USF Available Technologies

Technology Transfer Office

Shape Shifting Surfaces

Researchers at the University of South Florida have developed a state of the art shape-shifting surface that is a flat or curved surface that can change its shape including its area and the orientation of internal lines, while maintaining integrity against various forms of external assaults.

Objects that function as physical barriers or supporting surfaces include walls, table tops, shelves, floors, ceilings, stairs, vehicle bodies, pipelines etc. Conventional methods for constructing these barriers can be costly, but even when they are inexpensive, the numbers of these kinds of objects mean that they represent a significant economic investment. Such barriers often incur additional costs when they require modification or removal. There is a need for a surface having a shape that may be modified or adjusted without damaging the surface or rebuilding it.

The surfaces innovated at USF can bend and flex with every small region capable of elastically changing its shape from flat to domed and then to saddle shaped. They can be used in products as diverse as containers, shielding, furniture, architectural elements, clothing, exercise equipment, children's toys, reconfigurable robotic systems such as claytronics, programmable matter, and digital clay.

An important distinction is that shape-shifting surfaces are functional without any actuation. Shape-shifting surfaces include compliant mechanisms so a rich variety of passive behaviors can be designed into them without the inherent expense of large numbers of actuators and processors which would be immensely beneficial in the field of construction.

ADVANTAGES:

- **Can bend and flex with every small region**
- **Can be used in a multitude of products**
- **Doesn't require actuation**
- **Maintains relative integrity of a surface while changing size of the area**

Versatile Shape Shifting Surfaces

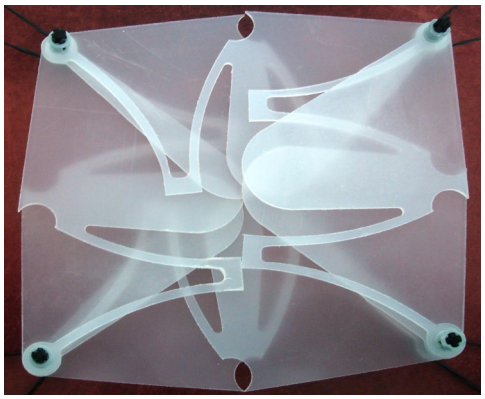

Image Shows a unit cell of the shape shifting surface in tension

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