

# TOPHAT™ FOR THE ALIGNMENT & FOCUS OF HELIOSTAT MIRROR FACETS

US Pat. No.: 8,582,092

Technology Readiness Level: 4

*Basic technological components have been integrated to establish the pieces will work together*

The Theoretical Overlay Photographic Heliostat Alignment Technique (TOPHAT™) is a unique method which helps to accurately and effectively concentrate solar energy onto a receiver. By utilizing a camera/target fixture placed in front of the heliostat TOPHAT aligns and focuses the mirrors on a heliostat. It uses the photographs taken by cameras on the fixture and comparing the location and size of the target patterns with their predicted theoretical images. Adjustments are made to the facets until the photographic images of the targets match the theoretical images in location and size. The fixture is a flat structure nominally the same dimensions as the heliostat. Cameras are accurately mounted at the center and corners of the fixture. Targets, also mounted on the fixture, are viewed by the cameras in reflection through the facets.



Cameras are accurately mounted at the center and corners of the fixture. Targets, also mounted on the fixture, are viewed by the cameras in reflection through the facets.

## TECHNICAL BENEFITS

- Increased efficiency & accuracy in solar mirror alignment
- Reduced loss of concentrated solar
- Increased efficiency in solar energy generation
- Can be used during heliostat assembly or within the heliostat field
- Cameras can work during the day or at night

## INDUSTRIES & APPLICATIONS

- Energy sustainability
- Increased efficiency in solar concentration
- Power production
- Fuel and chemical production