



LEHOS: LONG DISTANCE HELIOSTAT TESTING FACILITY AT CENER



CONTEXT

- New heliostat designs are needed for cost reduction and improved quality.
- Heliostat testing (optical quality and tracking accuracy) is crucial for any new heliostat or plant development.
- In current plants (100MWe):
 - 80% heliostats at >500m
 - 55% heliostats at >800m
 - 16% heliostats at >1200m.
- There are no facilities worldwide for testing heliostats at >500m.

BUSINESS MODEL

- Long distance heliostat optical characterization at CENER facilities.
- Customizable test campaign and complimentary laboratory tests.

TECHNOLOGY

- Combined heliostat characterization:
 - CENER's HELIOSCHAR+ system.
 - CCD Camera + Lambertian target.
- Large spots or low-intensity spots measured with large accuracy.

MAIN FEATURES

Testing positions at
400m, 800m, 1.200m and 1600m.

Measurement of the **optical accuracy**
(reflected beam) and dailyA evolution.

Tracking accuracy, repeatability and
daily average assessment

Portable HELIOSCHAR+ system for **full
4D reflected beam** characterization.

Facet canting evaluation by integrated
dynamic pin hole measurements.

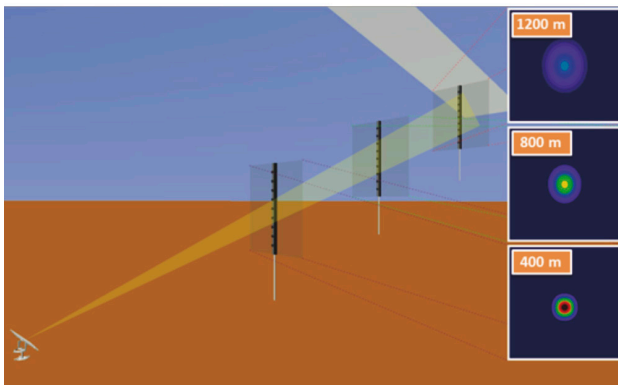
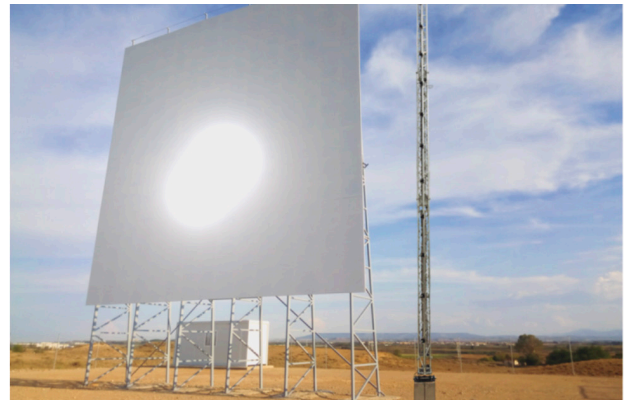
The National Renewable Energy Centre of Spain (CENER) develops applied research in renewable energies, and provides technological support to companies and energy institutions in six areas: wind, solar thermal and photovoltaic solar energy, biomass, smart and efficient buildings and districts, and grid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



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HELIOSCHAR+ SYSTEM

- Direct and accurate reflected beam measurements.
- Automatic gain adjustment for any flux intensity.
- Embedded lenses increase useful power and reduce background light.
- Heliostat reflected beam measured at different distances for 4D (x, y, z, ϕ) beam characterization.
- Integrated dynamic pin hole measurements



CCD CAMERA SYSTEM

- High resolution CCD camera with automated flux measurement.
- 12 x 12 m white Lambertian target.
- Combined camera and HELIOSCHAR+ information increase accuracy at large distances.

DEVELOPMENT STATUS

- New testing facility already available for testing at CENER.
- CCD Camera + target system fully operative.
- Field tests of HELIOSCHAR+ with a small-size heliostat being conducted.



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