

The CEA logo consists of the lowercase letters 'cea' in a white, sans-serif font, positioned on a red square background. A thin white horizontal line is located directly beneath the letters.The Leti logo features the lowercase letters 'leti' in a red, sans-serif font, set against a white background.

## Hololike

CEA-Leti's head-up projection display:  
enabling augmented reality on transparent surfaces  
in a bright environment

### What is Hololike?

**How do you display an image on a transparent surface, such as a car windshield? That is what this demonstrator is about!** A floating image is projected on a transparent screen—an impossible task without a unique micro-structuration surface. This structuration, manufactured by a European Industrial partner, uses a patented CEA-Leti knowledge based on retro-reflective properties. It allows the concentration of the optical beam that helps build a bright holographic-like aerial superimposed image in broad daylight.

A specific design is being developed for automotive applications. Our technology adapts to the windshield's inclined surface to offer the best compromise between the image brightness seen on the car windshield by the driver and the integration of the optical system inside the vehicle.

### Applications

This technology will enable a wide range of applications requiring superimposed information—images, videos etc.—on a transparent screen in a bright environment:

- Cars, tractors, airplanes, boats, motorcycles, etc.
- Shop windows for advertising purposes
- Museum displays, etc.
- And many more to be developed

## What's new?

CEA-Leti's head-up projection display smartly leverages the well-known optical property of a retro-reflective structure: light is reflected back to the source no matter where it comes from. It also mixes both retro-reflective and transparent properties of the surface within the projection display.

To address various ergonomic issues (e.g. head-up projection display vs. user location), current research is investigating ways to introduce a calibrated diffusion function in the retro-reflective signal, which would lead to a large panel of device configurations.

CEA-Leti's head-up projection display opens the way to large field-of-view augmented reality applications because:

- It doesn't require any optics between the image and the eye to allow accommodation and
- Light coming from the image is concentrated in a specific location—in the vicinity of the projector—where the viewer can experience bright viewing conditions.



## What's next?

CEA-Leti is co-developing this technology with industrials in many commercial fields (defense, automotive, agriculture, etc.) to sharpen it and enable cost-effective applications.

## Key facts

- This head-up projection display has been presented at RG Lab's "France Télévision Numérique" exhibition (Roland Garros tournament)
- US 2017/0038585 and US 2017/0059862 patents

*Obtained in daylight conditions, without using photo editing software*



## Interested in this technology?

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