MILITARY

Advanced Tactical Laser (ATL)

- Advanced Tactical Laser
- Aerospace Relay Mirror
- HELLADS
- HPFL
- Tactical Redirected Energy
- Tactical Relay Mirror

The Advanced Tactical Laser (ATL) ACTD is an innovative concept for airborne ultra-precision strike missions that uses a high-energy laser weapon mounted in a tactical aircraft to engage stationary or moving ground targets. On-board visible and infrared surveillance and acquisition sensors provide the weapon operator scene images of increasing resolution for finding, identifying, and engaging targets. The entire weapon system is envisioned as a package of several self-contained modules that can be installed or removed from the aircraft in a few hours.

The ATL uses a closed-cycle, chemical oxygen-iodine laser (COIL) with an appropriate beam control. The closed-cycle system captures waste by-products, making it suitable for tactical employment. The ATL will be installed in a C-130 aircraft to demonstrate its ability to engage tactical targets from a moving platform at ranges of approximately 10 kilometers. This SOCOM demonstration program is important and should be completed in the 2007-2009 timeframe.

The Advanced Tactical Laser can place a 10-centimeter-wide beam with the heating power of a blowtorch on distant targets for up to 100 shots. The Advanced Tactical Laser can produce a four-inch-diameter beam of energy that can slice through metal from a distance of 9 miles.

The Advanced Tactical Laser can provide powerful capabilities for both lethal and non-lethal ultra-precision engagement of threats with little or no collateral damage. This is often critical in urban environments and congested chokepoints that are vulnerable to terrorist activities or insurgent operations. Operated from a ground, sea or airborne platform, ATL offers the ability to place a precisely calibrated energy pulse on a target from either close in or from a standoff distance of several miles. While the ATL provides a laser weapon that can be used for lethal warfare when warranted, the ATL can also affect less-than-lethal engagements that can help control high-risk situations for both military and humanitarian purposes. Its rapid energy delivery coupled with its high-resolution, non-cooperative observation and surveillance capabilities provide unique defensive operational capabilities in densely populated areas. ATL can exploit the target vulnerabilities to cause the target to be destroyed for military purposes OR to cause limited damage to the extent that its functionality and/or mobility is impaired for humanitarian purposes such as saving the lives of captives or hostages. The ATL can achieve this result in a covert, non-destructive, and non-intrusive mode that negates unnecessary loss of life.

The ATL is required to be a sealed exhaust chemical oxygen iodine laser (COIL) that eliminates the soldier's exposure to chemical effluents and to fit on an MV-22 aircraft. Boeing has demonstrated a compact sealed Chemical Oxygen Iodine Laser that meets these requirements. Boeing has patents for the critical design features of the Sealed Exhaust type of COIL technology, which is the advancement that allows this type of laser to meet the Government's requirements and merit ACTD approval. USASMDC believes that the COIL developed by Boeing is the only existing technology that meets these requirements and that only Boeing has the expertise to perform the ATL ACTD Program Definition phase in concert with synergistic and inseparable testing utilizing its sealed exhaust COIL.

The prime contractor for the advanced tactical laser is the Boeing Company's Rocketdyne division.The advanced tactical laser, which is expected to cost $180 million through 2005. The ATL includes a laser, optics and control systems enabling fire control systems on fixed and rotary-wing aircraft to precisely direct laser fire on targets from 15 kilometers away.

- FY 2002 - Boeing awarded contract to develop ATL weapon system. Drafts of Initial Technical Management Plan (ITMP) and Systems Engineering & Management Plan (SUMPS) completed and in coordination. Lethality testing begun. One mole laser producing 17KW steady power. Statements of work (SOW?s) accomplished between USSOCOM and: AFRL; SMDC; Lincoln Labs; and AFSOC. Discussions initiated with USMC for providing test aircraft. System Baseline Review process started.
- FY 2003 - System Baseline Review scheduled December 2002. This will define specifications for ATL weapon system. Preliminary Design Review (PDR) in 4th quarter. Weapon System component construction stated.
- FY 2004 - Conduct Concept Design Review (CDR). Assemble Battle Management Command and Control

System. Complete optical control system manufacture.
- FY 2005 - Low power flight tests with laser controls and low power (surrogate) laser scheduled. Also, assembly and ground checkout of ATL weapon system scheduled. Lethality and ground firing of laser to be accomplished.

The ATL concept has been explored with a large number of military and defense department planners and operators. Through these interactions, including two government-sponsored needs assessment studies, a wide range of candidate missions has evolved. Each has some unique requirements in terms of preferred platform, sensor suites and command and control functions, but they all rely on the same basic laser capability to generate 100 to 300 kW of optical power and deliver it precisely to a small, pre-defined spot.

The outermost cruise missile engagements occur at 20 km, where laser dwell times of five seconds are required for each kill. At shorter ranges, the dwell times are reduced. One target is destroyed for each dwell period, and a few seconds are allocated for re-targeting between shots.

The ATL is not subject to direct attack by small arms or shoulder-launched anti-aircraft missiles. In fact, it can be far enough away that its action is almost covert. The laser beam makes no sound and is not visible. The effect of the beam may not be easily associated with a presence of an aircraft several miles away!

An ATL will generally operate below most of the clouds. For missile defense, the ATL works best at altitudes around 10,000 feet. But it can operate down to about 2,500 feet; below that, the operational range becomes too short to be useful. Localized weather cells and fronts, however, may be avoided by maneuvering around them, in the Arabian Gulf, temperatures are high, humidity moderate, cloud ceilings high, and visibility limited by blowing sand and dust much of the time. In the Korean peninsula, conditions vary greatly between summer and winter. Winters are cold and clear. Summers are hot, humid and frequently overcast. In both areas, the baseline ATL design achieves > 20 km kill range 50 percent of the time. In the Arabian Gulf location, for 10 percent of the time the range will exceed 24 km, and at 10 percent of the time it will be less than 16 km. In the Korean coastal climate, the variation is greater. The "best" 10 percent of the time the range exceeds 30 km, but the worst 10 percent limits the range to less than 8 km.