

SHORT

Scalable Heliostat Calibration System for Solar Tower Plants

Patented camera-based technology for automatic, parallel calibration of heliostats by identifying the real kinematic model of each unit.

TECHNOLOGY TRANSFER / LICENSING OPPORTUNITY FOR CHINA



Large solar tower fields need calibration that scales with tens of thousands of heliostats.

Conventional calibration points one heliostat at a time to a tower target and detects the reflected spot. This is slow, sequential and problematic for distant heliostats, where the spot can be weak, large or difficult to locate.

From sequential tower-target calibration to automatic parallel calibration

1 by 1

conventional calibration

sequential, slow and difficult for distant heliostats

parallel

SHORT calibration

many heliostats can observe known targets simultaneously

Why SHORT is different

- Calibrates the actual kinematic model of each heliostat, not only angular offsets.
- Accounts for mounting errors, real azimuth/elevation axes and mechanical deviations.
- Enables fast, automatic and simultaneous calibration, potentially during the night.
- Reduces commissioning effort, field calibration time and long-term stability requirements.

<0.25 mrad

RMS tracking error validated at PSA

low-cost

camera per heliostat

parallel

field calibration concept

CN patent

CN108139556B granted

SHORT Technology

From patented know-how to Chinese industrial deployment

VALIDATED CAMERA-BASED CALIBRATION
TECHNOLOGY READY FOR TRANSFER

How it works



A low-cost camera is rigidly mounted on each heliostat. It observes known targets distributed around the field. By comparing observed and expected target positions, SHORT estimates the real kinematic model and generates updated calibration parameters for the heliostat controller.

Technical edge

- Automatic parallel calibration
- Low-cost embedded camera per heliostat
- Real kinematic model identification
- Targets: lights, objects, moon or other known references
- Potential night-time calibration without affecting operation

Applications

- New solar-field commissioning and acceptance
- Periodic recalibration during operation
- Integration into heliostat control systems
- Large fields where tower-target methods are too slow
- Reduction of tracking-related performance losses

Current maturity

Validated at CIEMAT-PSA with an embedded prototype including camera, filter, processor and communications. Technical material reports tracking error below 0.25 mrad RMS. Ready for transfer to an industrial partner for product adaptation, integration, industrialization and local deployment.

Protected IP

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China: CN108139556A / CN108139556B
CN title: 用于表征反射表面的方法、装置和系统
CN publication date: 8 Jun 2018 | Holder: Fundación CENER

Partnership model

CENER is seeking a Chinese industrial partner to license and complete the industrialization of SHORT for local manufacturing, integration and commercial exploitation in China.

- Heliostat manufacturers / control-system suppliers
- Solar-field, automation or EPC companies
- Tower CSP developers / owners

Partner with CENER to industrialize a patented European technology for scalable heliostat calibration in China's next generation of solar tower plants.