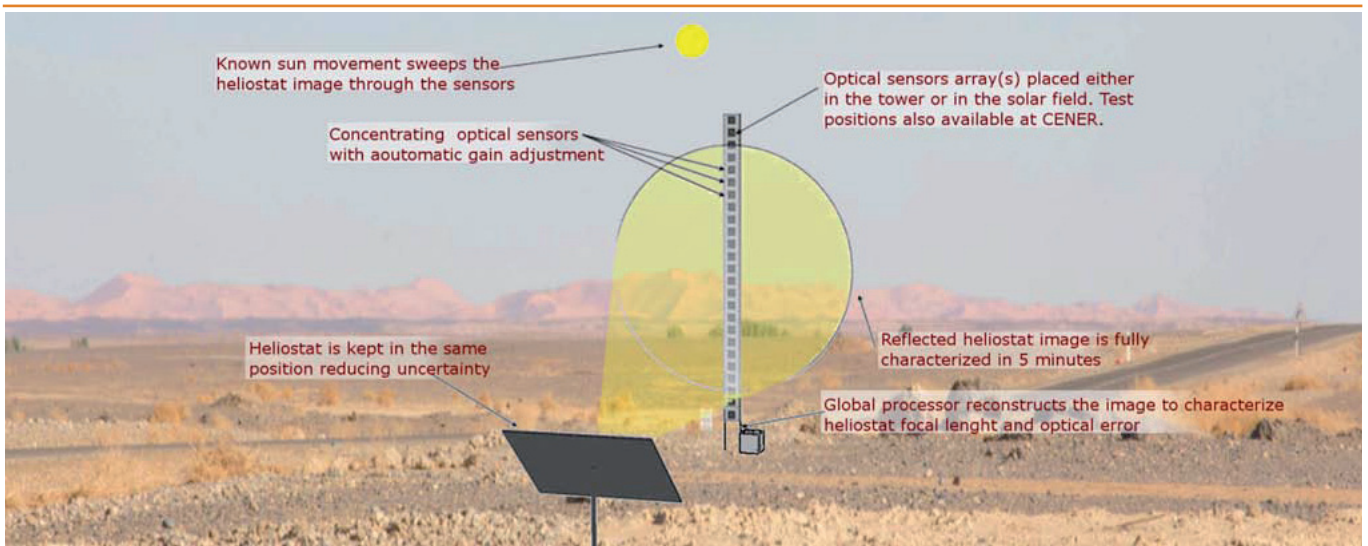




THE SOLUTION FOR THE ACCURATE CHARACTERIZATION OF HELIOSTAT IN COMMERCIAL SOLAR TOWERS



CONTEXT

- Heliostat optical characterization is crucial for a proper O&M.
- Uncertainty in optical quality leads to increased receiver damage risk.
- Uncertainty in optical quality leads to conservative aiming strategies and reduced plant output.
- But distant or small heliostats can't be characterized with current methods.

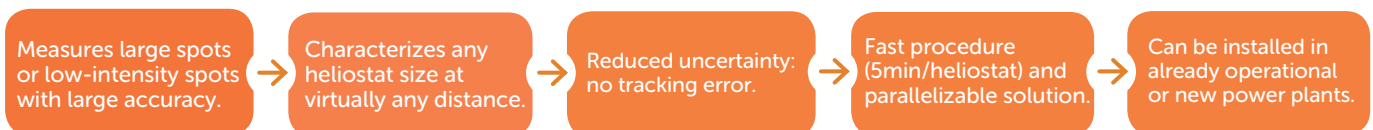
TECHNOLOGY

- An opto-electronic sensors array scans heliostat's reflected sun spot.
- Uses sun's movement to sweep the sun spot through the sensors array.

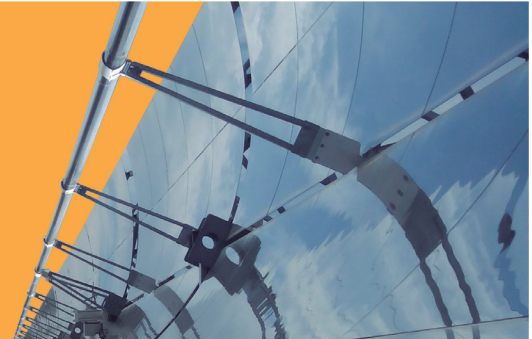
BUSINESS MODEL

- Patent pending (P201830756).
- Heliostat characterization system for installation in Solar Tower plants.
- Heliostat characterization at CENER facilities.

MAIN FEATURES



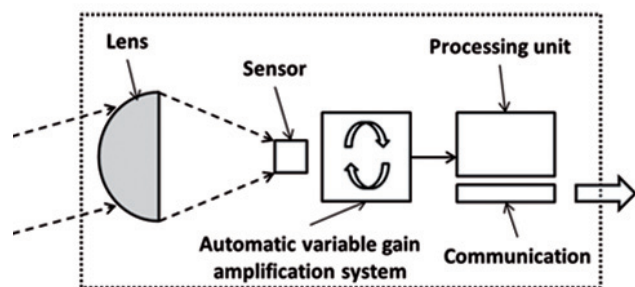
The National Renewable Energy Centre of Spain (CENER) develops applied research in renewable energies, and provides technological support to companies and energy institutions in six areas: wind, solar thermal and photovoltaic solar energy, biomass, smart and efficient buildings and districts, and grid integration of energy. CENER is a technology centre with worldwide recognized prestige, activity and experience.



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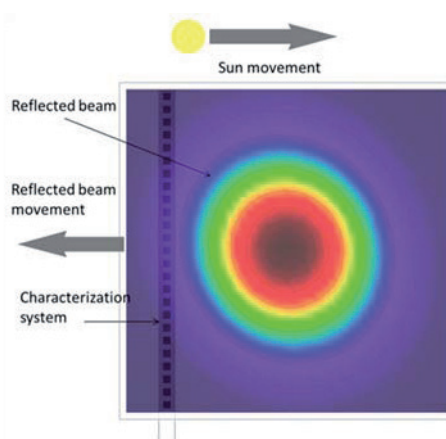
STATE OF THE ART

- Target and camera systems won't accurately measure optical quality of small or distant heliostats.
- Low flux and limited target size prevents classical methods accuracy.
- Non-linear camera response and non-uniform Lambertian target increase uncertainty.



SOLUTION

- Automatic gain adjustment in sensors for measuring any flux intensity.
- Embedded lenses for increased useful power and reduced background light.
- Any spot size can be measured by successive sweeps through the array.

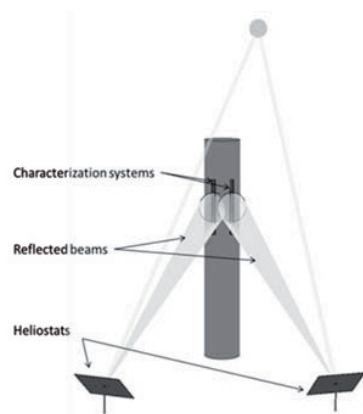


DEVELOPMENT STATUS

System under advanced development.

First fully functional system to be installed and validated at CENER in early-2019.

Several systems ready to be integrated in current commercial power plants allowing for parallel characterization of heliostats.



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