HEL TD

High Energy Laser Technology Demonstrator

Summary

- Army's first mobile high energy laser platform
- Rugged beam control system
- Leverage ongoing high power solid state laser development
- Modular building block approach
- Speed of light, pinpoint precision

High Energy Laser Technology Demonstrator-Beam Control System (HEL TD BCS) provides force protection capabilities against rockets, artillery, mortars, unmanned aerial vehicles, and exposed unexploded ordnance.

The HEL TD BCS advanced technology objective demonstrates a rugged, mobile beam control system that is traceable to size, weight and performance needs of the Army. It is an integral part of a Laser Combat Weapon System that will execute missions such as: force protection, intelligence surveillance reconnaissance, counter-ISR and offensive operations, which are critical functional elements at every level of the brigade. The BCS effort will mature and demonstrate a ruggedized BCS capable of providing the pointing accuracy necessary for HELs to engage RAM, UAVs, and exposed explosive devices. Additionally, the BCS design accounts for the stresses demanded by the required counter rocket, artillery, and mortar target sets on a tactical mobile platform suitable to support the tactical Army. The Laser Combat Weapon System demonstrates the capability for modular expansion of the future force, beginning at the brigade down through the small unit level, offering full military utility across all services.

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Technical Center

Purpose

Challenges are faced by Warfighters 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 that revolutionize tactical battlefield operations, for the small unit at the brigade level. No single weapon system existed previously to provide the Soldier all of these attributes on a single platform.

The HEL TD advanced technology objective will demonstrate target acquisition, tracking and aim point selection for C-RAM. Success of the BCS software and fire control technology mitigates the risk for a Laser Combat Weapons System that fits within the lighter, more agile force structure of the future.

The enemy is creative and adaptive. The technology exists today to meet the needs of the Soldier. A Laser Combat Weapon System fits into the small unit brigade military force structure on existing platforms (e.g. Stryker, etc.) while offering full military utility across the services. A Laser Combat Weapon System technology demonstration that utilizes an industry competitive model ensures stakeholder support from cradle to grave.

Testing

BCS effectiveness will be proven through demonstration of target acquisition, tracking and aim point selection on tactical platform via the HEL TD low power test demonstration taking place in fiscal year 2011. The demonstration will show the capability of a mobile solid state laser weapon system to counter rockets, artillery, and mortar projectiles.

Components

When completed, the HEL TD will consist of a ruggedized and supportable high energy laser and subsystems installed on a tactical military vehicle that will be capable of providing area joint force protection to forward operating bases, naval installations, air bases and other facilities. Army priorities and resource constraints evolved the HEL TD weapons capability acquisition strategy into a "serial phased" approach. As part of the phased approach, the high energy laser, power system and thermal system will be added later.

A key component of the HEL TD BCS is the beam director, a dome-shaped turret that will extend above the roof of the vehicle when it engages targets. The beam director can rotate 360 degrees to provide full sky coverage, can look down below the horizon and contains a set of mirrors that point and focus the beam on the target.

At a later date, along with the electric laser, precision pointing and adaptive optics will be added to the platform. Additionally, onboard infrared sensors will be implemented for autonomous surveillance and fire control.

Heavy Expanded Mobility Tactical Truck	500 hp Caterpillar C-15 engine, Allison 4500 SP/5-speed automatic transmission, 8X8 axle, 16.5 ton payload capacity
Beam Director Assembly	50 cm aperture Mersenne telescope, engagement perimeter, active secondary mirror
Acquisitions and Track Sensors	300w target illuminator, MWIR acquisition sensor, laser ranger, NIR Fine track sensor
Main Optical Bench	Mounted vertically to BDA deploy structure, auto-align and beam stabilization loops fore and aft of aperture sharing element, separate telescope alignment reference unit, three 400Hz steering mirrors, Surrogate High Energy Laser, and beam shaping optics.
Deploy Mechanism and Structure	Low jitter base, 4.5 minute full deployment of 3,000 lb beam director, beam path flow conditioning system, and back-up EGI mounted.
Warfighter Machine Interface (WMI)	Based on a standard air defense and Avenger C3I interfaces to support Soldier familiarity and interoperability of the system.

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