



## HEL MD

*High Energy Laser Mobile Demonstrator*



HEL MD demonstrates directed energy force protection capabilities against rockets, artillery, and mortars; unmanned aerial vehicles; and cruise missiles

The High Energy Laser Mobile Demonstrator program objective is to demonstrate a rugged, mobile solid state laser system that meets the size, weight and performance needs of the Army. The effort includes maturing technologies to execute missions including: force protection; intelligence, surveillance, and reconnaissance; counter-ISR; and offensive operations. To obtain that capability, multiple subsystems are in development to integrate into the prototype weapon system, including the laser subsystem; beam control subsystem; electrical power subsystem; thermal management subsystem; and Battle Management Command, Control, Communications, Computers and Intelligence (BMC4I) subsystem. These subsystems will be mounted on a customized Heavy Expanded Mobility Tactical Truck (HEMTT). As technology matures, higher power lasers will integrate with improved pointing and tracking capabilities to extend range and increase system effectiveness.

- Army's first mobile high energy solid-state laser platform
- Rugged beam control system
- Increasingly powerful solid state lasers
- Modular building block approach
- Speed of light, pinpoint precision threat engagement

# HEL MD

## Purpose

Warfighters face challenges in all aspects of their mission. Soldiers must have weapons that offer precision, controllability, predictability and repeatability to meet the threats of today and the future. A laser combat weapon system offers these attributes enabling enhanced tactical battlefield operations for the small unit at the brigade level. The cost per engagement is substantially lower than the current C-RAM system. No single weapon system currently provides the Soldier all of these attributes on a single platform. The HEL MD has demonstrated target acquisition, tracking, aim point selection/maintenance and destruction for selected threats.

## Data Collections

System effectiveness has been proven through 10 kW demonstrations at White Sands Missile Range, N.M., in 2013 and at Eglin Air Force Base, Fla., in 2014. These data collection series confirmed the capability of a mobile solid-state laser weapon system to counter small caliber mortars, UAVs, and UAV-mounted ISR sensors.

## Components

When completed, HEL MD will consist of a ruggedized and supportable high energy laser and subsystems installed on a tactical military vehicle that will be capable of demonstrating area joint force protection to forward operating bases, naval installations, air bases and other facilities. SMDC is developing the HEL MD in a phased approach. The high energy laser, power system and thermal system will be improved over the next few years to demonstrate higher power level with increased subsystem maturity. The modular system design enables integration of new technologies and subsystems to effectively engage current and future threats.

The HEL MD beam director rotates 360 degrees to provide full sky coverage and extends above the roof of the vehicle to engage below-the-horizon targets. The thermal management and electrical power systems provide a deep magazine of continuous target engagements. Lethal engagements take seconds with duration being target dependent. Frequent short duration engagements can continue for hours a day before the HEMTT requires refueling; diesel fuel is the only "ammunition" HEL MD requires. The modular prototype provides seamless integration with current and future BMC4I.

Current demonstrations utilize a 10 kW-class laser. In the future, a 50 kW-class laser will be integrated into the HEL MD platform. The 50 kW laser will be increased to a

Current System	
Heavy Expanded Mobility Tactical Truck	500 hp Caterpillar C-15 engine, Allison 4500 SP/5-speed automatic transmission, 8X8 axle, 16 ton payload capacity
Laser	10 kW tailored commercial laser
Beam Control System	50 cm aperture retracting telescope, 300 W target illuminator, low jitter precise pointing tracking system
Acquisition & Track Sensors	IR based WFOV for target acquisition coupled with NFOV for engagement
Warfighter Machine Interface	For control of entire system based on a standard air defense and Avenger C4I interface
Battle Management Command, Control, Communications, Computers, and Intelligence	Modular design to enable interface with current and future fielded BMC4I systems
Electrical Power	One set of lithium ion batteries to provide extremely stable power to the laser. Battery charging and other subsystem power from single 60 kW diesel generator mounted on HEMTT
Thermal Management	Two loop chilled water system for laser and standard air conditioner for all other subsystems
Crew	Two person: vehicle operator and weapon operator

100 kW-class laser two years later. The supporting thermal and power subsystems will be upgraded to support the increasingly powerful electric lasers. These additions increase the effective range of the laser while decreasing lase time on target. Additionally, onboard all weather sensors will be integrated for autonomous surveillance and fire control.



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