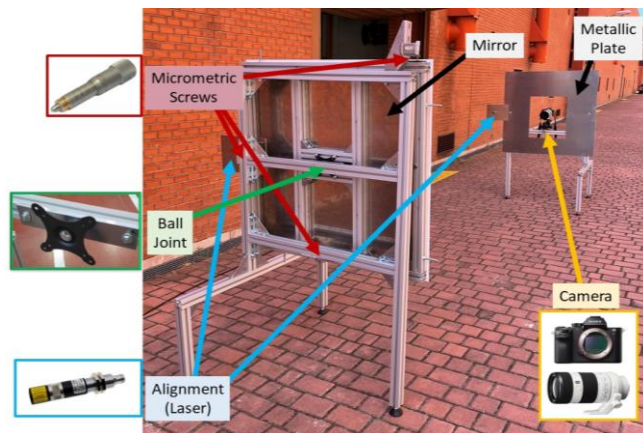


Alignment system for heliostat mirrors in solar tower power plants

Summary/Characteristics

Researchers at Universidad Carlos III de Madrid have developed a technology aimed at reducing the significant impact that heliostat misalignment has on the efficiency of a heliostat field. The system combines models based on geometric optics and computer vision techniques to detect and correct heliostat alignment errors in a reasonable time and with accuracy. It is a precise, multi-objective and practical technique that provides a significant improvement in the overall performance of heliostat solar plants and over the current state-of-the-art techniques addressing the same problem.

Potential commercial partners and/or licensees are sought to refine the technology, increase its TRL and support its market uptake.



Experimental prototype

Innovative Aspects

- Combines geometric optics and computer vision to detect and correct alignment errors in heliostats.
- System based on a simple, portable camera installed at fixed points on a nearby heliostat, connected to a computer to perform the calculations.
- Method that compares real images with the theoretical perfect alignment, correcting even optical deformations.
- Enables complete alignment in less time and with higher accuracy than existing methods.



Technology display on field tests (solar plants)

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Competitive Advantages

- Higher energy efficiency by reducing annual production losses, which can exceed 30% due to alignment errors.
- Reduced costs and time, as there is no need for inclinometers, telephoto lenses or complex equipment; only a standard camera and a laptop are required.
- Operational simplicity: the system can be operated by a single person in the field.
- Lightweight, low cost and more reliable, with simple installation and reduced uncertainty in heliostat positioning.

Technology readiness level:

Ready for demonstration – Field tests carried out. TRL 6.

Intellectual and Industrial Property Status:

Spanish patent granted P202030725. Title: "Procedimiento y sistema para alinear las facetas de un heliostato de un campo solar".

Type of collaboration sought:

Technical cooperation agreements, commercial agreements or licence agreements are sought with companies in the solar energy sector, as well as companies involved in the design, operation and/or maintenance of solar tower plants with heliostat fields.