Airborne Laser (ABL)

SUMMARY

- The program demonstrated Beam Control/ Fire Control functionality in the laboratory.
- Subsystem integration and test aircraft assembly continue.
- ABL has no operational capability since it is currently in the design/development phase.

ABL is a modified Boeing 747-400F commercial aircraft with the military designation YAL-1A.

SYSTEM DESCRIPTION AND MISSION

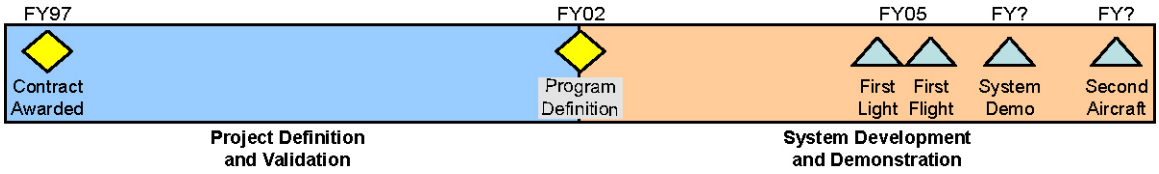
The Airborne Lasesr (ABL) element mission is to negate enemy ballistic missiles during their boost phase. The ABL engagement concept involves placing sufficient laser energy on the missile booster motor tank in order to weaken the casing. This weakening allows internal pressure to rupture the booster motor tank and destroy the missile. A successful engagement in the boost phase kills the threat missile before it deploys its decoys, warheads, or submunitions.

ABL is a modified Boeing 747-400F commercial aircraft with the military designation YAL-1A. Major weapon components include:

- A Megawatt chemical oxygen-iodine high-energy laser.
- The Beam Control/Fire Control: Nose-mounted turret and optical benches containing highly sensitive cameras, sensors, deformable and steering mirrors, and a set of Illuminator Lasers (Beacon and Tracking) that enable the system to track the target.
- The Battle Management, Command, Control, Communications, Computers, and Intelligence hardware and software.
- The ground support equipment for chemical storage, mixing, and handling; transport carts for loading/unloading chemicals at the aircraft.

MDA restructured the program during the year to focus on achieving specific technical goals each year. The 2004 goals include first light of the High Energy Laser in the System Integration Laboratory at Edwards Air Force Base, California; integration of the Beam Control/Fire Control on the aircraft; and passive (no lasing) flight-tests to evaluate the integration and performance of the Beam Control/Fire Control and the Battle Management, Command, Control, Communications, Computers, and Intelligence subsystem.

TEST AND EVALUATION ACTIVITY



ABL demonstrated Beam Control/Fire Control functionality in the laboratory at Sunnyvale, California. The Beacon and Tracking Illuminator Lasers have since experienced power losses. The root cause of reduced power output over time from each laser has been determined, and a plan is in place to correct the performance of the illuminator lasers. Boeing is

integrating the Beam Control/Fire Control onto the aircraft, and will be testing it in passive (no lasing) flight-tests, without the Beacon and Tracking Illuminator Lasers. Component integration and testing will continue over the next several years.

TEST AND EVALUATION ASSESSMENT

ABL successfully demonstrated Beam Control/Fire Control functionality in the laboratory. The subsequent issues with the Beacon and Tracking Illuminator Lasers are typical of this highly complex, state-of-the-art developmental program. The deliberate approach that progresses testing from the developer's laboratory Beam Control/Fire Control testing to the system integration laboratory and, finally, to the aircraft, is prudent. The program's focus on specific and increasingly difficult technical goals each year systemically reduces program technical risk.