

SHAPE MEMORY ORIGAMI FOR HAPTICS

A three-dimensional shape change for haptic feedback

This project explores the potential of an integrated material system based on shape memory alloys (SMA) that generates haptic feedback for Visually Impaired People (VIPs). Since VIPs rely more than others on tactile information, there is a need for less intrusive haptic devices as commonly used in electromechanical actuations. SMAs emerge as a promising solution due to their ability to create silent and natural sensations, while being lightweight, thin, and flexible.

In this project, a soft integrated material system was designed that shows the potential of incorporating SMA and SE flat springs into an origami-paper textile to create haptic feedback. This Shape Memory Origami unit changes from a two-dimensional surface into a three-dimensional shape creating an upward and contraction movement as well as texture and heat difference. By using the combination of the SMA-SE flat springs, a two way movement in a compact area is enabled while providing an easy integration of the wires in the paper-textile.

The sensations generated by the material system were easily perceived with the hands characterized as natural, calm and gentle by sighted participants. This demonstrates that there is a potential for creating an integrated material system based on flat springs SMAs that generated haptic feedback for VIPs in a natural and new way.

