



Laser Weapon Systems

Innovative Warfighting Solutions For The Services



LASER WEAPON SYSTEMS

Lockheed Martin has specialized in laser weapon system development for 40 years, with advancements in areas such as precision pointing and control, line-of-sight stabilization and adaptive optics – essential functions in harnessing and directing the power of a laser beam – and in compact, robust, spectrally beam-combined fiber laser devices that provide unmatched performance.

Lockheed Martin's directed energy (DE) laser program draws upon our proven expertise across a broad range of capabilities, as well as our spirit of innovation. Our experience includes:

- The beam-control/fire-control system for a megawatt-class laser that destroyed a ballistic missile in flight Airborne Laser Program
- High-power spectrally beam-combined fiber lasers that provide the most efficient conversion of platform prime power into lethal power on target
- Unique SWIR component capabilities that significantly extend the ISR (intelligence, surveillance, and reconnaissance) range of the DE laser system
- Manufacturing complex, high-performance optical targeting systems
- Widespread weapons-system and platform integration experience across all DoD services

REVOLUTIONARY TECHNOLOGY

Laser weapons provide the advantages of speed, flexibility, precision and low cost per engagement that are only possible with lasers.

These advantages apply to stand-alone DE laser systems as well as to weapon systems that combine DE and kinetic energy (KE) capabilities. In these cases, DE operates as a force multiplier, enabling the warfighter

to counter a growing range of emerging threats by providing:

- Very deep magazine
- Extremely low cost per engagement
- Speed of light delivery
- An adaptive optics beam control capability that increases significantly the lethality and range of the laser system
- The ability to acquire, track, and destroy small UAS in an operationally challenging cluttered background environment
- A DE system with demonstrated ability to provide multiple hours of continuous operation, without failure

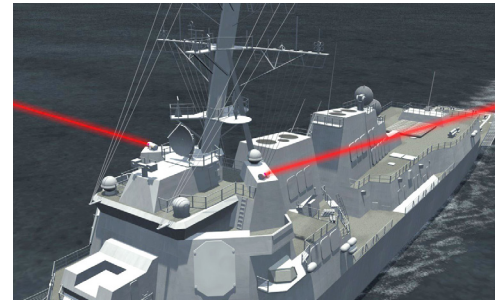
Laser weapons are well-suited to countering large numbers of inexpensive, highly maneuverable threats that might otherwise exhaust the magazines of our current defensive KE weapons. Using DE and KE weapons together enables warfighters to defeat emerging swarm



threats, reserving our most capable kinetic weapons for our adversaries' largest and most hardened threats. DE weapon systems support multi-mission scenarios, and can be readily augmented by communications functions, as well as unprecedented intelligence, surveillance and reconnaissance range, and precision.

UNIQUE ADVANTAGES

- A robust and highly-maintainable laser architecture that is designed to minimize life-cycle cost and to maximize up-time
- Output laser power that can be rapidly adjusted between low and maximum power to support disrupt, disable, and destroy capabilities
- Highly parallel laser architecture that supports graceful degradation by eliminating almost all single points of failure



- Highest system efficiency demonstrated in any DE laser system; minimizing size weight and power requirements
- High Lethality



LOCKHEED MARTIN IS ADVANCING AND DEMONSTRATING A RANGE OF LASER WEAPON SYSTEM TECHNOLOGIES:

ATHENA (ADVANCED TEST HIGH ENERGY ASSET)



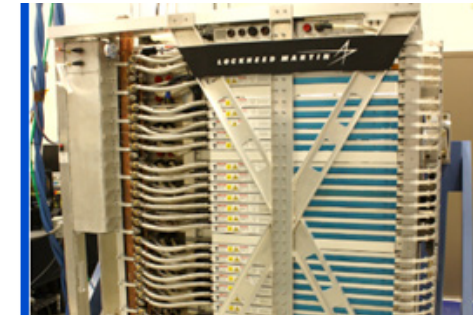
- A LM-designed and integrated ground-based, transportable laser weapon system
- At 30 kW, represents the first and highest fiber laser power level for a laser weapon system of this type, has demonstrated the ability to provide multiple hours of continuous operation, without failure, and provides an advanced adaptive optics beam control system to enhance lethality and range.
- An affordable, integrated system that has demonstrated capability of addressing multiple threats, including UAS against a challenging cluttered background, rockets, mortars, and small boats

HELIOS (HIGH ENERGY LASER AND INTEGRATED OPTICAL-DAZZLER WITH SURVEILLANCE)



- The high-energy fiber laser will be designed to counter unmanned aerial systems and small boats
- HELIOS sensors will be part of an integrated weapon system, designed to provide decision-makers with maximum access to information. HELIOS data will be available on the Lockheed Martin-led Aegis Combat System.
- The HELIOS dazzler will be designed to obscure adversarial UAS-based ISR capabilities.

RELI (ROBUST ELECTRIC LASER INITIATIVE) FOR ARMY HIGH ENERGY LASER MOBILE TEST TRUCK (HELMTT)



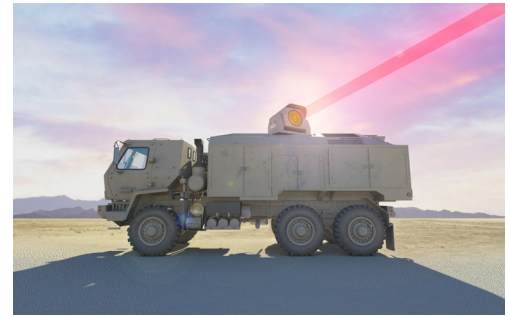
- 60 kW class laser currently integrated into the Army's HELMTT vehicle
- Currently undergoing testing in relevant tactical environments against targets such as rockets, mortars, and UASs
- Scalable architecture that demonstrates enhanced laser supportability and graceful degradation
- Highly reliable solid state laser architecture with >8 hrs high power operation, and >5,000 laser shots

SHIELD (SELF-PROTECT HIGH ENERGY LASER DEMONSTRATOR)



- SHIELD LANCE (Laser Advancement for Next Generation Compact Environment) advances spectral beam combined (SBC) fiber laser packaging to provide high beam quality HEL in aircraft pod.

HEL TVD (HIGH ENERGY LASER TACTICAL VEHICLE DEMONSTRATOR)



- Army demonstrator addresses Indirect Fires Protection Capability (IFPC) missions
- Mobile 100 kW-class laser weapon system to counter rocket, mortar, and UAS threats for fixed site protection
- Compact, efficient Spectrally Beam Combined fiber laser with high Power in the Bucket efficiency (PIBE)
- Advanced adaptive optics improves system performance, even in harsh weather conditions
- Low jitter, agile beam director for enhanced lethality

LPLD (LOW POWER LASER DEMONSTRATOR)



- Missile Defense Agency (MDA) laser beam control program designed to demonstrate applicability of DE to MDA missions by propagating a lethal high-power laser beam over a very long-range from a high-altitude airborne platform
- Developing technology and system design under MDA contract
- Leverages expertise in laser system architectures, ballistic missile defense system integration, platform integration, optics and beam control

Lockheed Martin.
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