



Piezo4Haptic

Ultra-thin piezoelectric patch with maximum integrability for multi-modal multi-touch haptic surfaces

What is it

A haptic interface allows the user to interact with the environment using touch. In this demonstrator, piezoelectric actuators are collectively placed in a thin layer on a flexible polymer substrate: this is CEA-Leti's patented "piezo-in-flex" technology.

This patch-like layer is then integrated under an OLED display. The display vibrates subtly (in the tens of kHz), creating localized enriched touch sensations like relief or texture. It results in a multi-touch haptic interface involving different senses.

Applications

Any human-machine interface can be potentially enhanced by introducing a haptic effect. For example:

- **Accessibility:** touch makes information on a display easier to navigate (for the elderly or visually-impaired, for example)
- **Transportation** (air, rail, automotive): haptic buttons on dashboards or control panel displays
- **Security and defense:** for more user-friendly interfaces
- **Smartphone displays with enriched touch features :** buttons you can feel and images with texture

What makes it unique

Most haptic demonstrators use piezoelectric ceramics, which need to be glued manually to the interface. CEA-Leti is leveraging its 200 mm technology platform to integrate piezoelectric actuators collectively and cost-effectively on a polymer substrate using industrial tools and processes. This enables flexible, conformable, invisible, and silent piezoelectric patches that can be used to functionalize any surface with multi-point, multi-modal touch capabilities.

Piezo4haptic demonstrator ▼



Piezo-in-flex technology

- Touch sensations simultaneously at multiple locations on the surface
- Multiple vibration frequencies for a variety of sensations (texture, relief, etc.)
- Invisible and silent
- Low power
- Ready to manufacture

Scientific publications

- Goubault, T., Casset, F., et al., *Finite Element Modeling and Experimental Validation of Dual-Mode Ultrasonic Haptics on OLED Screens*, EuroSimE 2026.
- Goubault, T., Casset, F., et al., *Fabrication and Electro-mechanical Characterization of Piezoelectric Patches for OLED-Based Haptic Interfaces*, EuroSimE 2025.

What's next

CEA-Leti's piezoelectric patch is ready to manufacture. LED panel manufacturers, systems integrators, and OEMs looking for innovative features to make their products more interactive and accessible can work with CEA-Leti to adapt this technology for their specific needs. CEA-Leti offers several types of partnerships and supports each project from the design stage through to transfer to the partner's chosen commercial fab.

Interested in this technology?

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