

Laser Division

Department of Defense's center of expertise for the development of lasers. This division includes technologies for gas, chemical, solid state and semiconductor lasers. The division creates new and innovative concepts aimed at expanding the knowledge base of lasers with the ultimate goal of integrating these concepts into useful weapons for U.S. military forces.

Starfire Optical Range Division

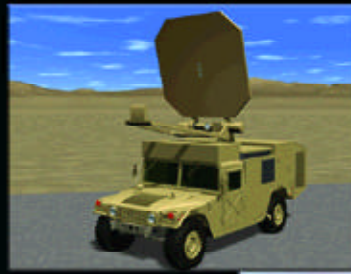
Operates a facility with two large telescopes integrated with multiple lasers and incorporating adaptive optics systems.

Starfire conducts research and field experiments for many directed energy projects, for space object imaging, and for ground-based laser beam control technologies.

The AFRL Technology Transfer Office offers one-stop shopping for companies wishing to commercialize AFRL technologies, utilize its unique facilities, or develop cooperative agreements. In addition, AFRL encourages collaborative activities with academic organizations. Contact the Technology Transfer Support Group at 505-846-6377.



New light-weight membrane materials for use in large optical-quality telescope designs



Vehicle-Mounted Active Denial System



Space surveillance telescope atop Mt. Haleakala in Hawaii

The benefits of this research and development will lead to more effective offense and defense strategies with fewer battlefield casualties. Significant increases in strategic and tactical advantages will result in enhanced protection of the free world and stronger homeland defense. Use of these directed energy technologies will ultimately be critical to our national defense and will add to the protective armor of the U.S. warfighter. These technologies are also leading to significant advances in commercial industries such as medical, aeronautical, space, and law enforcement. The use of ground-based, airborne, and space-based directed energy weapons will alter current and future defense and warfare concepts. The impact of new uses and expanded knowledge of lasers and other directed energy technologies will change and improve the very texture of the world's free societies.



Directed Energy Directorate

Developing Speed of Light Weaponry



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A missile with hostile intent is launched. Enemy troops are moving into a position of advantage on a mountainside. A commander is unable to communicate with his own forces without his signal being intercepted. The common element of these three modern warfare problems is that they have a solution based on new directed energy concepts.

Some Bronze Age civilizations were thought to have used directed energy, such as focusing the sun's energy on an invading enemy, to gain a military advantage over their adversaries. Since those early times, advances in various types of weapons, aeronautics, propulsion, rocketry, optics, imaging, and other advanced technologies have played a major role in the world's history.

The Directorate's mission is to conduct research and development aimed at broadening the knowledge base for low- and high-energy lasers, high-power microwaves, and optical technologies. Ultimately, these technologies will be transitioned and integrated into future military and commercial systems with the major emphasis on support of military capabilities.

For more than fifty years, the Air Force Research Laboratory's Directed Energy Directorate and its predecessors have conducted research and development aimed at expanding the technology boundaries of directed energy concepts. While the Directorate began as a research laboratory devoted to the refinement of nuclear energy, its focus has moved to non-nuclear directed energy with particular emphasis on lasers of a variety of wavelengths, microwaves, and associated technologies such as advanced optics.

Advanced Optics and Imaging Division
Conducts research and development in support of improved optical and imaging systems. The division's primary focus is on advanced optics for the detection and tracking of hostile targets. In support of the Air Force's Airborne Laser program, this division is investigating how to use optics to precisely place a beam of laser light on a moving target at greater and greater ranges.

High-Power Microwave Division
Conducts research and development for high-power microwave technologies. The division's focus includes development of offensive concepts as well as defensive protections against potential aggressors.

The electromagnetic spectrum extends from very short wavelengths such as gamma rays to the longest radio waves. The spectrum also contains visible light, concentrated light produced by lasers, and microwave beams commonly used for home cooking. Intensifying and focusing these waves can produce a variety of directed energy concepts capable of being developed into a highly effective weapons-class arsenal augmenting offensive and defensive capabilities.

The Directed Energy Directorate is located at the Phillips Research Site on Kirtland Air Force Base in Albuquerque, New Mexico. Dr. R. Earl Good is the director of the operation of more than 600 people, 670,000 square feet of laboratory and administrative space and an annual budget of nearly \$150 million. The Directed Energy Directorate is part of the Air Force Research Laboratory under its parent organization, Air Force Materiel Command.

