

# CSP Peer Review

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## Sun♦Lab

# Test & Research Facilities

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# Sun♦Lab

## Test and Research Facilities

- ❑ **Sandia National Laboratories , Albuquerque, NM**
  - ❑ **National Solar Thermal Test Facility (NSTTF)**
  
- ❑ **National Renewable Energy Laboratory (NREL), Golden, CO**
  - ❑ **High Flux Solar Furnace (HFSF)**
  - ❑ **Optical Lab**

# Sun♦Lab

## Test and Research Facilities

### Mission

- ❑ **To support CSP program and industry by providing first-class facilities, infrastructure, support personnel and equipment for test and evaluation of components and systems**
- ❑ **To leverage our facilities by seeking non-CSP business opportunities (for income, diversify and maintenance)**
- ❑ **To continue ES&H excellence as highest priority (pass all audits, internal and external)**



# Overview of the NSTTF

Troughs

Rotating Platform

Tower

Remote Dish



ETF

TBCs

Control Building

Furnace



# Test Facilities at the NSTTF

- Only complete solar test facility in this country*
  - Central Receiver Test Facility – Power Tower**
  - Point-Focus Parabolic Dishes – TBCs and ADDS**
  - Engine Test Facility – Engines and Receivers**
  - Rotating Trough Platform (Recent upgrade on DAS and controls)**
  - Line-Focus Parabolic Troughs**
  - Solar Furnace**
  - Mirror/facet fabrication**
  - Optical performance test capabilities**



# Recent CSP Testing at the NSTTF

- Advanced Dish Development System (ADDS) - Remote Dish**
- Hybrid Receiver Development**
- Thermocline Tank - thermal storage**
- Downcomer Test**
- Long-Shafted Pump**
- Valve and Instrumentation Salt Test**
- Technical and Test Support for activities associated with Solar Two**

*This national resource has been used in the development and testing of every major type of concentrating solar power technology developed in the United States.*



# NSTTF Facilities

## Support for Non-CSP Customers

### User Facilities Agreements

- Solar Tower Atmospheric Effects Experiments (STACEE) -Astrophysics Experiment

### Work for Others Agreements

- Air Force Research Laboratory (2002)
- EDIG & Weizmann Institute (2002)
- Nagle Pumps, Inc. (2002)
- Applied Physics Laboratory
- Northrop
- Atlantis
- Phillips Laboratory

### Others

- SNL (i.e., geomechanics)
- DOE (Solar Buildings Program – Roof Integrated Solar Water Heater)





# NSTTF Personnel – our greatest asset

## Expertise (combined 100s of years of solar experience)

- Instrumentation
- Data Acquisition (measurement and error analysis)
- Optical tests
- Design and fabrication of solar systems
- Test evaluations
- Thermal analysis
- Controls
- ES&H



*We are innovative people using our quality facilities to develop cost-effective solar technologies and conduct high-impact, quality testing for anyone.*

# Sun♦Lab

## Test and Research Facilities

### Opportunities and Issues

#### Opportunities

- To continue to provide major contributions to solar technology (salt systems, material testing, receiver and engine testing, R&D, and calibration) in support of CSP Program
- WFO and User Facility Agreements help maintain core capabilities, diversify and to offset facilities' cost

#### Issues

- Cost of maintaining state-of-the-art facilities
- As budgets fluctuate, emphasis on facilities change
- Facility upgrades needed to maintain world-class capabilities
- Retain \$100Ms of investments in facilities—for a viable CSP Program, test facilities are needed



# NREL

**High Flux Solar Furnace..... Al Lewandowski**  
**Optical Lab..... and Gary Jorgensen**