News Release

Defense Advanced Research Projects Agency

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IMMEDIATE RELEASE March 17, 2006

DARPA BEGINS UNIQUE OBLIQUE FLYING WING PROGRAM

The Defense Advanced Research Projects Agency (DARPA) has awarded funding to Northrop Grumman Systems Corp., El Segundo, Calif., for the Oblique Flying Wing (OFW) program. Northrop Grumman will receive $10.3 million for the first phase, a 20-month risk reduction, testing and preliminary design effort.

The DARPA Oblique Flying Wing program aims to design and conduct the first-ever flight tests of a tailless, supersonic, variable sweep oblique flying wing.

In an oblique wing aircraft, one wing of the aircraft is swept forward and the other wing is swept back in an asymmetric configuration when flying at supersonic speeds. In conventional aircraft, the two wings are symmetrically swept. The Oblique Flying Wing has the potential to enable new levels of performance and efficiency for future military aircraft.

Key challenges for the DARPA Oblique Flying Wing program include aerodynamics, aeroelasticity, propulsion integration, and controllability. During phase I, Northrop Grumman will conduct technology maturation testing to reduce the risk of the critical technologies associated with their OFW concept and develop a preliminary design for an experimental flight vehicle.

DARPA's Oblique Flying Wing program will demonstrate that supersonic oblique flying wing aircraft are feasible, so that oblique flying wing designs can be considered for future military missions. DARPA intends to address the most difficult design and controllability issues associated with this concept by focusing on a variable sweep, tailless design able to fly at supersonic speeds.

The oblique flying wing varies its wing sweep (i.e., the angle of the wing leading edge relative to the direction of flight) depending on the flight speed. At low speeds, the wing sweep angle is relatively low, providing an efficient low-speed aerodynamic design. At high speeds the wing is highly swept, reducing supersonic wave drag. The variable sweep of the oblique flying wing allows for efficient operation at both low speed and supersonic speeds and would provide excellent flexibility for future military missions requiring rapid deployment, long range and long endurance.

(more)

"The oblique flying wing as a theoretical concept has been considered for many years. It is an intriguing planform for supersonic flight due to the excellent wave drag optimization possible, and it has been studied repeatedly for supersonic applications. But no one has yet demonstrated a supersonic oblique flying wing in flight – DARPA intends to do just that," said Thomas Beutner, program manager for the Oblique Flying Wing program in DARPA's Tactical Technology Office.

The DARPA Oblique Flying Wing program will attempt to open the design space for future aircraft by developing the technology for a tailless oblique flying wing, and demonstrating it in flight. "What we envision is an X-plane program. Like the X-1 or the X-29, the oblique flying wing program will be a technology demonstrator that explores a concept that can only be proven in flight," said Beutner.

If successful, the current preliminary design effort may be followed by a second phase that would finalize a detailed design, and build and flight test an X-plane, with first flight expected in the 2010/2011 timeframe.

Aircraft designers have been interested in oblique wing concepts for decades, and have conducted conceptual trade studies, wind tunnel tests, and small subsonic demonstrations of various designs. The National Aeronautics and Space Administration also conducted flight tests (1979-1982) on the AD-1 research aircraft, which had a conventional fuselage and tails, and an oblique wing that could be rotated on a center pivot. To date, all flight demonstrations of oblique wing and oblique flying wing aircraft have been at low speed, and all previous designs have used vertical tails to address some of the controllability challenges of the concept. DARPA's program will be the first oblique wing to fly at supersonic speeds and the first to fly without a tail.

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