



Archive

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## Airborne Laser Completes First Flight

The Airborne Laser (ABL), an extensively modified Boeing 747-400F destined to be the world's first directed-energy combat aircraft, made its maiden flight today, circling over western Kansas for a 1 hour and 22 minute flight before landing where it took off, at McConnell Air Force Base. ABL took off to the south with unrestricted visibility at 3:29 p.m. CDT and landed into the wind at 4:51 p.m. CDT. It was the first time the aircraft had flown since it arrived in Wichita on Jan. 22, 2000, straight off the Boeing assembly line.

The flight was the first in a test series designed to prove that the aircraft still performs like a Boeing 747 despite the significant structural and operational changes made during its two and a half-year stay at the Boeing Maintenance and Modification Center, which is adjacent to McConnell Air Force Base.

This successful flight is truly a milestone in the history of ABL, said Col. Ellen M. Pawlikowski, director of the Airborne Laser System Program Office at Kirtland Air Force Base, N.M. It represents a major step forward toward our ultimate goal of shooting down a ballistic missile with a beam of ultra-powerful light by the end of 2004.

After the missile shootdown, ABL is scheduled to take its place as a principal member of the boost-phase segment of the Missile Defense Agency's (MDA) layered system designed to protect the country and U.S. troops against enemy ballistic missiles. ABL's task is to destroy the just-launched missiles by focusing its high-energy laser beam on the pressurized fuel tank, causing it to rupture and explode, in effect causing the missile to kill itself.

ABL, now under the MDA's management, is being developed by a team composed the Boeing Co., TRW, and Lockheed Martin. Boeing supplied the aircraft and the sophisticated software system which will be the brains of the weapon system. TRW built the megawatt-class lasers that comprise the system's kill mechanism, while Lockheed Martin built the complicated maze of mirrors and lenses used to guide the lasers to the target and the turret that will house the system's 1.5-meter telescope. Once testing has been completed, the ABL will be turned over to the Air Force, the first in a visualized fleet ready for use as a first line of defense against missile attack.

For ABL, the flight represents the most visible evolution of the program since it formally began in November, 1996, with a \$1.1 billion appropriation to Boeing, the prime contractor for the project. Although there have been numerous notable advances crucial to the program's development since then, today's flight was the first fully in the public eye.

What observers along the streets circling McConnell and Boeing saw was a unique hybrid aircraft with a distinctive nose lumbering slowly into the air, then rising steadily as it flew off. In actuality, the nose is a 12,000-pound rotating turret which eventually will house the ABL's five-foot telescope, the lens through which three of four onboard lasers will be fired. Besides the lethal light source, a Chemical Oxygen Iodine Laser (COIL) capable of producing a basketball-sized spot hotter than 10,000 100-watt lightbulbs at a distance of more than 200 miles, the plane also will be equipped with two solid state kilowatt-class lasers used for tracking, aiming, and measuring the amount of atmospheric distortion between the plane and the target, a phenomenon corrected by the use of adaptive optics.

The only major laser that will not be fired through the turret will be the a tracking device called the Active Ranger System, a CO2 laser which sits in a teardrop-shaped pod atop the aircraft on the distinctive 747 "hump."

At this stage of development, the turret is comprised of a rotating clamp-like device called a roll shell, and a large ball made of composite material that will simulate the housing for the five and a half-foot window through which the laser beams will be fired. The turret is equivalent in weight to the fixture that will later be installed on the aircraft and used during testing. Also, since the six COIL modules which will comprise the business end of the weapon system, have not yet been installed there are only bags of small metal bearings similar to birdshot in the aft section of the aircraft.

As it went overhead, observers also noted a large perforated sheet of green metal lining the underside just behind the wings. The metal is titanium and the holes will be the exhaust ports for the hot, steam-like vapor that represents the lasers by-product. Not visible from the outside are a whole host of additions and modifications made by Boeing workers. In all, the project was the largest ever undertaken by the company and represents more than 1.6-million man-hours of labor. Interior changes included:

Installation of two interior walls called bulkheads, one near the nose to help support the turret, and an airtight one almost in the middle of the plane to provide a barrier between the crew in the front and the laser-housing area in the rear; addition of an air-to-air refueling system so the plane, which will fly with two crews, can stay aloft longer; enough new wiring to take care of the electrical needs of more than 3,000 typical homes; replacement of more than a dozen floor beams to handle the weight of the lasers; installation of six infra-red tracking devices, one each in the front and rear; two on each side, to detect the heat generated by boosting missiles; re-engineering of the air pressurization system to provide more safety for the crew and high-powered cooling in the laser section.

Although the aircraft is generically known as ABL, its official name is YAL-1A, which, in Air Force nomenclature stands for Prototype Attack Laser, Model 1-A. If testing goes well, it will be followed by a so-far undetermined number of similar aircraft.

Sometime in the next few months, YAL-1A will be flown to the Boeing facility in Everett, Wash., to be sprayed Air Force-gray. At that time, the number 00-0001 also will be painted on the tail. The number, assigned when the aircraft came off the assembly line, signifies it is the first new military aircraft of the millennium.

After it is painted and its airworthiness certified, YAL-1A will be flown to Edwards Air Force, Calif., where the other weapon system segments, the lasers and the optical system, will be incrementally installed and tested. That process is expected to take almost two years and includes laser firings on the ground and against a number of objects in the air such as balloon-dropped target boards and short-range rockets in preparation for its major test against a ballistic missile.