Lockheed Martin Completes Integrated Testing Of Major ABL Sub-System

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Lockheed Martin today announced it has completed factory testing of the optical benches for the Airborne Laser's Beam Control/Fire Control (BC/FC) system.

The Airborne Laser (ABL) is the first megawatt-class laser weapon system to be carried on a specially configured 747-400F aircraft, designed to autonomously detect, track and destroy hostile ballistic missiles. The Beam Control/Fire Control system will accurately point, focus and fire the laser to provide sufficient energy to destroy the missile while it is still in the highly vulnerable boost phase of flight -- before separation of its warheads.

The ABL program is managed by the Missile Defense Agency and is executed by the U.S. Air Force from Kirtland Air Force Base in Albuquerque, N.M.

Lockheed Martin completed functional and performance testing of the two major elements of the Beam Control/Fire Control system -- the Multi-Beam Illuminator (MBIL) and the Beam Transfer Assembly (BTA) -- at its Sunnyvale, Calif., facility where the complete BC/FC system is configured in the same design as it will be installed in the airplane. One of the major functions of the BC/FC is to compensate for the operating environment -- the vibrations associated with flight and the distortion of light due to Earth's atmosphere -- in order to successfully shoot-down targeted missiles. The challenging task requires a sophisticated network of lasers, mirrors and precision optics combined with real-time software to manage the process.

The MBIL includes low-energy lasers and their alignment optics used to illuminate and track missiles and point the high-energy laser. The Track Illuminator Laser (TILL) illuminates the body of a missile to determine where to point the high-energy laser. Then, the Beacon Illuminator Laser (BILL) is used to determine atmospheric distortion in order to correct the shape of the high-energy laser to shoot down the missile.

The BTA contains the sensors, steering mirrors and deformable mirrors used to focus the high-energy laser on the target missile. The sensors facilitate automatic target detection and tracking, and detect the atmospheric distortion information provided by the BILL. The steering mirrors enable pointing of the high-energy laser at the target. The deformable mirrors shape the high-energy laser beam to compensate for atmospheric distortions.

Lockheed Martin performed extensive testing to verify that the system accurately controls every mirror at operational data rates. The tests validated that the BC/FC system is capable of acquiring a target, initiating tracking of the target, initiating atmospheric compensation, firing the high- energy laser and shutting down the system while maintaining beam quality and accuracy. To accomplish the tasks at the required speeds, the BC/FC system executes over 600,000 lines of "C" and Ada high-order software using the computer processing power of more than 80 Power PCs.

"These computers are capable of executing over 72 billion instructions per second," said Lockheed Martin ABL program director Rob Brimmer.

Lockheed Martin will deliver the Multi-Beam Illuminator next month to ABL team lead Boeing at Edwards Air Force Base, Calif., where the Beam Control/Fire Control system and the high-energy laser will be integrated with the aircraft. Following the MBIL delivery, this spring Lockheed Martin will deliver the Beam Transfer Assembly and the Flight Turret Assembly. The Flight Turret Assembly houses a rotating 1.5-meter telescope used to direct the lasers at targeted missiles.

The ABL team -- Air Force, Boeing, Lockheed Martin, Northrop Grumman -- decided to deliver subsystems in phases so that detailed testing could continue while equipment is installed on the aircraft. The subsystems will be installed by working from the midsection fore and aft. The Multi-Beam Illuminator is the first BC/FC element to be installed on the aircraft, followed by the Beam Transfer Assembly, then the Flight Turret Assembly.

Boeing, Lockheed Martin and Northrop Grumman are working closely with the Air Force and the Missile Defense Agency to develop ABL. Boeing is responsible for developing the ABL battle management system, integrating the weapon system, and supplying the modified 747-400 Freighter aircraft. Lockheed Martin is developing the Beam Control/Fire Control system. Northrop Grumman is providing the complete chemical oxygen iodine high-energy laser system.

Lockheed Martin is a world leader in systems integration and the development of air and missile defense systems and technologies. These include the world's first successful hit-to-kill intercept with the Homing Overlay Experiment in 1984, the successful demonstration of the first complete weapon system using hit-to-kill technology with the Terminal High Altitude Area Defense (THAAD) system, as well as the world's first operational hit-to- kill missile defense system, PAC-3. It also has considerable experience in interceptor systems; kill vehicles; battle management command, control and communications; precision pointing and tracking optics; as well as radar and other sensors that enable signal processing and data fusion. The company makes significant contributions to all 10 major U.S. Missile Defense Systems and participates in several global missile defense partnerships.

Headquartered in Bethesda, Md., Lockheed Martin employs about 130,000 people worldwide and is principally engaged in the research, design, development, manufacture and integration of advanced technology systems, products and services. A world leader in systems integration, Lockheed Martin is involved in a wide range of ballistic missile defense programs and activities for the U.S. and international government customers. The corporation reported 2003 sales of more than $31 billion.

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