

**OPTICAL DESIGN AND SYSTEM
PERFORMANCE CHARACTERIZATION
FOR AGRICULTURE**

18/04/2022

PISÉO, THE FACTS

- **Leading** Photonics Innovation Platform.
- **Winner** of the French State call for project for Innovation Platforms creation.
- **12 years old.**
- **8 shareholders**, including Yole Group, GIL-Syndicat du luminaire, Syndicat de l'éclairage, Serma Group, Cluster Lumière.
- **ISO 17025 accredited** electro-optical **test laboratory** (scope available on www.cofrac.fr).
- **150+ customers** (Start-ups, SMEs, large groups) worldwide
- **16 employees** highly qualified from industry (Engineers, PhD).
- **10 000+** tests performed.
- **500+** customer projects carried out.
- Based in **Lyon**, France.



PISÉO, INDEPENDENT INNOVATION PLATFORM

A UNIQUE COMBINATION OF EXPERTISE AND TECHNICAL MEANS DEDICATED TO THE INTEGRATION OF UV-VIS-IR PHOTONIC TECHNOLOGIES: LED, LASER, PHOTODIODES, IMAGE SENSORS, MATERIALS...

CONSULTING & ENGINEERING

- System pre-development and feasibility studies
- Optical design and simulations
- System design and industrialization: products & test benches
- Scouting & analyses: technologies, markets, standards and regulations
- Optical risk assesment and prevention

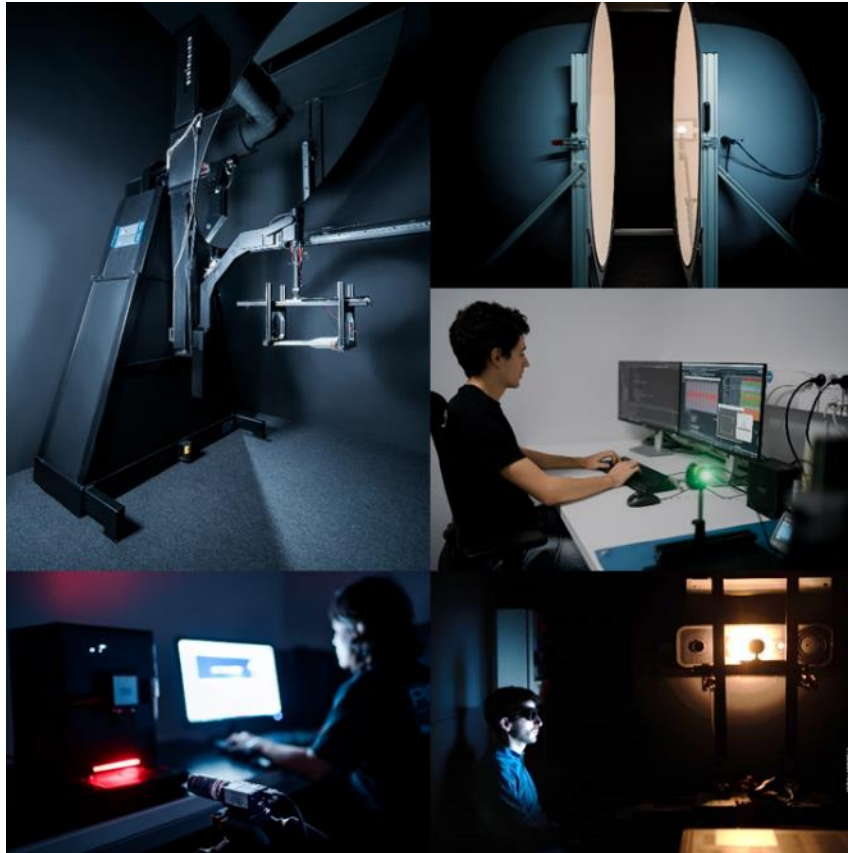
TEST LAB (ACCREDITED ISO 17025)

- Radiometry, photometry, luminancemetry & colorimetry
- Image quality of VIS and IR imaging systems
- Optical properties of materials

Markets: Automotive, Healthcare, Horticulture, Defence, Lighting, Industries...



Radiometry, photometry, luminancemetry and colorimetry laboratory (ISO 17025 accredited)



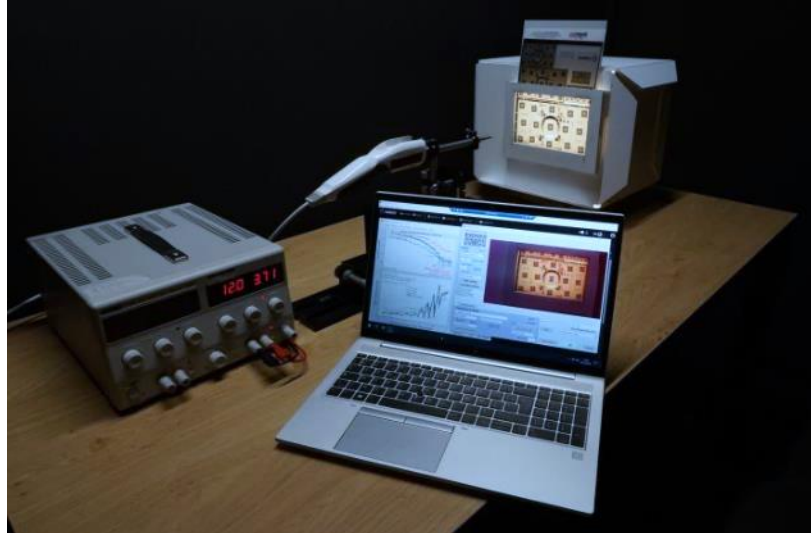
Test equipment:

- LMT GO 2000 Mirror Goniophotometer
- Integrating spheres diameters 2m and 50cm
- Instrument Systems Spectroradiometers 200nm-1100nm
- Stabilized power supplies and power meters
- Westboro Photonics 12 MP luminance camera
- Everfine photobiological risk test bench
- Optical flicker and strobe test bench
- Portable spectroradiometers and luxmeters
- Light sources calibrated under accreditation
- Binder climatic chamber

Mesurement directly in PAR and PPFD



Imaging laboratory



Test equipment:

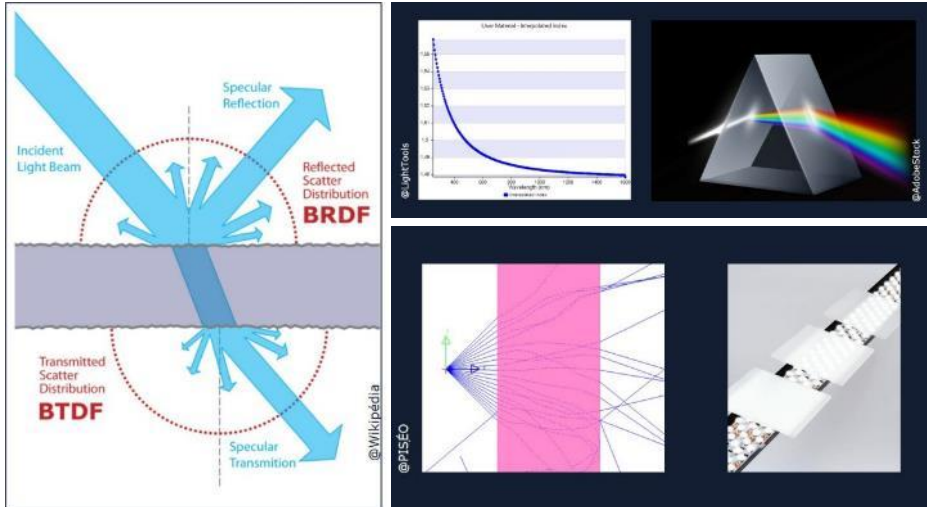
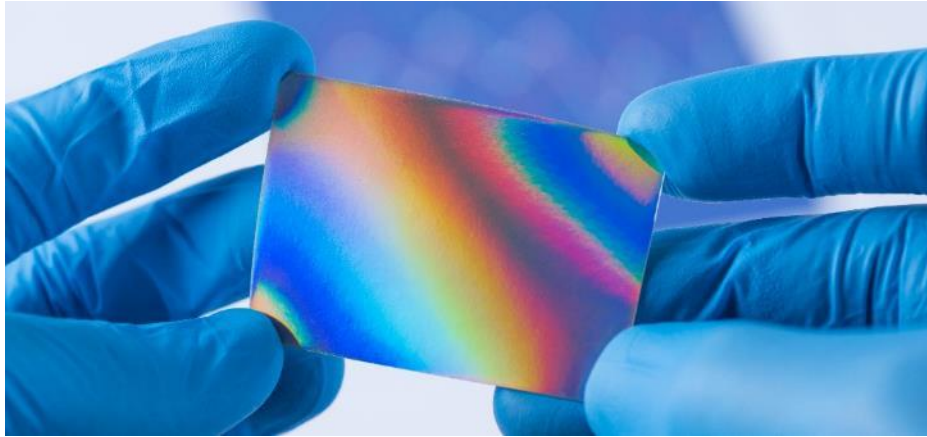
- IMATEST V22.1 image quality analysis software
- Standard targets made according to ISO 12233 standard
- Multispectral lighting systems uniform luminance and standardized illuminants D55, D65.
- Direct lighting or backlight
- Westboro photonics 12 mpx luminance camera
- Spectroradiometers Instrument Systems...
- HGH black body

Characteristics measured :

- MTF
- Geometry Distortion
- SNR
- FOV
- DOV
- Colorimetry
- Dark current
- NUC
- ...



Material optical properties characterization laboratory



Test equipment :

- Reflectance and transmittance measurement bench
- VIS-IR spectrometer (academic partner)
- Light distribution measurement bench (partner)

Properties measured:

- Refractive index
- Transmission and reflection
- BSDF
- Volume Diffusion
- Surface diffusion



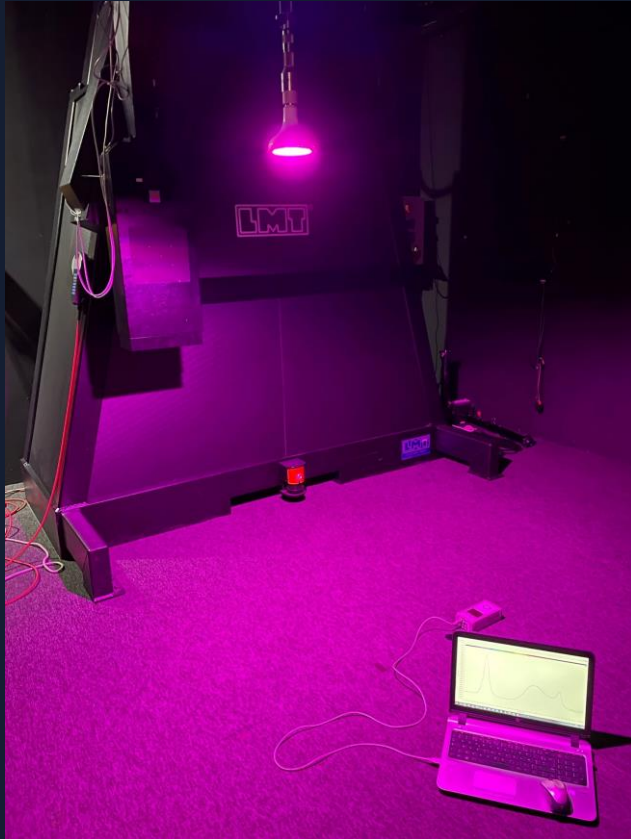
DESIGN OF OPTICAL SYSTEMS



- Definition of optical parameter, homogeneity, power...
- Choice of LED and operating point.
- Design, optical simulation. Optimization and tolerancing.
- Support for the mechanical integration and electro-optical qualification of the pre-series in the PISÉO laboratory.



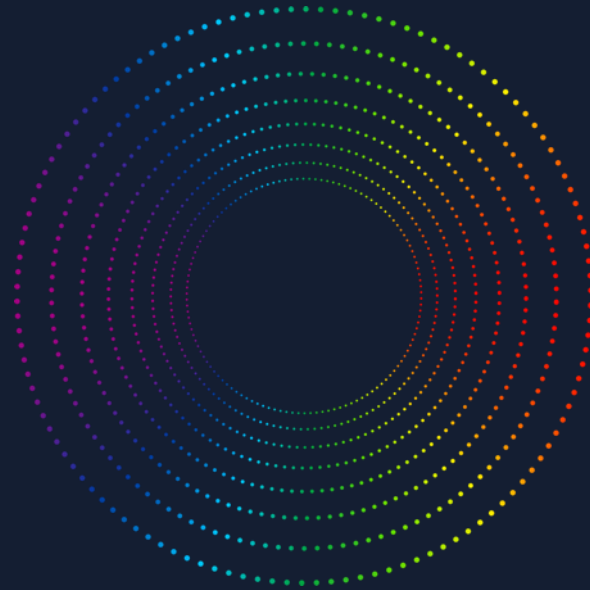
PERFORMANCE CHARACTERIZATIONS



- Distribution of intensities in PPFD
- Luminous flux (PPF)
- Spectral distribution (UV-VIS-IR)
- Power consumption
- System efficiency



THANK YOU



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PISEO
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