



HELSTF

High Energy Laser Systems Test Facility



Summary

- Dynamic engagement testing of ballistic and aerodynamic targets
- Established relationship with Laser Clearinghouse for above-the-horizon engagements
- High explosive static testing for full-scale targets
- Developmental and Operational Testing and Evaluation (DTE and OTE)
- Laser material interaction for lethality, survivability, and vulnerability testing
- Precision tracking and high resolution imaging for missile intercept tests

Serving the warfighter and the nation as the test and evaluation organization of choice for high energy laser technologies and weapon systems.

The High Energy Laser Systems Test Facility (HELSTF), operated by the U.S. Army Space and Missile Defense Command (SMDC), is part of the Department of Defense Major Range Test Facility Base (MRTFB). HELSTF's experienced work force, organic laser systems, test areas, access to extended land and air range space at White Sands Missile Range, and robust infrastructure provide a one-of-a-kind capability for a wide variety of laser propagation, lethality, survivability, vulnerability, and dynamic engagement testing and evaluation.

The High Energy Laser Systems Test Facility (HELSTF) offers extensive capabilities and a robust infrastructure for testing and evaluating a wide array of laser technology programs and weapons. Located at White Sands Missile Range (WSMR), HELSTF has access to WSMR's 3,200 square miles of restricted land area and 7,000 square miles of restricted airspace in which to conduct static and dynamic live fire, lethality, vulnerability, and material interaction testing. HELSTF, part of the Department of Defense (DoD) Major Range and Test Facility Base (MRTFB), is an approved above-the-horizon high-energy laser (HEL) test range and has a close working relationship with the Laser Clearinghouse.

HELSTF represents an approximately \$880 million investment by the Army and Department of Defense in HEL research, development, testing, and evaluation that includes such unparalleled capabilities as:

Mid-Infrared Advanced Chemical Laser (MIRACL): MIRACL is a megawatt-class continuous wave chemical laser. This deuterium fluoride laser produces energy spectra of approximately 10 lasing lines between 3.6 and 4.0 microns. MIRACL has accumulated approximately 3,600 seconds of successful lasing time in more than 158 tests.

SeaLite Beam Director (SLBD): The SLBD provides the capability to track highly maneuverable tactical targets and destroy them by delivering a focused MIRACL beam to a specified aimpoint on the target. Components include a large aperture gimbal-mounted telescope with a 1.8-meter uncooled primary mirror, eight water-cooled mirrors, a visible and infrared precision tracking system, alignment and stabilization subsystems, and a functional controller to allow for automatic operation. In addition to its laser role, the SLBD is a high-resolution imaging system for recording missile intercept tests conducted on WSMR. The SLBD can also serve as a test bed for innovative tracking techniques and algorithms and for integrating new diagnostic instruments and sensors for improving beam quality.

Solid State Heat Capacity Laser (SSHCL) Test Bed: Developed jointly by the U.S. Army Space and Missile Defense Command and Lawrence Livermore National Laboratory, the 10-kilowatt SSHCL became operational at HELSTF on Aug. 30, 2001. HELSTF custom built this test bed which includes a clean room, power supplies and pulse forming network, coupon testing area, and a full set of diagnostic instrumentation. Recently modified and improved, the test bed is ready to accommodate future outdoor testing of higher power solid state lasers.

Mobile Tactical High Energy Laser (MTHEL) Test Bed: The THEL Advanced Concepts and Technology Demonstration (ACTD) was a joint U.S. Army Space and Missile Defense Command and Israel Defense weapon developed to engage short-range tactical rockets. Currently under the Program Executive Office Air, Space, and Missile Defense (PEO ASMD), the MTHEL Test Bed continues its successful testing effort that has resulted in more than 28 single and multiple rocket and five 152-mm artillery round intercept kills to date. MTHEL is in prototype development for a mobile weapon that will conduct Developmental testing and Evaluation and Operational testing and Evaluation at HELSTF.

Pulsed Laser Vulnerability Test System (PLVTS): Operational since 1992, PLVTS consists of a 12-kilowatt pulsed CO2 laser operating at 10.6

microns and a beam director used for multi-wavelength dynamic target illumination. PLVTS, owned and operated by WSMR, replicates many threat tactical laser systems to support susceptibility and vulnerability testing of U.S. military systems and components.

Large Vacuum Chamber (LVC): The 50-foot diameter chamber can produce a vacuum equivalent to 650,000-foot altitude. It is the only vacuum chamber facility that allows entry of a high-energy laser beam.

Hazardous Test Area (HTA): A fully instrumented site with remotely controlled diagnostic equipment, the HTA is located approximately 975 meters downrange and allows for safe testing of full-scale tactical and explosive targets.

Effects Test Area (ETA): Provides an indoor controlled laboratory test environment for evaluating laser effects on non-explosive materials and small (less than one meter) components.

Beam Transfer Area (BTA): Permits a large number of simultaneous tests during each MIRACL firing by rapidly switching the beam between any of HELSTF's numerous test areas.

Optical Maintenance Facility (OMF): Provides on-site capability to characterize, clean, and install optical elements of any type.

HELSTF also offers a full range of low power lasers, CCTV, data collection/processing, communications, meteorological, chemical lab, cleaning facility, safety/environmental, machine/carpenter shop, logistical services, facilities maintenance, security, and administrative support to meet mission requirements for all prospective HEL customers. With its unequalled capabilities, extensive infrastructure, dedicated team of professionals, and location on WSMR, HELSTF is clearly the optimal range for HEL developmental and operational testing and evaluation (DTE and OTE) for HEL weapons and for private sector experimentation and testing.

HELSTF is transforming its infrastructure to keep pace with Army Transformation. Modernization efforts include fully upgrading mission control systems; fielding a mobile diagnostic suite to support potential HEL weapon systems testing in all relevant combat environments; and developing a Battle Management, Command, Control, Communication, Computer, and Intelligence (BMC4I) test bed that will include digitized scene generation, distributed training and testing, live/virtual constructive test environment, and open architecture data links as part of the Army's 21st Century Range. These modernization efforts will benefit the development of future HEL technologies and maintain HELSTF as the organization of choice for testing HEL weapon systems.



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