Tactical High Energy Laser

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The **Tactical High-Energy Laser**, or **THEL**, is a laser developed for military use, also known as the **Nautilus laser system**. The mobile version is the **Mobile Tactical High-Energy Laser**, or **MTHEL**.

THEL/ACTD

Contents

Demonstrator

The cooperative Tactical High Energy Laser (THEL) Demonstrator ACTD was designed and built by the United States and Israeli governments on July 18, 1996. The THEL is a high-energy laser weapon system that uses proven laser beam generation technologies, proven beam-pointing technologies, and existing sensors and communication networks to provide a new active defense capability in counter air missions. The goal of THEL is to provide a different solution than other systems or technologies for the acquisition and close-in engagement problems associated with short- to medium-range threats, thereby significantly enhancing coverage of combat forces and theater-level assets. The THEL's low cost-per-kill (about $3,000 per kill) could also provide a cost-effective defense against low-cost air threats. It features up to 60 shots without reloading and if it meets design goals, a probability of kill of nearly 100% at a range of 5 km.

An Israeli designed, U.S funded program has been initiated to develop a THEL demonstrator using deuterium fluoride laser (chemical laser) technologies. Israeli THEL team members have completed a Concept Design Review in Israel for the demonstrator. Approximately 21 months will be required to design and build the system, followed by 12 to 18 months of field testing at the High Energy Laser Systems Test Facility in Israel. This program will deliver a THEL Demonstrator by March 1998 with a limited operational capability to defend against short-range rockets. The THEL weapon system concept definition studies using advanced technologies were awarded to four contractors on September 30, 1996. The prime contractor for THEL is Northrop Grumman (formerly TRW.)

THEL conducted test firing in FY1998, and Initial Operational Capability (IOC) was planned in FY1999. However this has been significantly delayed due to reorienting the project as a mobile, not fixed design, called Mobile Tactical High Energy Laser (MTHEL). The original fixed location design eliminates most weight, size and power restrictions, but is not compatible with the fluid, mobile nature of modern combat. The initial MTHEL goal was a mobile version the size of three large semi trailers. Ideally it would be further downsized to a single semi trailer size. However doing this while maintaining the original performance characteristics is difficult. Furthermore the Israeli government which had been providing significant funding decreased their financial support in 2004, stretching out the IOC date to at least 2010.

In 2000 and 2001 THEL shot down 28 Katyusha artillery rockets and 5 artillery shells. On November 4, 2002, THEL shot down an incoming artillery shell. A mobile version has completed successful testing. During a test conducted on Aug. 24, 2004 the system successfully shot down multiple mortar rounds. The test represented actual mortar threat scenarios. Targets were intercepted by the THEL testbed and destroyed; both single mortar

rounds and salvo were tested.

Even though military experts such as the former head of the Administration for the Development of Weapons and the Technological Industry, Aluf Yitzhak Ben Yisrael, were calling for the implementation of the THEL, the project was discontinued. During the 2006 Israel-Lebanon conflict, Ben Yisrael, currently the chairman of the Israeli Space Agency, renewed his calls to implement the THEL against high-trajectory fire.

Possible countermeasures

In theory certain countermeasures could reduce the effectiveness of THEL. These could include heat hardening and reflective coating of the projectiles, which would increase the necessary laser exposure time. However THEL has primarily been developed to intercept relatively primitive threats such as homemade Qassam rockets and World War II-era Katyusha rockets, which thus far have not incorporated sophisticated countermeasures.

The challenge will be to split the THEL system into transportable pieces, each capable of inflicting only a part of the needed heat. While netted with the base center, several (small) units could respond to the same threat; this may be a way to overcome 1) the danger of system destruction, 2) the need for chemical lasers and associated transportation problems, and 3) eventual light countermeasures.

See also

Lasers

- Laser science
  - Laser applications
  - Laser construction
  - Active laser medium
- List of lasers
- Chemical laser
  - Deuterium fluoride laser

Laser weapons

- Skyguard
- Airborne laser
- Advanced tactical laser
- High Energy Liquid Laser Area Defense System (HELLADS)

External links

- Defense Update article on M-THEL (http://www.defense-update.com/directory/THEL.htm) .
- US, Israel to test Nautilus anti-rocket system (http://www.globes.co.il/serveen/globes/docview.asp?did=791864)
- Israeli-U.S. Laser Downs Long-Range Missile in Test (http://news.myway.com/top/article/id/401978%7Ctop%7C05-07-2004%3A%3A08%3A06%7Creuters.html
- Laser weapon passes biggest test (http://www.msnbc.msn.com/id/4926840)
- Video of MTHEL engaging various targets (http://www.youtube.com/v/IcmI6UnR4gg)

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