Multifunctional Displays

PATENTS 10+ PATENTS

A major breakthrough in display technologies and interaction with the environment

What it is

Thanks to the heterogeneous co-integration of gallium nitride microLEDs and photodetectors, CEA-Leti is redefining the future of display technologies, expanding the capabilities of conventional displays with new interactive features. CEA-Leti is developing a wide range of sensors, materials, and architectures to address these new applications. By combining microLEDs, various types of devices (advanced photometric detection, infrared emission, RF antennas, haptic devices), and CMOS design for embedded signal processing, CEA-Leti is shaping the future of display technology.

What it can do

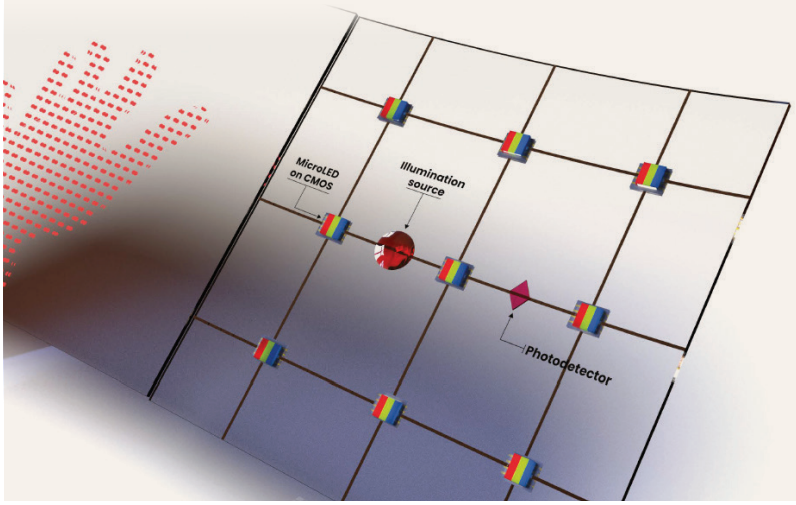
Designed to sense their environment, CEA-Leti's multifunctional displays transform interaction, enabling revolutionary use cases in a wide range of applications. Displays with integrated biometric authentication, gesture recognition, and health monitoring capabilities will enable innovative solutions in industries from consumer electronics to medical diagnostics. Multifunctional displays are expected to become an essential component of next-generation interactive systems.

What makes it unique

MicroLEDs, the pillar of this innovation, deliver exceptional brightness and a compact footprint, creating available space for the integration of novel functions and paving the way toward multifunctional and transparent displays.

CEA-Leti overcame a significant technological hurdle in the development of this innovation: the heterogeneous integration of microLEDs and photodetectors in a way that minimizes parasitic optical couplings. Advanced multifunctional displays also require complex, high-performance CMOS control circuits that are fully integrated in the display.

A multifunctional display combining microLED, source, and photodetector ▼



At a glance

- Contactless gesture recognition
- Fingerprint recognition over the entire display surface
- The ability to measure physiological parameters upon contact with the display surface

Scientific publications

- Templier, F. (2023) "Micro-LED Technology: A Unique Opportunity Toward More Than Displays." Information Display Journal.
- Pelissier, M., et al. (2025) "Co-Integration of Organic Photodetector With Micro-LED Dedicated to Multifunctional Display Application." SID Display Week Conference.

Working with CEA-Leti

Manufacturers can partner with CEA-Leti on custom development to bring their display products enhanced interactivity, an essential element for the success of tomorrow's display products. CEA-Leti can provide complete support, from developing new concepts to transferring them to commercial fabs.

CEA-Leti has built a portfolio of more than 100 patents in the field of microLEDs over its many years of advanced research. MicroLED fabrication and heterogeneous co-integration can be achieved in CEA-Leti cleanrooms. CEA-Leti also offers IC design in advanced CMOS technology, both for microLED drivers and photodetector readout circuits with embedded signal processing.

Interested in this technology?

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