The information contained in this poster is subject to a government license.
2007 Parabolic Trough Technology Workshop, March 8-9, 2007, Golden, Colorado
NREL/PO-550-41426 March 2007

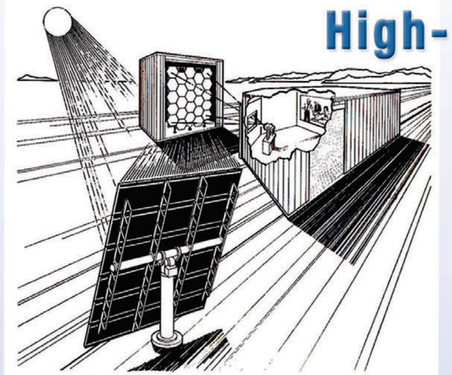
National Renewable Energy Laboratory
Innovation for Our Energy Future

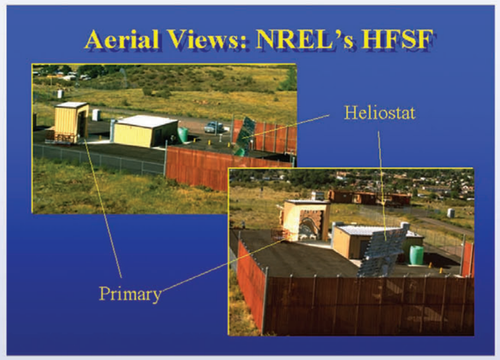
A national laboratory of the U.S. Department of Energy
Office of Energy Efficiency & Renewable Energy

NREL's Concentrated Solar Mesa-top Facilities

South Table Mountain Golden, CO

High-Flux Solar Furnace



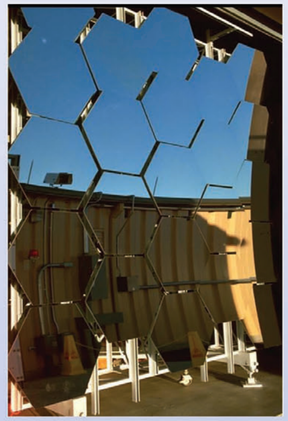


Heliostat

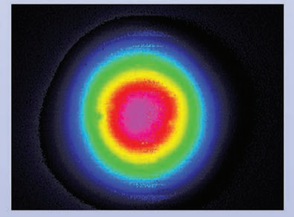
Steel and firebrick melting demonstration

High-Flux Solar Furnace Specifications

- Designated National User Facility in 1993
- 32 m² flat Heliostat
- 12.5 m² Primary Concentrator (25 facets)
- f/D (focal length to diameter) = 1.85
- Nominal total power 9.5 kW
- Peak flux with Primary 240 W/cm²
- Secondary Concentrators for higher flux or more uniform flux
- Attenuator to modulate flux or temperature



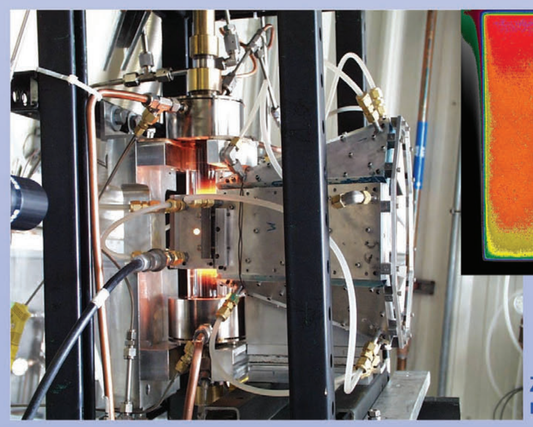
Primary Concentrator



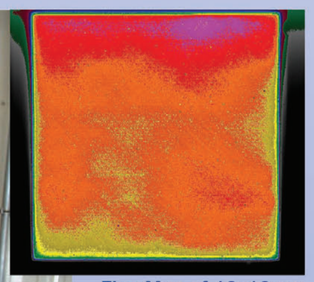
Flux Map of focused beam over 10 cm diameter

Applications

- High Temperature (2000K) Chemistry
- High Temperature Materials Properties
- Rapid Thermal Processing
- Chemical Vapor Deposition
- Adv. Materials Synthesis (C60, SiC)
- Concentrated PV testing
- High heating rates (> 1000°C/sec)
- Thermal Effects Testing



ZnO dissociation reactor on-sun



Flux Map of 10x10 cm exit of homogenizer for CPV applications

High Payload Tracker

Tracker with Solargenix trough aboard

Highlights

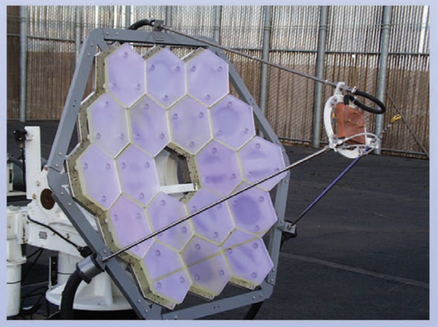
- APS 2-axis tracker
- 9000 pound payload capacity
- 1 milliradian tracking accuracy
- Applicable to thermal or PV systems

APS tracker

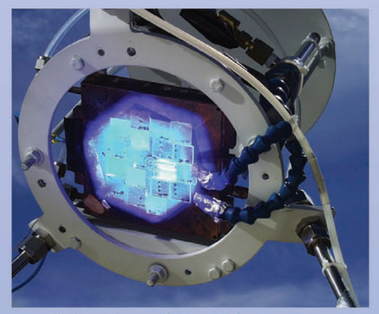
Concentrated UV Testing

Highlights

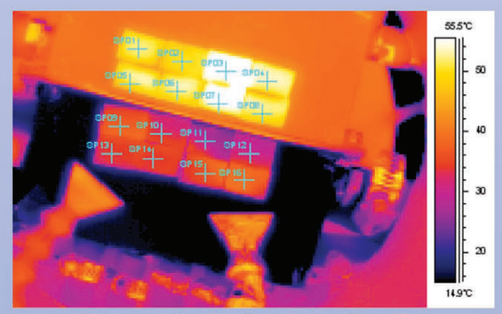
- 100x concentration
- > 90% reflectivity 285-400 nm
- < 5% reflectivity > 600 nm
- Accelerated weathering tests
- High-Low temperature chamber
- New larger dish to be installed this summer with enhanced controls



Special coating reflects only UV light



Polycarbonate samples on sun



IR image showing hot and cold regions

UV dish with IR camera and UV radiometers