller shoes

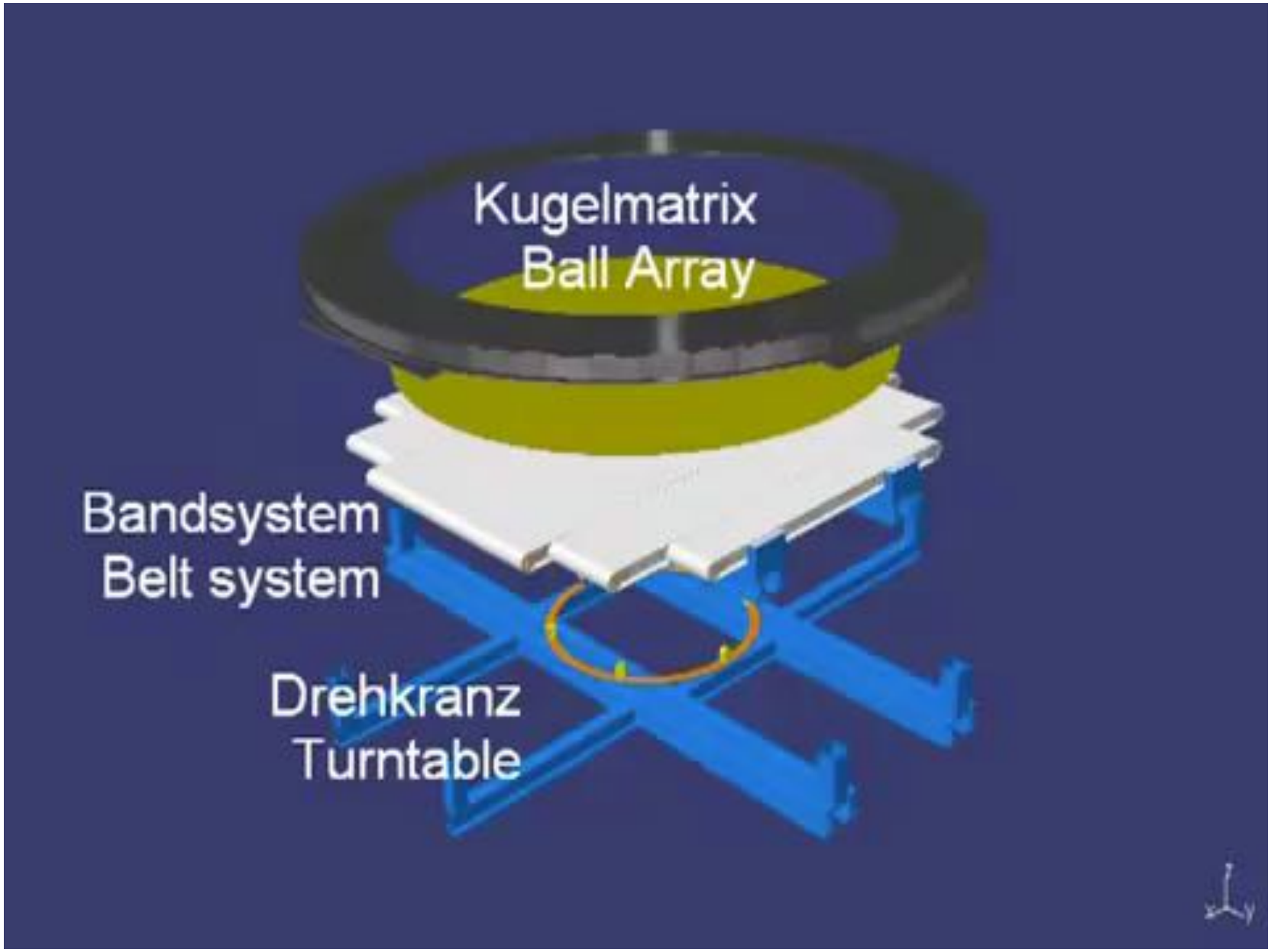

Virtual Reality roller shoes
wheels are put on the sole.



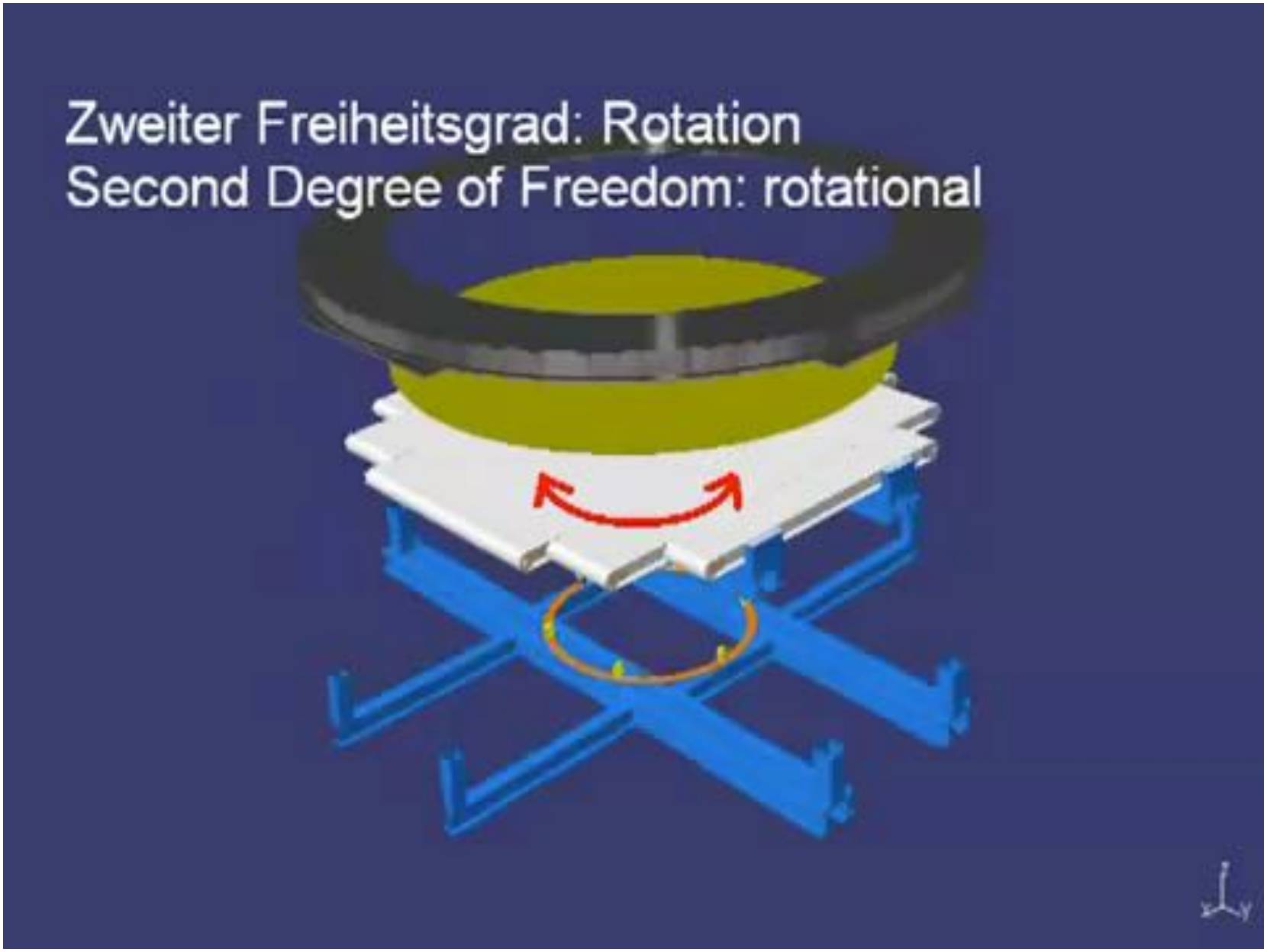


Ball Array

Cyber carpet


Kugelmatrix
Ball Array
Bandsystem
Belt system
Drehkranz
Turntable


Erster Freiheitsgrad: linear
First Degree of Freedom: linear


Zweiter Freiheitsgrad: Rotation
Second Degree of Freedom: rotational

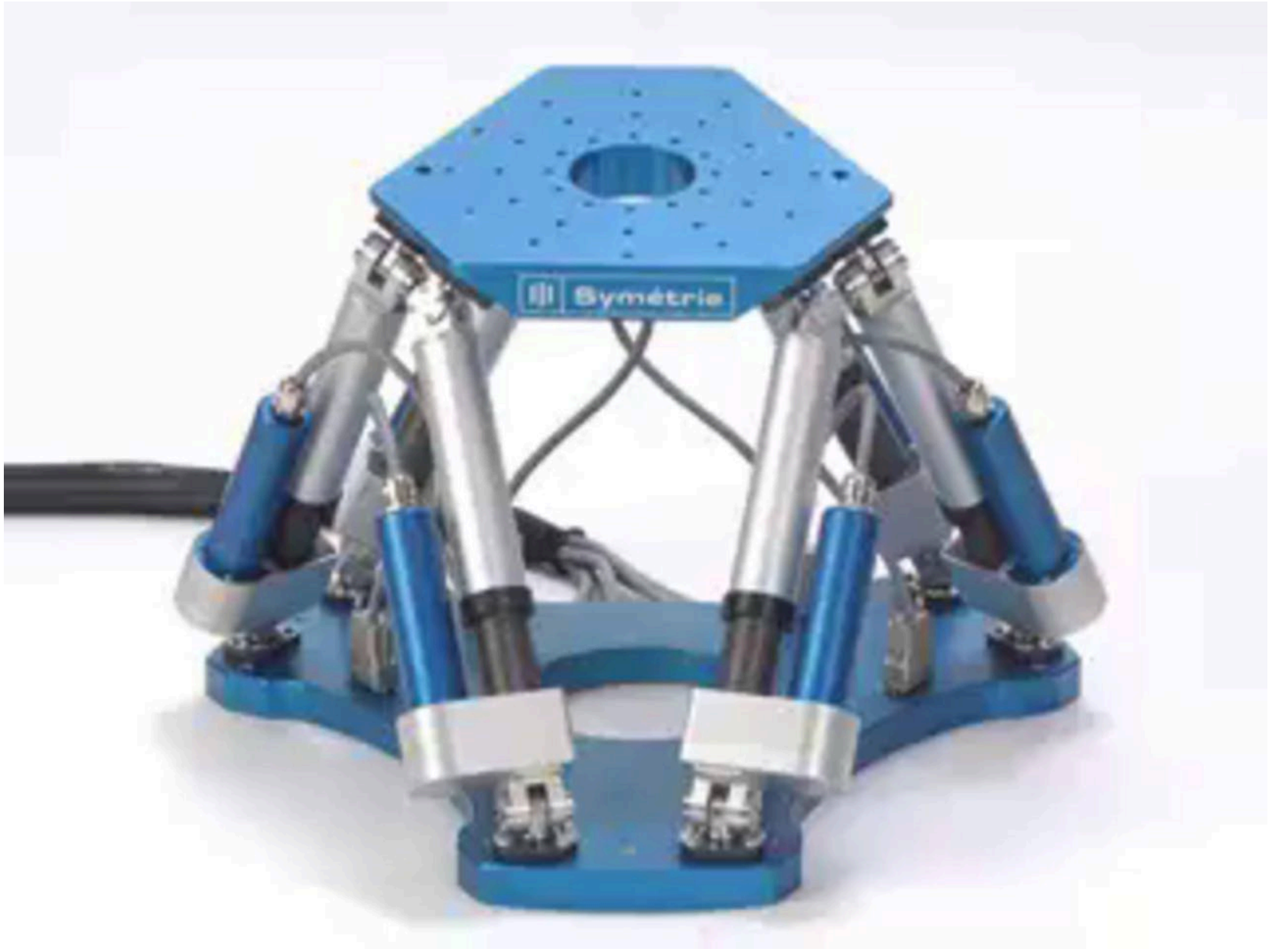

"Learning To Walk"

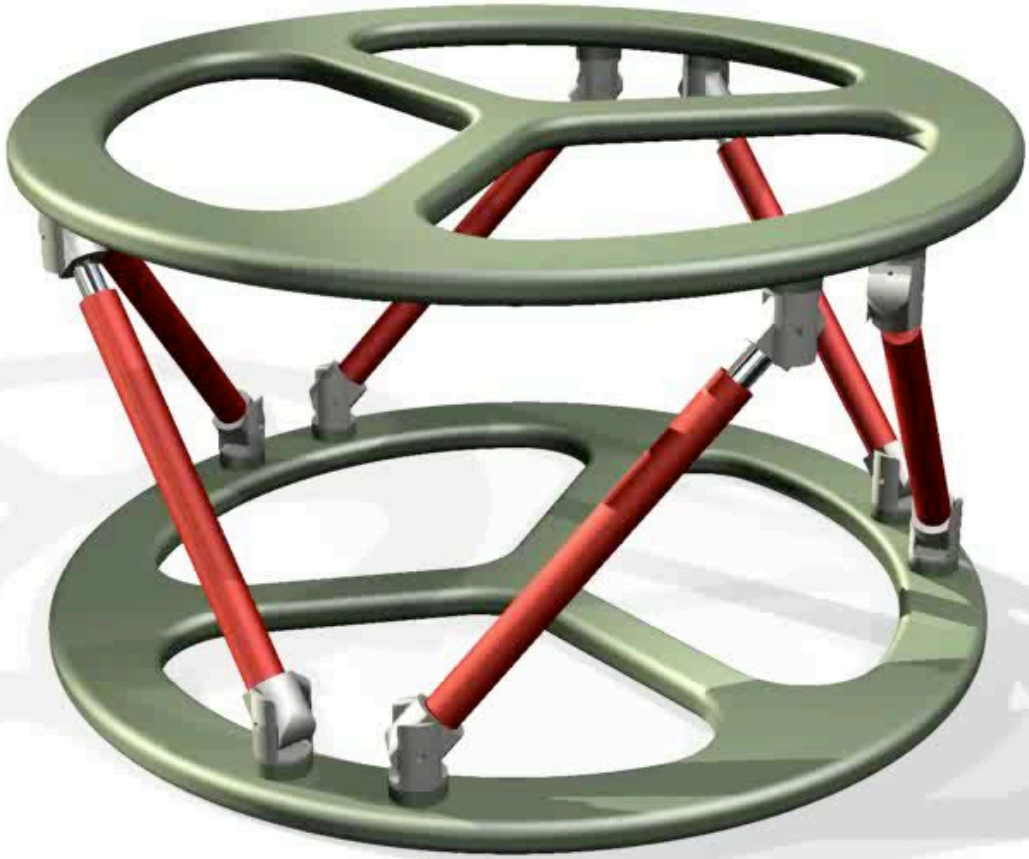
2D treadmill allows users to **move their feet,**
but does not generate a **sense of motion/acceleration.**

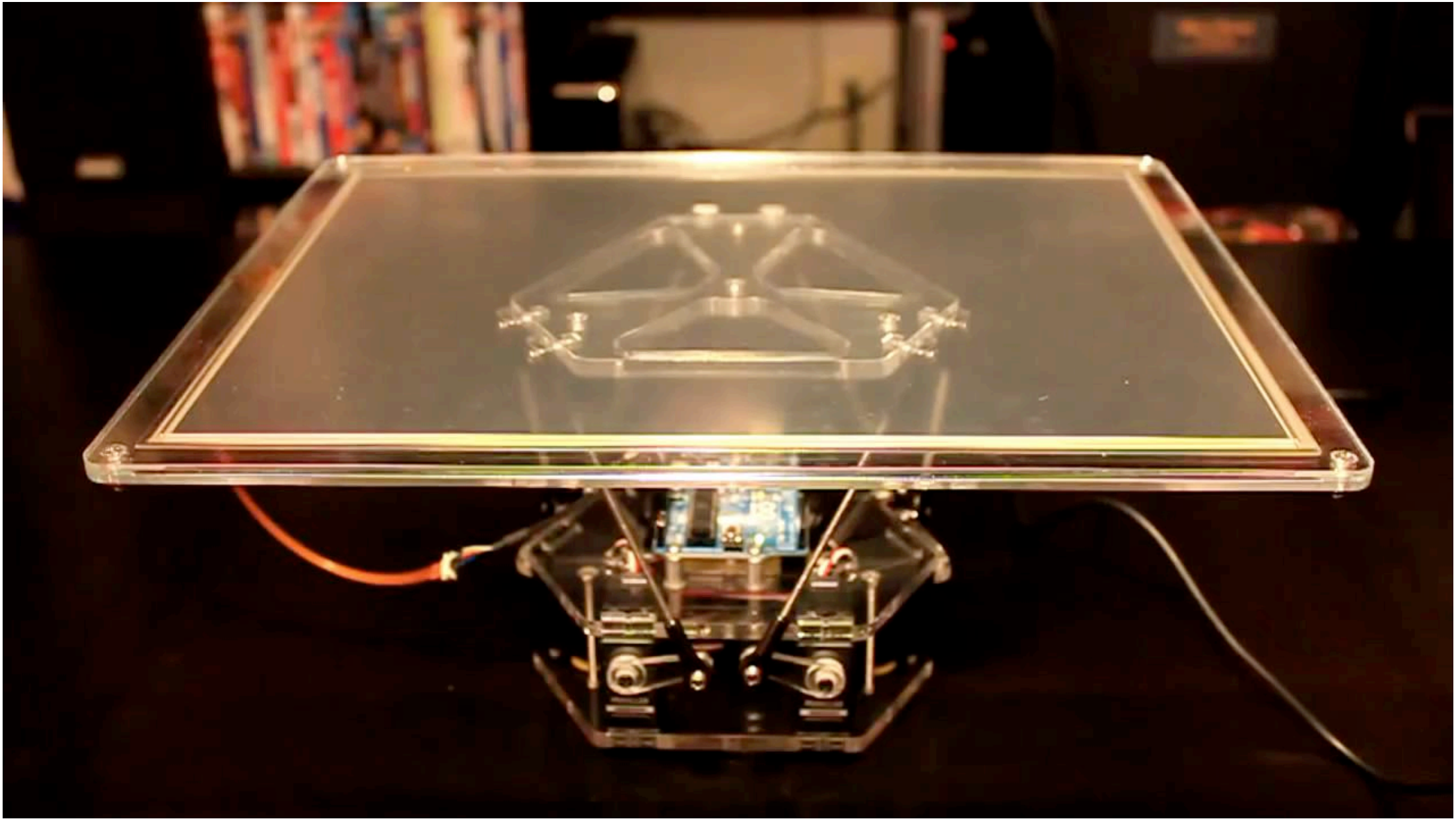
that you can accomplish using…

motion platforms

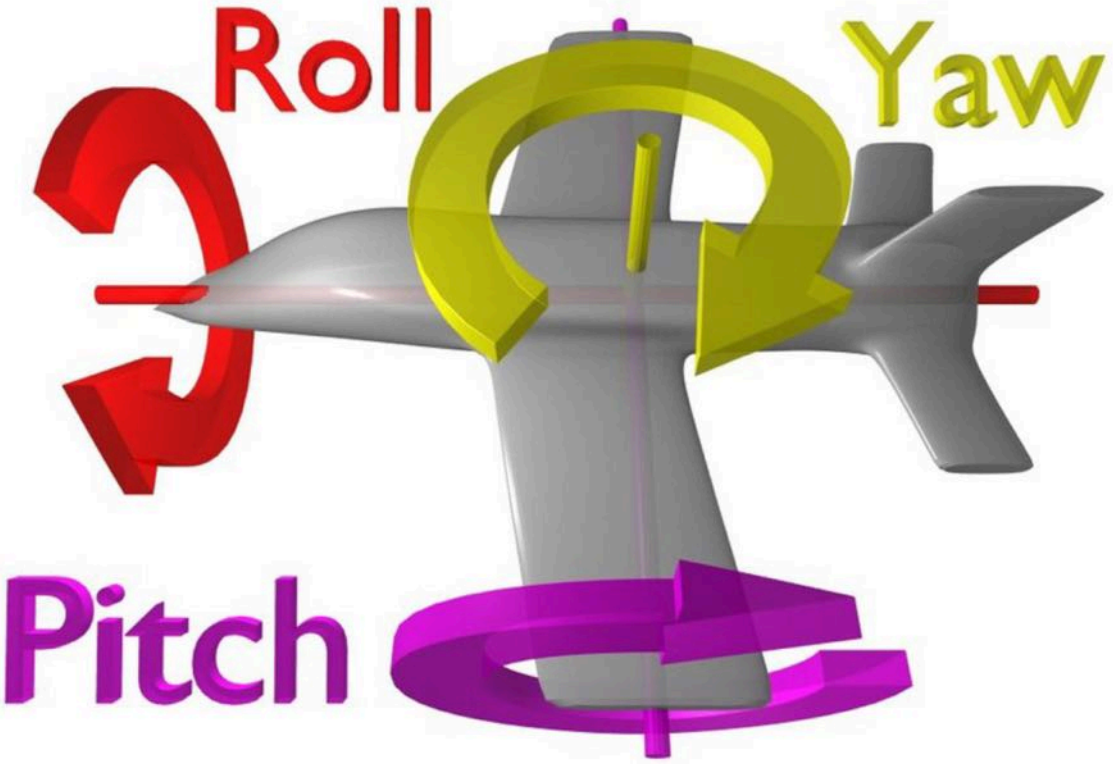
this one is mounted on a **stewart platform,**
a type of motion platform


Symétrie

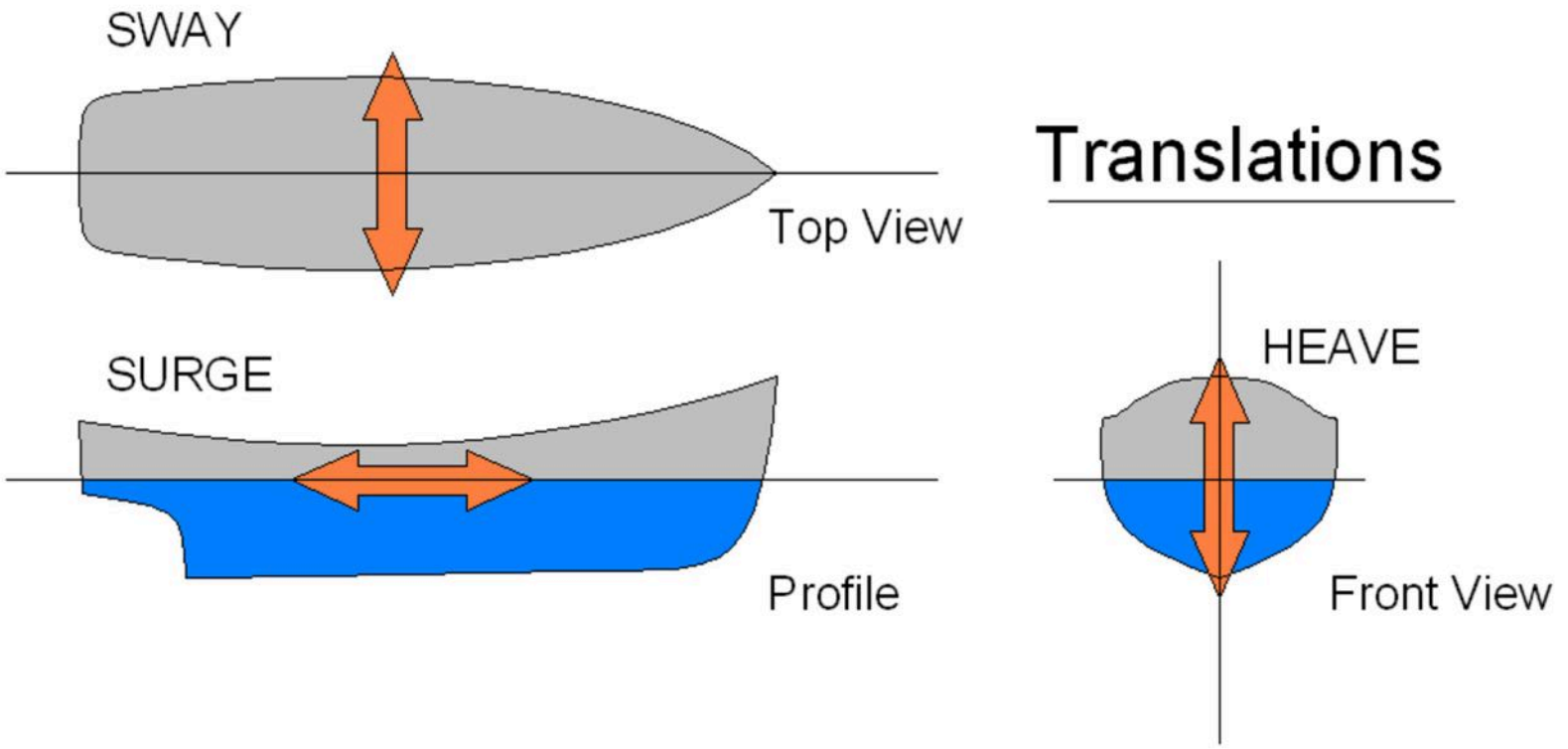




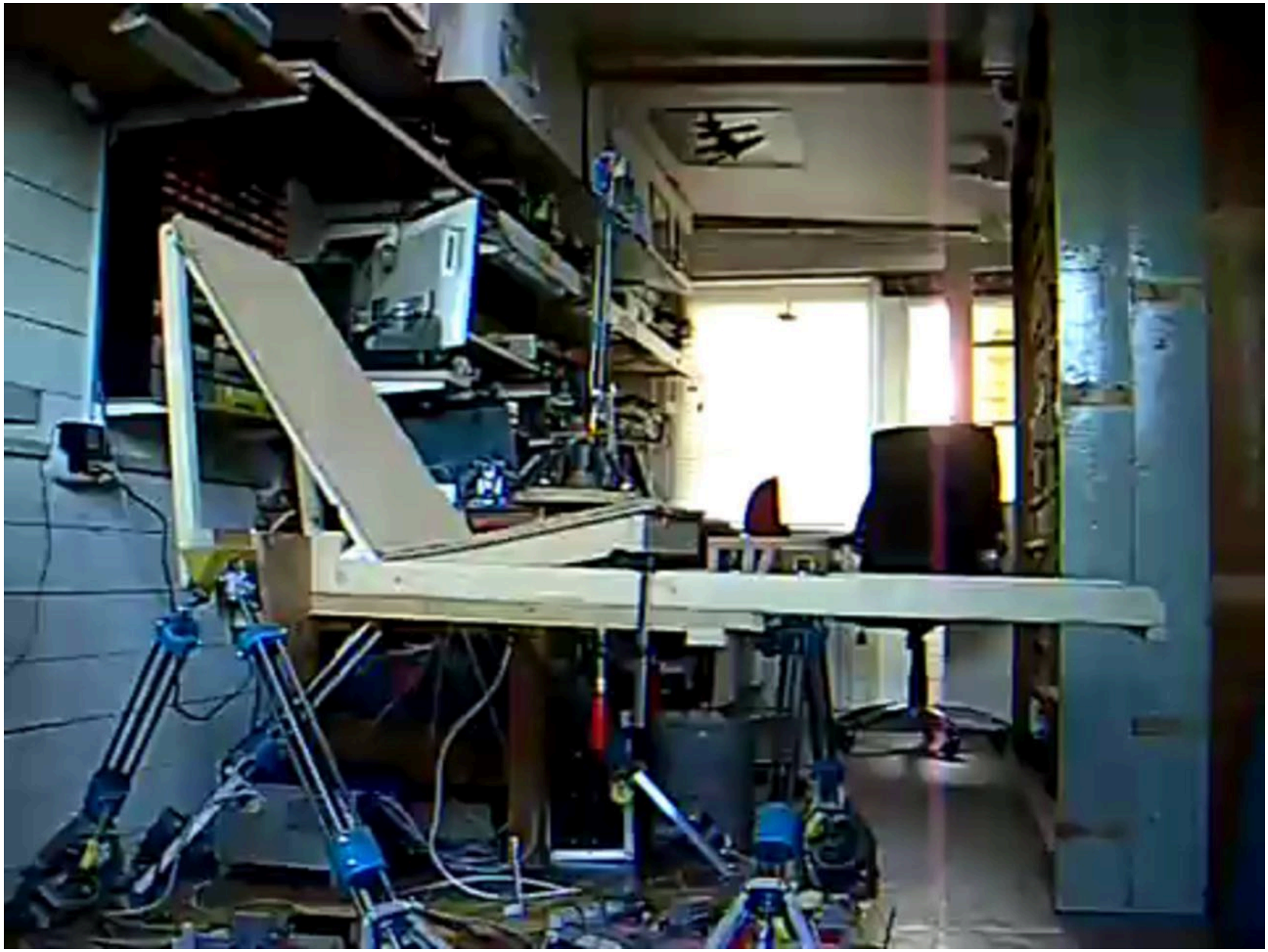
so **which degrees of freedom** does it have (say, up down)
and **how** does the Stewart platform achieve them?



does **three degrees of rotation**



…and **three degrees of translation**



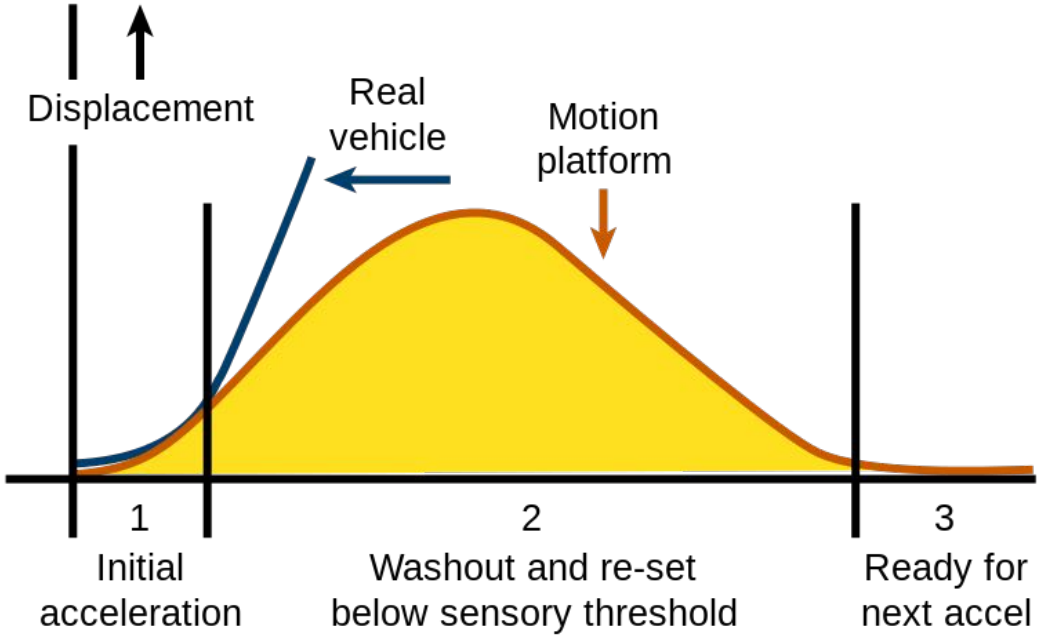

消火栓
H R
Treno
Xindy
Animation
www.xd-cinema.com
sales@xd-cinema.com


Racing CUBE
www.FaseTech.net
Surge.

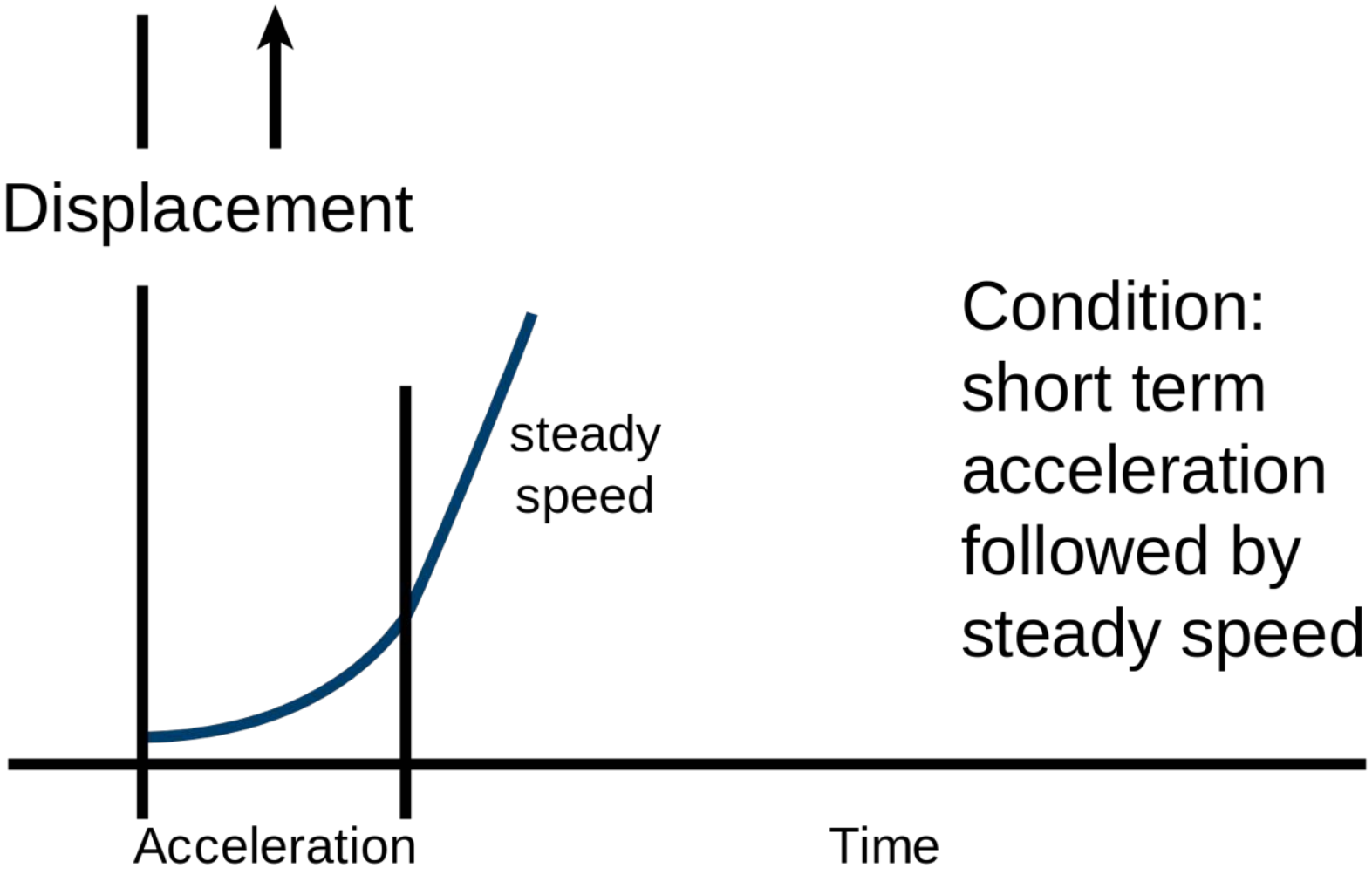
unlike the treadmill, motion simulators have **only limited amplitude,** they address this using…

acceleration onset cueing ::

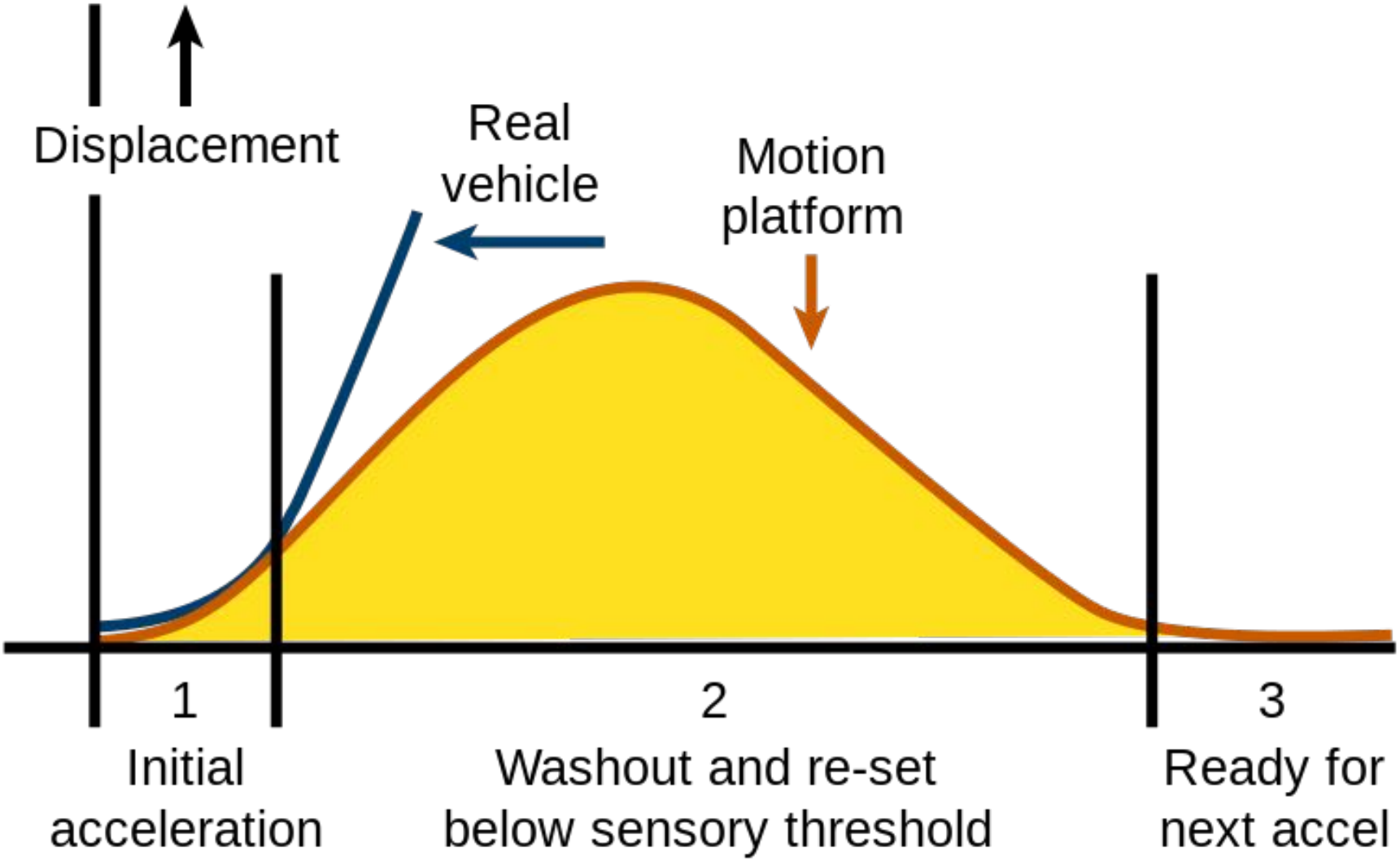
(1) initial acceleration realistic, (2) fade out quickly before reaching end of motion range, (3) move back to neutral position unnoticeably slowly

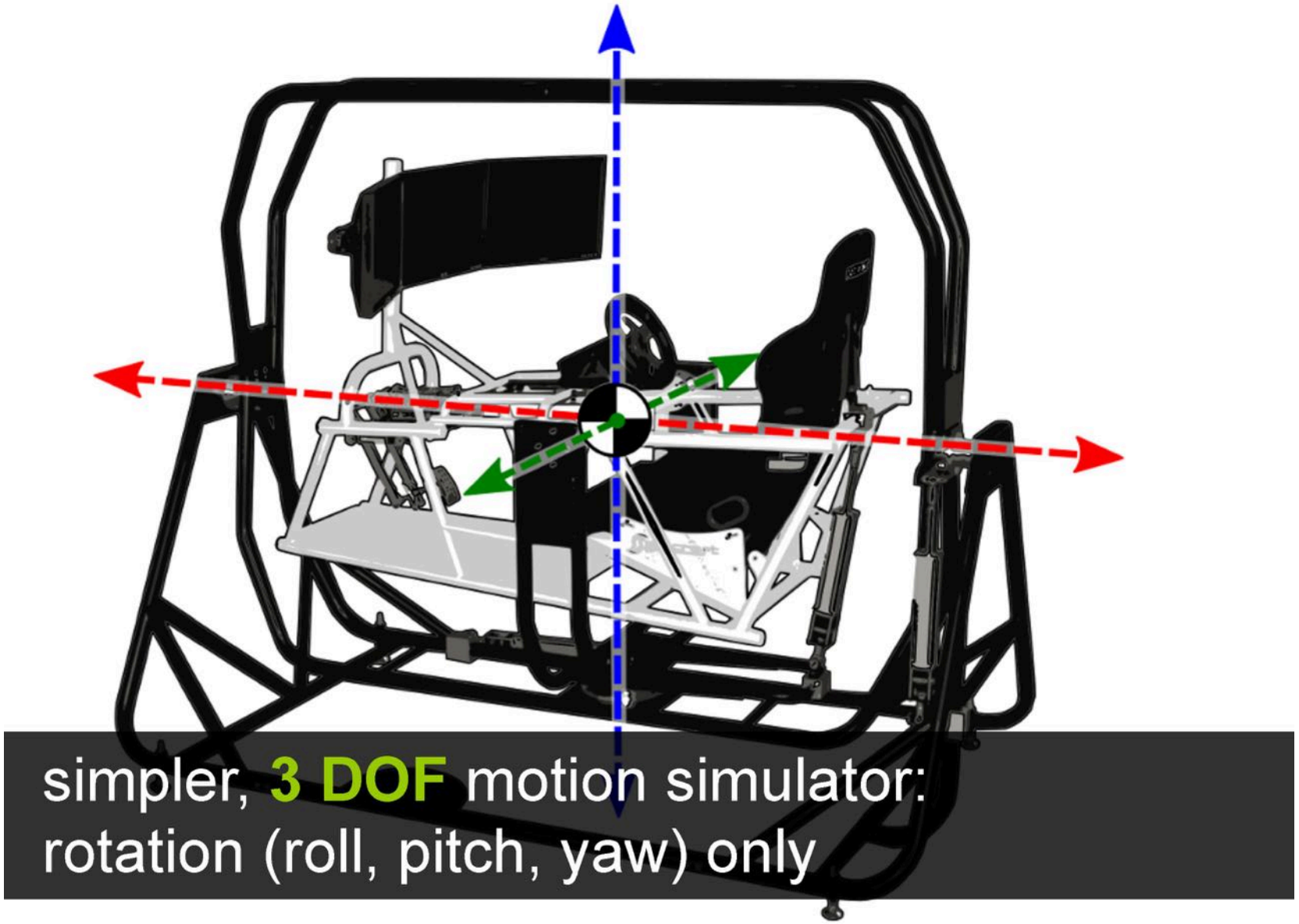


Acceleration-Onset Cueing



Condition:
short term
acceleration
followed by
steady speed


Displacement
Real vehicle
Motion platform
1
2
3
Initial acceleration
Washout and re-set below sensory threshold
Ready for next accel



simpler, **3 DOF** motion simulator:
rotation (roll, pitch, yaw) only

this steward platform is also used to actuate **finger**

instructables

http://www.instructables.com/id/Stewart-Platform/

actuate human skeleton


exoskeletons

based on people

the **size** of machines is proportional to what they actuate
→ motion platforms and locomotion devices will never be small nor cheap

let's **not** use machines


HPI
Haptic Turk
a motion platform based on people