

Lifting the Veil of Israel's Classified Laser Weapon Program

The new technology prompts a strategic change in Israel's defense capabilities - DDR&D

By **Tamir Eshel** - Jan 8, 2020

Israel's Ministry of Defense revealed today a major achievement in a high energy laser program undergoing with the Directorate of Defense Research and Development (DDR&D). Investments in laser technology made by the department have led to the ability to precisely focus laser beams on long-range targets, overcoming atmospheric disturbances.

The new technology is key for the delivery of laser effects on target within a short time. It will enable the development of laser weapons capable of intercepting a variety of threats.

"The new technology will prompt a strategic change in Israel's defense capabilities." The IMOD press release said. "Throughout the year 2020, we will conduct a demo of our capabilities." Israel Head of the Directorate of Research and Development in the DDR&D, Brig. Gen. Yaniv Rotem said, "We are entering a new age of energy warfare in the air, land, and sea." he added. According to Rotem, investments in R&D made in the last years have placed the State of Israel among the leading countries in the field of high-energy laser systems.

Encouraged with the new technology breakthrough DDR&D embarked on three parallel high energy laser weapon systems demonstrator programs with Elbit Systems and Rafael, designed to demonstrate new laser weapon capabilities.

A ground-based laser weapon system a field-deployable (containerized) system that will complement the capabilities of the Iron Dome, establishing the lowest tier layer to augment Israel's four-layered air defense system. This lowest layer will be able to defeat mortar bombs and short-range rockets fired at very short ranges, leaving very short time for intercept. While the Iron Dome missile-based C-RAM has demonstrated the capability to engage those threats, their interception by missiles is too costly to deliver for an optimal response.



The sheltered variant will augment the current Iron Dome C-RAM offering cost-effective interception of short-range rockets and mortars

A vehicle-mounted laser-based platform protecting maneuver forces, employing a platform-mounted laser system to defend troops in the field against direct and indirect threats (such as rockets, artillery missiles, or anti-tank guided weapons). These lasers will complement the vehicle-specific active protection systems deployed on heavy and future armored combat vehicles, such as the Merkava and Namer, and will provide a higher level of protection for less protected vehicles or troops in the open.



The vehicle-mounted laser weapon demonstrator will be tested in C-RAM, C-UAS and APS roles.

An airborne laser weapon system mounted on an air platform, likely a High Altitude Long Endurance (HALE) or Medium Altitude Long Endurance (MALE) drone, capable of intercepting missile threats above cloud cover, covering wide areas. This concept enables laser interceptors to deploy high above the clouds, thus overcoming the main limitation of ground-based laser weapons. Such a drone-based laser weapon will be able to engage targets before launch or soon after launch, at their boost phase, when the missiles are loaded with propellant and are most vulnerable to damage caused by the laser.



Technologies developed with investments from the Israel MOD DDR&D can leverage the use of high energy laser for tactical applications, in air, land, and sea. Illustration: DDR&D



While the sheltered laser weapon will augment the Iron Dome, the vehicle-mounted system would augment active protection systems such as Iron Fist and Trophy, providing C-RAM protection for an entire formation. Illustration: DDR&D

Laser weapons offer an 'unlimited magazine', enabling continued use at a low cost per kill. Complimentary use of two different technologies – kinetic air defense (via systems such as the Iron Dome), and laser platforms deliver much higher yield, probability of intercept and combat economy, decreasing the number of interceptors used.

Over the years, the DDR&D has invested considerable efforts in advancing powerful laser technology. Many developments, both from Israel and abroad, have been tested and proven to be ineffective. Significant achievements have recently been made as a result of the collaboration between the DDR&D, defense industries (Rafael and Elbit Systems) and academic institutions. These achievements were made possible by the development of electric source laser systems, in the replacement of chemical laser technology.





Vehicle-mounted laser weapon providing C-RAM, C-UAS and active protection for a combat formation. Illustration: DDR&D.

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