



Fact Sheet

5700 18th Street, Bldg 245
Fort Belvoir, VA 22060-5573

The Airborne Laser Test Bed

The Airborne Laser Test Bed (ALTB) was an advanced platform for the Department of Defense's directed energy research program. Using two solid state lasers and a megawatt-class Chemical Oxygen Iodine Laser housed aboard a modified Boeing 747-400 Freighter, the ALTB demonstrated the potential of using directed energy as a viable technology against ballistic missiles. The ALTB conducted over 205 flight test missions, engaging 11 missiles, destroying two boosting short-range ballistic missiles, and completing 310 successful Aircraft Diagnostic Target engagements. The ALTB has been demilitarized and most of the components have been reutilized for other government research.



Firing Sequence

1. The ALTB used one of its six infrared sensors to detect the exhaust plume of a boosting missile.
2. A kilowatt-class solid state laser, the Track Illuminator, tracked the missile and determined a precise aim point.
3. The Beacon Illuminator, a second kilowatt-class solid state laser, then measured disturbances in the atmosphere, which were corrected by the adaptive optics system to accurately point and focus the High Energy Laser (HEL) at its target.
4. Using a large telescope located in the nose turret, the beam control/fire control system focused the HEL beam onto a pressurized area of the missile, holding it there until laser energy compromised the missile's structural integrity causing it to fail.

Significant Events

- **On Jan. 10, 2010**, the ALTB successfully engaged an instrumented rocket at the lethal demonstration range. This test was the first time the HEL performance data was collected at the target missile.
- **On Feb. 3, 2010**, the ALTB successfully engaged and destroyed a boosting solid-fueled Terrier Black Brant (TBB) rocket.
- **On Feb. 11, 2010**, the ALTB successfully engaged and destroyed a boosting liquid-fueled Foreign Military Acquisition (FMA) missile. On the same flight, it successfully engaged a boosting TBB rocket meeting all test objectives without negating the rocket.
- **On May 3, 2010**, the ALTB successfully engaged an instrumented rocket at twice the range of the first lethal engagement. The results of this experiment verified ALTB's ability to destroy an FMA at twice the first lethal demonstration range.
- **On Sept. 1, 2010**, the ALTB successfully engaged a boosting liquid-fueled FMA missile at twice the range of the first lethal demonstration; however an interrupted data conversion led to an unsafe HEL beam pointing condition. The safety system successfully terminated the autonomous HEL firing before any damage or off-target propagation occurred.
- **On Oct. 20, 2010**, the ALTB successfully engaged a boosting solid-fueled TBB rocket. During tracking, the HEL incorrectly reported it was not ready to fire and aborted the engagement. The cause was traced to a single micro-switch on an iodine valve that incorrectly reported a closed-valve condition.
- **On July 14, 2011**, the ALTB damaged a mirror in the high energy beam train during testing that limited further HEL testing. Low power tracking and atmospheric tests continued.
- **On July 27, 2011**, the ALTB completed a laser track of Minuteman III ICBM, marking the first ever laser track of an ICBM and the longest range missile track to date.
- **On Aug. 11, 2011**, the ALTB completed a passive track of a Minotaur IV Lite rocket (HTV-2b) in which it acquired and tracked (via IR) a boosting missile at over 500 km. Additionally, ALTB proved its ability to maintain a passive track through staging.
- **On Oct., 11 2011**, ALTB conducted its last mission collecting data on jitter and boundary layer effects on laser propagation.
- **On Feb. 14, 2012**, ALTB was flown to Davis-Monthan AFB, put in storage, and retired from active service.
- **As of April, 2014**, the ALTB aircraft has provided over 36,000 parts, worth in excess of \$150M, to 17 different government agencies including NASA's SOFIA program and the USAF E-4B Airborne Operations Center.