



HIGH ENERGY LASER TACTICAL VEHICLE DEMONSTRATOR (HEL TVD)



A pre-prototype system to address Indirect Fire Protection Capability Increment 2 – Interceptor Block 2 (IFPC 2-I Blk 2) objective requirements

Warfighters face challenges in all aspects of their mission. They must have weapons that offer precision, controllability, predictability and repeatability to meet the threats of today and the future. A laser weapon system offers these attributes enabling enhanced tactical battlefield operation with a cost per engagement substantially lower than current systems. The High Energy Laser Tactical Vehicle Demonstrator will be a rugged, mobile, pre-prototype solid state laser system that meets the size, weight and performance needs of the Army. It will demonstrate target acquisition, tracking, aim-point selection/maintenance and defeat for selected threats. To obtain that capability, multiple subsystems are under development for integration into the pre-prototype weapon system. These subsystems include: laser; beam control; electrical power; thermal management; and Battle Management, Command, Control, Communications and Intelligence.

- System to address IFPC 2-I Blk 2 target set
- Compact 100 kW-class solid state laser
- Rugged beam control system
- Modular building block approach
- Speed-of-light engagement of threats with pinpoint precision



HEL TVD

The first mission is to protect U.S. and allied forces at fixed and semi-fixed bases. High energy lasers will complement conventional offensive and defensive weapons at a significantly lower cost per engagement than current systems. The high energy laser system requires only fuel to complete its mission; there is no ordnance logistics burden as with conventional weapons.

The average cost per kill is approximately \$30, which shifts the engagement cost equation in favor of U.S. forces. With the entire system on a single tactical vehicle, the site's defense strategy can be quickly adjusted in response to a changing threat environment.

The High Energy Laser Tactical Vehicle Demonstrator will consist of a 100 kW-class laser projected through a precision pointing, high-velocity target tracking beam control system. The beam control system will have an aperture of at least 30 cm. To support the laser and beam control system, the HEL TVD will have power and thermal management systems that power and cool all the subsystems and provide sufficient magazine to defeat many targets. A Battle Management, Communications, Command and Control subsystem will receive target assignments with appropriate target cues from radars then point the laser beam to engage the targets.

The HEL TVD will conduct a demonstration against a variety of targets in fiscal year 2022. Lethal engagements of a variety of targets is planned for this Technology Readiness Level 6 demonstration. In addition, there will be instrumentation to characterize the 100 kW-class laser beam propagation; the propagation data will be used to help anchor laser models.

The payoff for Warfighters is progress in multiple areas toward a weapon system that will provide: cost effective engagements, reduced manning, significantly reduced logistics burden and a multiple mission capable platform.

HEL TVD Subsystem Summary

Laser	100 kW-class solid state laser
Beam Control System	No smaller than 30 cm aperture telescope, target illuminator, adaptive optics, low jitter precision pointing and tracking system
Acquisition and Track Sensors	IR-based wide field-of-view for target acquisition and IR-based narrow field-of-view fine target tracking
Warfighter Machine Interface	Ruggedized laptop with operator-friendly controller
Battle Management Command, Control, Communications, Computers, and Intelligence	Modular design with manual/semi-automatic/automatic target acquisition, aim-point selection, and aim-point management connected to the Army battle management system
Electrical Power	On-board generator(s) and energy storage
Thermal Management	Laser cooling system and standard heating, venting and air conditioning for all other subsystems
Platform – Family of Medium Tactical Vehicles	330 hp, 7.2 liter Caterpillar C-7 engine, Allison 3070SP, 7-speed automatic transmission, 6x6 axle, 10 ton payload capacity
Minimum crew	Two: vehicle operator



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