MOBILE EXPERIMENTAL HIGH ENERGY LASER (MEHEL)

The Mobile Experimental High Energy Laser is a science and technology prototype for Warfighter familiarization and training

The Mobile Experimental High Energy Laser is a technology integration and experimentation effort with a solid state laser system, agile beam control system, supporting laser subsystems, a Ku-band radar, and Counter-Unmanned Aerial System Mobile Integrated Capability, or CMIC, components integrated into a combat vehicle. The goal is to enable Warfighters to gain hands-on experience operating a high energy laser system that will support development of tactics, techniques and procedures, as well as develop requirements for future combat platform-based HEL weapons.

- Army's first solid state high energy laser on a combat platform
- Modular system for simplified upgrade as technologies mature
- Additional counter-unmanned aerial system capabilities
- Control interfaces for Warfighter operation
- Warfighter hands-on experience to learn how high energy laser systems function

MEHEL

Purpose

The Mobile Experimental High Energy Laser is a U.S. Army Space and Missile Defense Command asset that provides Warfighters hands-on experience operating a high energy laser integrated in a combat vehicle.
It enables Warfighters to begin developing techniques, tactics and procedures for future HEL weapon systems, as well as inform requirements for future HEL weapon systems.

Components

USASMDC obtained a Stryker chassis for this risk-reduction effort. The first version of the MEHEL had a 2 kW laser with a 10 cm aperture beam director. That configuration, the first solid state HEL on a combat platform, demonstrated HEL capability in fiscal year 2016.
The laser was upgraded to a 5 kW system in December 2016. At the same time, the Ku-band radar and Counter-Unmanned Aerial System Mobile Integrated Capability, or CMIC, components were integrated. The CMIC components were developed by the Army's Aviation and Missile Research Development and Engineering Center.
The Ku-band Acquisition and Track Sensor enables MEHEL to autonomously sense and acquire targets. The laser was upgraded to a 10 kw system in August 2018 to provide longer effective range or reduce defeat time of a target at the same range.

Demonstrations and Warfighter Experimentation

The 2 kW configuration of the MEHEL participated in the Fires Center of Excellence-sponsored Maneuver Fires Integration Experiment, or MFIX, 2016. There it downed a number of small rotary-wing unmanned aircraft systems.
After the laser was upgraded to 5 kW, the MEHEL participated in the Joint Improvised-Threat Defeat Organization's Counter-Unmanned Aerial System Hard-Kill Challenge in March-April 2017. The contractor operators defeated a number of small rotary- and fixed-wing unmanned aircraft systems. Following this event, Soldiers were trained to operate the MEHEL.
Training took place at Fort Sill, Oklahoma, just before MFIX-17. During MFIX-17, Soldiers shot down an unmanned aircraft system with a laser for the first time. Since that time, the 5 kw MEHEL has been Soldier-operated at both MFIX-18 and Joint Warfighter Assessment 18.1.
The 10 kw MEHEL was Soldier-operated at MFIX-19.
Over the course of several demonstrations, Soldier operators have defeated a large number of small rotary- and fixed-wing unmanned aerial systems.

Current System	
Laser	10 kW ruggedized commercial fiber laser
Beam Control System	Approximately 10 cm aperature telescope, low jitter precision pointing and tracking system
Acquisition and Track Sensors	Infrared-based wide field-of-view for target acquisition and IR-based narrow field-of-view fine target tracker and Ku-band radar
Operator Interface	Mounted Family of Computer Systems (MFoCS)
Battle Management Command, Control, Communications, Computers, and Intelligence	Maneuver Aviation Fires Integrated Application Battle Operating Software Suite (MAFIA BOSS)
Electrical Power	Stryker generator charging 28 VDC batteries
Thermal Management	Advanced Vapor Compression with polygycol/water mixture
C-UAS Mobile Integrated Capability (CMIC) components	Additional counter-air and fire support capability
Minimum crew	Three

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