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QDec-H

Nighttime Scanning for Daytime Performance

The Challenge

Achieving optimum performance of heliostats is a key challenge in solar tower plants.
Even small deviations in shape or tracking reduce energy yield. Making optimization decisions is difficult without reliable data.

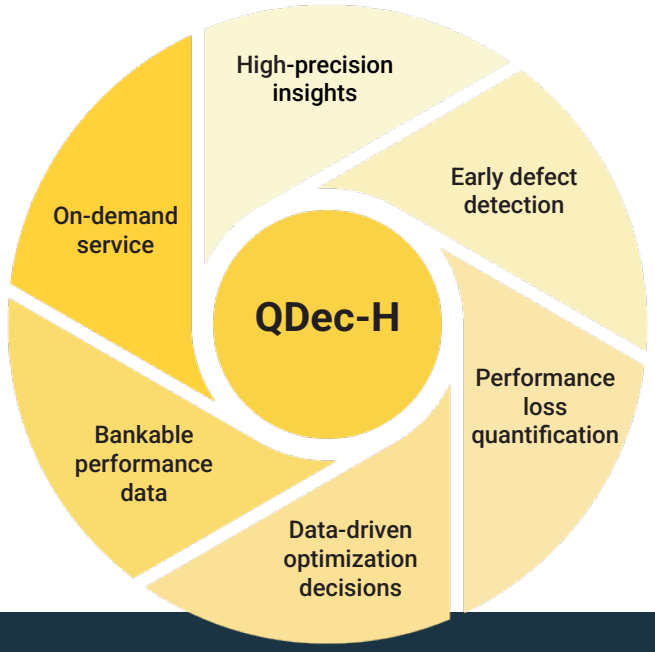
QDec-H offers a simple, fast and precise solution. Our measurement service **evaluates the shape accuracy of heliostats** directly in the solar field. Heliostats are measured during nighttime, when they are not in use.

Typical use cases:

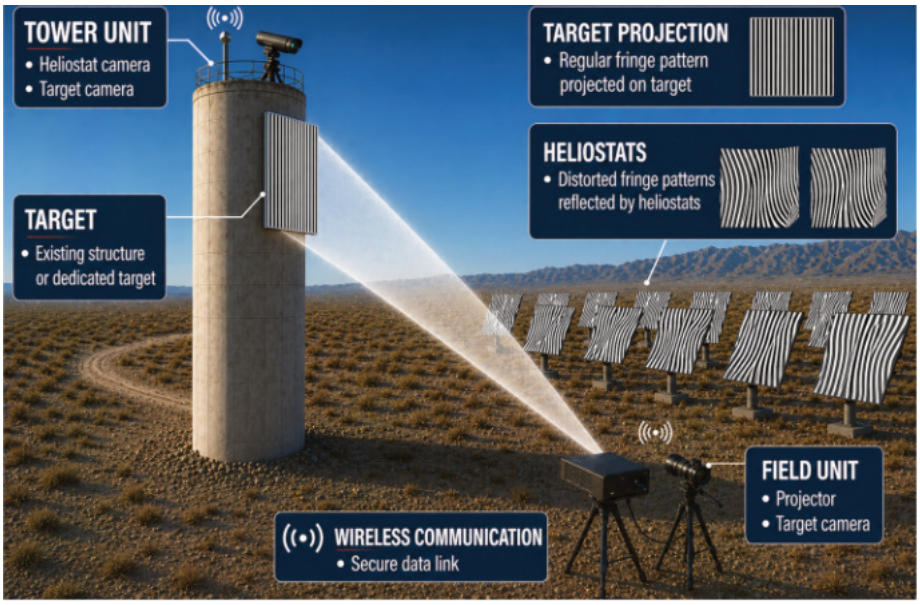
- Heliostat shape validation
- Assembly and installation verification
- Heliostat field acceptance testing
- Solar field optimization
- Damage and root cause investigation
- Technical due diligence
- Digital twin validation and model calibration

Key Benefits

- Independently verified performance
- Clear insights into heliostat quality and root causes
- Improved solar field efficiency
- Reduced operational risk



QDec-H – maximize heliostat performance!



Setup

QDec-H is deployed on-site using a simple and flexible measurement setup. No heliostat modification is required for field evaluation.

Key characteristics:

- Daytime setup, nighttime measurement
- Suitable for single heliostats and complete fields
- Optical non-contact measurement
- Optional: Permanent setup with control station

Measurement Performance and Output

QDec-H delivers fast, precise and reliable measurement results directly in the solar field. The service provides clear insights into heliostat quality and performance, enabling better decisions for optimization, acceptance testing and technical evaluation.

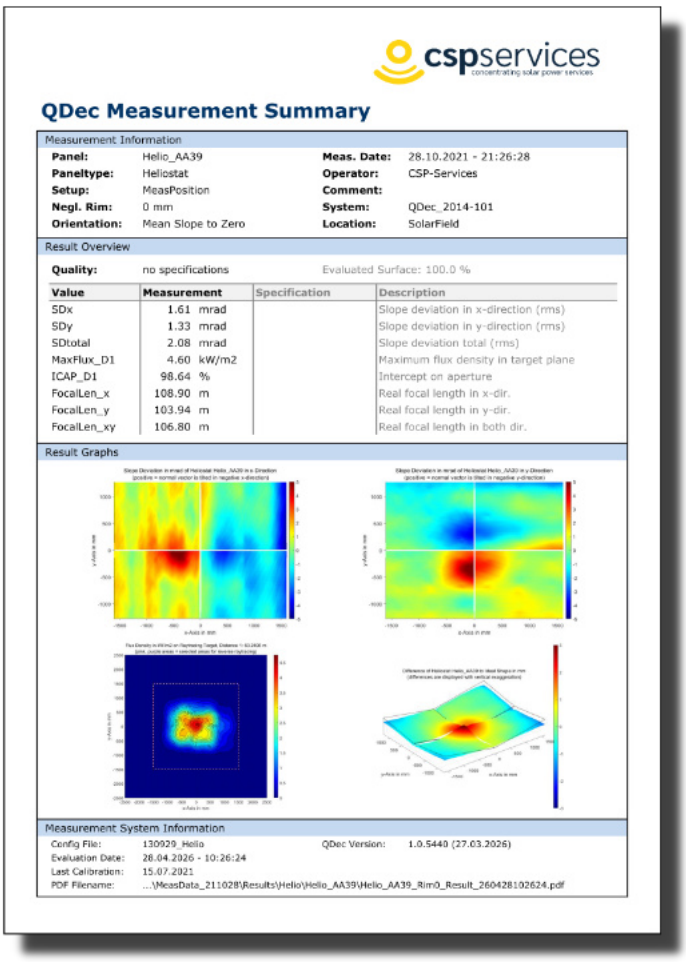
Fast deployment and measurement
» System setup within half a day
» 3–5 minutes acquisition time per heliostat or cluster
» Measurements outside operational hours

High resolution and accuracy
» Up to 2 million measurement points per heliostat
» Uncertainty < 0.1 mrad

Detailed performance analysis
» Slope and height deviation maps
» Facet canting deviations
» Focal length calculation

Advanced optical evaluation
» Ray tracing and flux distribution on any plane
» Reverse ray tracing visualization for each heliostat

Structured data output
» Statistical evaluation of all data
» Standardized, decision-ready PDF reports
» Optional export of full dataset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QDec Measurement Summary

Measurement Information

Panel:	Helio_AA39	Meas. Date:	28.10.2021 - 21:26:28
Paneltype:	Heliostat	Operator:	CSP-Services
Setup:	MeasPosition	Comment:	
Negl. Rim:	0 mm	System:	QDec_2014-101
Orientation:	Mean Slope to Zero	Location:	SolarField

Result Overview

Quality: no specifications Evaluated Surface: 100.0 %

Value	Measurement	Specification	Description
SDx	1.61 mrad		Slope deviation in x-direction (rms)
SDy	1.33 mrad		Slope deviation in y-direction (rms)
SDtotal	2.08 mrad		Slope deviation total (rms)
MaxFlux_D1	4.60 kW/m2		Maximum flux density in target plane
ICAP_D1	98.64 %		Intercept on aperture
FocalLen_x	108.90 m		Real focal length in x-dir.
FocalLen_y	103.94 m		Real focal length in y-dir.
FocalLen_xy	106.80 m		Real focal length in both dir.

Result Graphs

Measurement System Information

Config File:	130929_Helio	QDec Version:	1.0.5440 (27.03.2026)
Evaluation Date:	28.04.2026 - 10:26:24		
Last Calibration:	15.07.2021		
PDF Filename:	...\MeasData_211028\Results\Helio\Helio_AA39\Helio_AA39_Rim0_Result_260428102624.pdf		

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