Airborne Laser Program Team Members to 'Celebrate' Critical Design Review This Week

Robust Design A Pillar Of Revolutionary Airborne Laser Design

Three and one-half years following the start of design work on a revolutionary airborne theater ballistic-missile defense system, Team ABL this week successfully completed final critical review of its robust design for the Airborne Laser system.

Team ABL - Boeing, Lockheed Martin, TRW and the U.S. Air Force - met in Seattle April 25 through April 27 to review the final system design as the modification of a 747-400 Freighter aircraft platform continues and installment of sophisticated laser and tracking equipment looms next year.

The wide-body flying platform flew to the Boeing modification center in Wichita, Kan., in January to begin an 18-month modification effort. ABL system component installation is to start at Edwards Air Force Base, Calif., in July 2001.

The team is developing a high-energy chemical-oxygen-iodine laser carried aboard a 747-400 widebody platform that is to be capable of shooting down theater ballistic missiles while hundreds of miles from their launch site. ABL will locate and track missiles in the boost phase of their flight above the clouds, then accurately point and fire the laser with such energy that the missiles will be destroyed near their launch areas and may fall onto the adversary's territory.

More than 250 representatives from the industry-government team, the ABL Independent Review Team, and Air Force and Office of the Secretary of Defense Oversight organizations reviewed the design during the three-day Critical Design Review (CDR) at Boeing. The CDR is a significant milestone in the life of a complex program such as ABL. It is a symbolic portal separating concept and design from integration, fabrication and testing, says Dr. Paul Shennum, Boeing vice president and ABL program director.

This CDR, Shennum says, is a triumph in unique industry-government teaming cooperation and communication.

"The CDR is a celebration of three and one-half years of high-intensity design and risk reduction," Shennum said. "It represents a culmination of innovation and intuition. We have a design that is robust and one in which we're very confident."

Col. Ellen Pawlikowski, director of the Air Force ABL System Program Office, emphasized that, while ABL is a revolutionary system, the technology that governs it has been tested and is understood.

"ABL is a near-term solution; it is an achievable design that has been exhaustively tested and proven," Pawlikowski noted. "There's a strong recognition that the threat of missile launches by rogue nations is real, especially if you examine recent history with North Korea's ballistic missile tests and Scud warfare during Desert Storm."

Military analysts estimate that some 30 nations today have more than 13,000 theater ballistic missiles in their arsenals. In 2010, more than 45 nations will possess those weapons.

The ABL design philosophy was wedded to the concept of rapid prototyping. Rather than proceed with a concept, a design and ultimately a product - and then test it to see if it performed as designed - Shennum said ABL team members recognized the need to proceed down a radically different path.

"We had a highly complex, technically advanced system that required us to incrementally buy down risk in key subsystem design areas," Shennum said. "We early on had to build a flight-weight laser module -- if we couldn't get the performance we needed and get it on the aircraft, there was no sense in proceeding."

"Our philosophy was: design a little, make sure it would get on the aircraft, and do risk-reduction experiments that validate performance."

During the CDR, team members documented that the ABL Program Definition and Risk Reduction (PDRR) effort has been effective in meeting or exceeding Air Force mission requirements; has been on cost and on schedule; enlisting innovative approaches in designing the test program; and successful in reducing program risk.

Boeing is the team lead for weapon system integration, and is supplying the 747-400 Freighter aircraft and the battle management, command, control, communications and computers. TRW provides the chemical-oxygen-iodine laser and ground support. Lockheed Martin Space Systems is designing, developing, and building the beam control/fire control system.

During the $1.4 billion PDRR phase, Team ABL has been designing, developing, integrating and testing the sophisticated design. PDRR is approximately 48-percent completed. Following a rigorous ground and flight test program beginning late next year using dozens of decoys and test targets, the PDRR phase will culminate with the destruction by ABL of actual Scud-type missiles. Upon demonstration, America will have emergency capability -- if needed -- to respond to the growing threat from these ballistic missiles.

A follow-on Engineering Manufacturing and Development/Production effort then will begin after completion of the PDRR program.

The Air Force envisions a fleet of seven ABL aircraft that can be rapidly deployable anywhere around the globe within 24 hours to provide a strong deterrent to any potential use of theater ballistic missiles.

ABL is a boost-phase intercept element of the Department of Defense theater missile defense architecture, designed as an integrated family of systems to counter threats from ballistic missiles at any point within their launch trajectory - from the early boost phase to the late, or terminal, phase where the missile has used all of its propellant.

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