

## SMARTCAM – A portable intelligent imaging system for phenomena involved in natural and built environment risks

### Summary

This project focused on the development of a smart camera and corresponding lighting systems. The commercial solutions currently available are relatively expensive and difficult to maintain, however, they offer a set of technical capabilities that are relevant for the sustained growth of innovation and the impact of CERIS research.

As part of this project, a low-cost intelligent modular system for video acquisition was created, which in addition to providing an alternative to expensive commercial systems, will enable support for real-time processing.

The main results obtained included the development of: i) a smart camera with 120fps black and white with 1.3MPixel of resolution; ii) an LED lighting system; iii) innovative software for image processing.

For the image processing software, the aim was to ensure the validity of the system for Particle Image Velocimetry (PIV) applications in the hydraulics field and to study the adaptability of the software for Digital Image Correlation Technique (DICT) applications, or similar, as used in civil engineering for assessment of resistance of materials.

The inclusion of processing capacity in the camera hardware is an important strategy in data acquisition, providing savings in storage volume,

rapid transfer of results and real-time analysis of phenomena such as floods or structural rupture processes. These potentials are in line with the objectives of the CERIS thematic strand "Risk and safety in the natural and built environment".

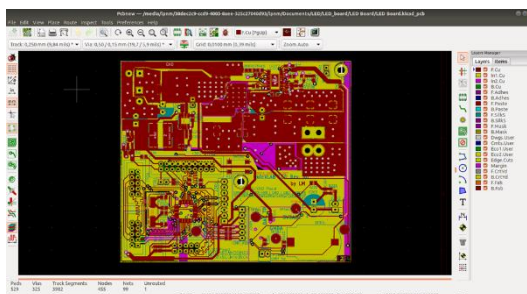
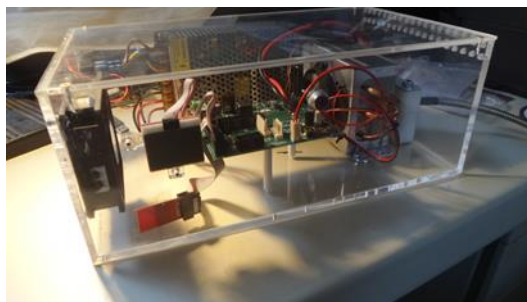


Figure 1. Top: Prototype of the LED illumination system. Bottom: CAD project for the LED control board.



Figure 2. Prototype installed on a laboratory channel.

### Project Reference

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### Leading Institution

CERIS – Civil Engineering Research and Innovation for Sustainability (Portugal)

### Partners

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### CERIS Principal Investigator

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### CERIS Research Team

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### Funding

CERIS – Civil Engineering Research and Innovation for Sustainability

### Period

2019

### Total

7 498.90€

### CERIS

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### Project Website

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