

ADVANCED OPTICAL SYSTEMS

INNOVATIVE OPTICS LEVERAGE DISRUPTIVE COMPONENTS FOR IMAGING TECHNOLOGIES

+ WHAT ARE ADVANCED OPTICAL SYSTEMS AT LETI?

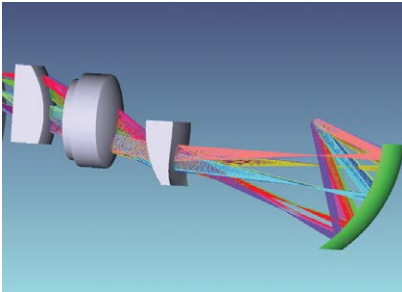
Using its unique technical platform, Leti is developing disruptive display components for coupling to smart optical systems to address demanding applications.

The institute's expertise encompasses the entire process chain from design through prototyping to final packaged system.

- Nomadic applications like *Head Mounted Displays (HMD)* may be targeted. Leti achieves optical systems based on free-form, implementing curved displays or near-to-eye, lens-free holographic displays.
- In vehicles, Leti proposes its compact *Head Up Displays (HUD)* based on a multi-channel approach minimizing the volume and weight or its micro-structured windshield with enlarged field of view.
- Interest in 3D displays is growing fast and improvement in resolution makes it possible to address these new topics. Leti is developing light-field systems to enter this challenging virtual new world.

+ APPLICATIONS

- Compact, wide-field-of-view glasses for digital reality (virtual, augmented and mixed reality)
- Compact and light HUD 2.0
- Projection on large transparent surfaces
- 3D displays



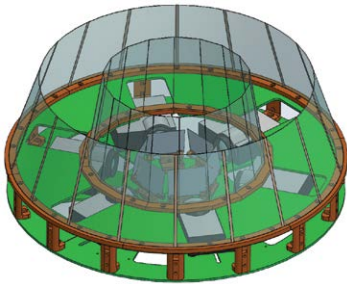
OPTICAL DESIGN & SIMULATION

Optical design comprises diffractive, refractive and reflective systems.

Leti's know-how enables it to:

- design complex and non-conventional optical systems (fly eyes, aspherics, free-form and waveguide), thin film coatings and holographic components
- conduct image quality analyzing and tolerancing on behalf of its customers.

Leti implements state-of-the-art, commercially available design software including *Code V*, *LightTools*, *Zemax* and *OptiLayer*.



OPTO-MECHANICAL DESIGN

Mechanical design and simulation are essential to ensure the full system's functionality within its intended operating environment.

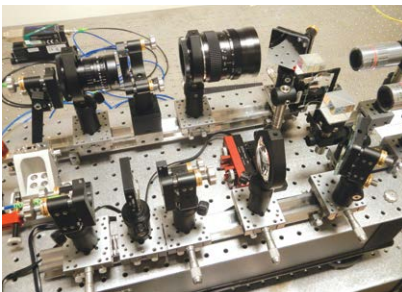
Leti relies on a wide range of tools, including *SolidWorks*, *LabVIEW*, *OrCAD PSpice* and 3D printing to deliver high-quality and perfectly adjusted optics.



SYSTEM CHARACTERIZATION AND IMAGE IMPROVEMENT

Optical systems are tested on homemade characterization optical benches driven by *LabVIEW* routines.

Image quality is assessed with MTF, and distortions are compensated for with computational corrections coded with *MATLAB* or *Python*.



HOLOGRAPHIC DISRUPTIVE CONCEPT

Leti has developed a new concept based on *near-to-eye holographic-projection* display that uses a self-focusing effect involving holographic and photonic technologies. Hologram recording bench codes holographic elements with the right angle, enabling them to project images directly into the eye.

**INTERESTED
IN THIS TECHNOLOGY?**

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