

Heliosstat System with Wireless Closed-Loop Control

THERMATA



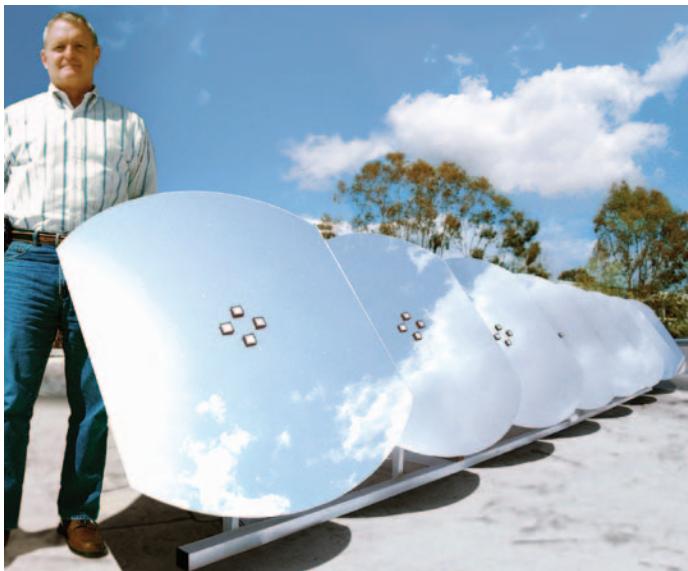
PROGRAM: SunShot CSP R&D 2012

TOPIC: Advanced Collectors

LOCATION: Pasadena, California

AWARD AMOUNT: Up to \$1.0 million

PROJECT TERM: 2012–2014



Self-powered, factory-assembled heliosstats use closed-loop control to lower the cost of a solar collector field. Tower-mounted cameras sense reflections from small "solar proxies" mounted on each mirror; these reflections are then used to determine the real-time aiming point. *Photo from Thermata*

CONTACTS

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Partnering Organizations:

- Sandia National Laboratories
- Tietronix Software, Inc.

For more information, visit the project page at: www.solar.energy.gov/sunshot/csp_sunshotrnd_thermata.html.

MOTIVATION

Open-loop sun tracking requires costly precision.

Traditionally, large heliosstats have been the best way to amortize the costs of that precision. Open-loop tracking also requires a stable heliosstat pedestal and footings, high-precision motors and frames, encoders, frequent calibration and surveying, and a fair amount of parasitic power consumption with its attendant wiring, conduits, and trenching.

PROJECT DESCRIPTION

Thermata is developing and demonstrating the first practical heliosstat to use closed-loop tracking that can optically sense and control the reflected sunlight beam at the target. The researchers are also characterizing the prototype heliosstat system's ability to achieve high optical efficiency and deliver thermal energy more accurately to the receiver. The closed-loop tracking system eliminates expensive components like encoders, and its small size enables self-contained photovoltaic powering, eliminating wiring costs. Together, these benefits reduce the total installed cost of the heliosstat field in a power tower concentrating solar power (CSP) project.

IMPACT

Using an innovative camera system and closed-loop control to accurately place the sun on any receiver target, Thermata's heliosstat tracking system eliminates the need for precise, highly engineered heliosstat structures. This technology enables cost reductions compared to the current state-of-the-art technology with radically smaller, lighter-weight mirror assemblies. In addition, reduced mechanical tolerance requirements and significant reductions in both installation and operations costs are expected.