Sandia National Laboratories

Energy, Climate & Infrastructure Security

National Solar Thermal Test Facility (NSTTF)

The NSTTF's primary goal is to provide experimental engineering data for the design, construction, and operation of unique components and systems in proposed solar thermal electrical plants planned for large-scale power generation.

Vision

To enhance the nation's security and prosperity through sustainable, transformative approaches to our most challenging energy, climate, and infrastructure problems.

At 200 feet tall, the Tower at Sandia National Laboratories might be the highest test facility in the country – and the hottest, as well: 218 computer-controlled heliostats reflect concentrated solar energy onto the Tower, producing up to 5000°K black body with a total thermal capacity of 5 megawatts and peak flux to 260 W/cm2.

The NSTTF offers a complete testing environment with a distinct height advantage for a variety of activities, including:

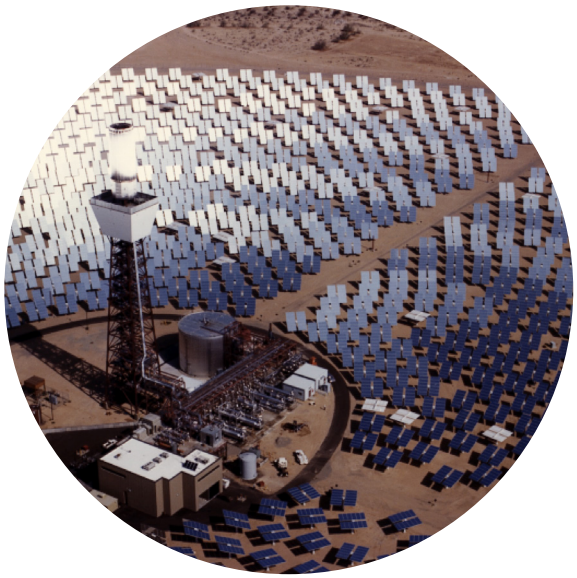
- Nuclear thermal flash simulation.
- Thermal performance testing and thermophysical properties measurement.
- Radar and sensor testing, including measuring the effects of aerodynamic heating on radar transmissions.
- Night and low-light laser testing.
- Space technology systems testing.
- Solar array and solar applications testing.
- Air-to-ground target testing.

Features:

- 4 - 350, 1 - 750 square foot test bays.
- Elevating module to bring tests from ground level to bay or roof.
- Heat rejection system at each bay.
- Analog and digital data logger with multiple channels and variable frequency control.
- Data Communications between Tower and control building.
- Underground tunnel between Tower and control building.

Amenities:

- Securable for all levels of classified tests.
- Highly skilled on-site technicians offer mechanical, electrical, control and instrumentation support.



U.S. DEPARTMENT OF ENERGY

- Onsite office space available with complete telecommunications connections.
- Auditorium with modern audio visual equipment.
- Conference rooms and kitchen facilities.

Benefits:

- Unique facility for a variety of tests.
- Convenient location on Kirtland Air Force Base.
- Easy contracting for testing.

Hellostat Field

212 high-quality, individually computer controlled mirrors can produce high flux on target on the Tower. Also used for astronomy experiments, high temperature transient tests, material testing, thermo-nuclear test simulations, or radiation hardening experiments.

Hellostat Test Facility

This site provides setup and testing heliostats with special canting and focusing requirements. Various optical tools are available to cant and focus heliostats for various applications including tracking and canting heliostats for near earth stationary objects in space.

Test Bed Dish Concentrators

36′ diameter dishes each produce 75kW thermal power and peak fluxes up to 1500 W/cm2. They are individually controlled to track to sun with 2 axis control.

Solar Furnace

To protect equipment, this dish is in a fixed configuration inside an open-sided building. A heliostat reflects the sun through an attenuator to control the amount of solar flux on target. Produces 5000 degrees K black body thermal output of 16kW.

Bench Test Facility

Features an assembly bay, two test cells, control room, and bench test capabilities. Each bay has a variety of energy supply options. Use for testing components under high temperature conditions. Analog and digital data collecting systems plus protected viewing from the control room.

Rotating Platform

Outdoor 10′x 20′ platform rotates 360 degrees under computer control. Use to test components under specific solar angles of incidence. Complete data acquisition systems.

Assembly Building

2500 square foot warehouse/assembly building with 34′ ceiling. Includes 5 ton mobile crane with 24′ lift, welding and machining tools.

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