Active Aeroelastic Wing Unveiled at Rollout Ceremony

The Boeing Company [NYSE: BA], NASA and the U.S. Air Force Research Laboratory, unveiled a new twist in aircraft flight control during rollout ceremonies today at NASA's Dryden Flight Research Center, Edwards, Calif.

The new twist is an Active Aeroelastic Wing (AAW), which uses new highly sophisticated flight control software, in conjunction with a highly modified wing, that actually bends and twists to maneuver and enhance performance. Because such wings would require fewer moving parts for controlling flight, they could be made thinner, lighter and more aerodynamically efficient than today's wings, and thus allow for greater range, payloads and fuel efficiency.

Jointly supported and managed by Boeing Phantom Works, NASA and the Air Force, AAW project goals include investigating the use of the lighter-weight flexible wings for high-performance military aircraft and demonstrating aircraft roll control through aerodynamically induced wing twist on a full-scale aircraft.

Featured at the rollout was an F/A-18A test aircraft, obtained from the U.S. Navy, with its wings highly modified, including additional flight controls. Following extensive systems tests and simulation, the AAW F/A-18A will begin first-phase flight testing by mid-year. Flight test results will ultimately provide benchmark design criteria as guidance for future aircraft designs.

Representing Boeing Phantom Works at the rollout ceremony, Pam Drew, vice president engineering and information technology stated, "The Active Aeroelastic Wing that we see here today is a triumph of our team's creativity and technology know-how. But it's only the beginning of a journey that will lead to aircraft and spacecraft that will push new frontiers of performance using aeroelastic controls."

"Active Aeroelastic Wing both returns aeronautics to it's beginnings, and opens the way to a new avenues of lifting surface research in the future," said Ed Pendleton, AAW program manager for the Air Force Research Laboratory, Wright-Patterson Air Force Base, Ohio.

"This aircraft and this technology is the first research stepping stone to dramatically improved performance and safety that NASA intends to pursue for the 21st century aircraft," added Denis Bessette, project manager for AAW flight research at NASA Dryden.

At its St. Louis facility, Boeing Phantom Works modified the wings of the F/A-18A test aircraft with additional actuators, a split leading edge flap and thinner wing skins that will allow the outer wing panels to twist up to five degrees. The traditional wing control surfaces-trailing edge ailerons and the outboard leading edge flap will be used to provide the aerodynamic force needed to twist or "warp" the wing. Project engineers hope to obtain roll performance at transonic and supersonic speeds close to that of production F/A-18s, without using the stabilators and with smaller control surface deflections.

"The AAW program is a prime example of how Phantom Works functions. We understood the challenge, drew on talent from across Boeing and the AAW program partners, and then applied that technical expertise to achieve results," said, Jim Guffey AAW program manager for Boeing Phantom Works. "We consider the AAW project a renaissance in flight control systems, and we're looking forward to flight testing." The Wright Brothers developed what is known as wing-warping to achieve flight control on their early aircraft. The twisting and warping of wing surfaces later gave way to ailerons, flaps and leading edge slats that evolved to their common form on aircraft today. With the subsequent development of precision computer software flight control techniques it is now possible to re-examine the twisting and warping flight control method on a high-performance aircraft. The AAW project is such an avenue.

The Phantom Works advanced research and development element serves as the catalyst of innovation for the Boeing enterprise. By working with the business units, it provides advanced systems solutions and innovative, breakthrough technologies for reducing the cycle time and cost while improving the quality and performance of aerospace products and services.

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