

DIRECTED ENERGY SYSTEMS INTEGRATION LAB (DESIL)



Provide world-class facilities to enable scientists and engineers to support the enhancement in directed energy technology improvements for the Department of Defense.

The Directed Energy System Integration Laboratory is a governmentowned and -sustained facility that allows industry and government customers to integrate and evaluate Directed Energy Weapon Systems. Capability enhancements and subject matter expertise efforts include evaluation of systems, sub-systems and components.

Complementary to the evaluation, the lab personnel support the integration of systems for characterization, verification and validation. Other capabilities to evaluate systems include modeling and simulation, indoor and outdoor high-energy lasing support, evaluation of beam quality, laser characteristics, and battery and power assessment supporting sub-system performance.

The DESIL also has a 2,700-square-foot climate-controlled high bay, and an outdoor test area for laser beam propagation, characterization, observation of atmospheric effects, measurement and analysis.

- 400m to target area includes fiber-optic communications back to the facility.
- Beam quality evaluations for up to 500kW-class high energy lasers.
- Air space coordination with Redstone Test Center Mission Operations Control Center for safe outdoor operations.
- Passive tracking for subsystem communications evaluation.
- Control room operations and guest space for operating laser systems.
- Flexible guest services for stand-alone system network architecture.





The Directed Energy System Integration Laboratory includes on-site support equipment including a 5-ton crane and the ability to dissipate high heat using a beam dump and chiller system for heat dissipation.

A candidate customer can request specific facility modifications such as unique power (shore power) requirements. On-site personnel possess expertise in directed energy systems, systems integration, and other engineering competencies.

Laser characterization up to a 500kW-class high energy laser system is achieved by firing the laser into one of the instruments and then collecting and analyzing the associated data. The metrics that can be assessed include power/power-in-the-bucket, wavefront, jitter, beam size, beam quality, centroid maintenance, transient effects in near or far field, as well as polarization. For outdoor propagation, additional atmospheric measurements can be captured. This includes turbulence, transmission, wind speed, wind direction, temperature, humidity, tracking performance, and lethality on materials. The compilation of the laser and atmospheric data supports experimentation, modeling and simulation data verification, and facilitates a forum for a collaborative mission space.

Future capabilities planned include a flexible sub-system integration strategy. This includes the ability to transition a given sub-system in/out of the test architecture to support enhancements in laser weapon technology areas. Technological capabilities for the DESIL are intended to be in lockstep with technology progression and support continuous development as part of the integration and characterization efforts. The outdoor test area supports target board engagements and passive tracking capabilities. The target placement is 400 meters, with a berm to serve as a physical backstop for any stray laser energy emitted. Firing the laser outdoors can serve as the final stage in the integration process. This can serve in many areas to confirm measurements collected by the characterization systems, observe and assess lethality in a static environment, as well as support dynamic target tracking and communication back to the weapon system. This stage of testing associates the use of radar, varying tactical assets, and capturing atmospheric conditions to facilitate evidence for decision-making processes at all levels. Collaboration within science and technology mission space and programs of record objective improvements are tested to support validation of enhancements being considered for fielded systems.



For more information, please contact: USASMDC Public Affairs Office

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