Lockheed Martin To Design Nano Air Vehicle To Monitor The Urban Battlefield

The Defense Advanced Research Projects Agency (DARPA) awarded Lockheed Martina $1.7-million, 10-month contract to design a revolutionary remote-controlled nano air vehicle (NAV) that will collect military intelligence indoors and outdoors on the urban battlefield.

Lockheed Martin Advanced Technology Laboratories (ATL) leads a team that will design a remote-controlled NAV, similar in size and shape to a maple tree seed. A chemical rocket enclosed in its one-bladed wing will power a sensor payload module more than 1,100 yards. Delivered from a hover and weighing up to 0.07 ounces, the module will be interchangeable based on mission requirements. Besides controlling lift and pitch, the wing will also house telemetry, communications, navigation, imaging sensors, and battery power. The NAV will be about 1.5 inches long and have a maximum takeoff weight of about 0.35 ounces.

In typical operation, a warfighter will launch the NAV and fly it toward the target by viewing its flight path through a camera embedded in the wing. Like a maple tree seed, the one-bladed device will rotate in flight, but its camera will provide a stable forward view and transmit images back to a small, hand-held display. As the system matures, a simple autopilot aboard the NAV will provide limited autonomous operations. Once the NAV delivers its payload, it will return to the warfighter for collection and refurbishment.

According to James Marsh, ATL director, designing and building such a small device will require revolutionary manufacturing technologies to integrate near-microscopic components into the airframe. But even the airframe will require a challenging combination of new and emerging technologies.

"The challenges are both exciting and daunting, because some of the technologies vital to our success have yet to be discovered," Marsh said. "We know going in that we need some of the best minds in manufacturing technology and in the development and integration of highly sophisticated, software- driven control technologies and mission systems."

The contract will fund conceptual design and risk reduction using prototypes of the engine, airframe, flight control system, and communications system as well as computer models of the guidance system and sensors. Following a successful preliminary design review planned for summer 2007 and a sequence of go/no-go tests, DARPA may fund an additional 18-month period during which Lockheed Martin will design and test a flying prototype.

Lockheed Martin ATL leads a team that includes Lockheed Martin Advanced Development Programs (Skunk Works), Lockheed Martin Advanced Technology Center, the Lockheed Martin-managed Sandia National Laboratories, AeroCraft, ATK Thiokol and the University of Pennsylvania.

Lockheed Martin's NAV program is part of a DARPA effort from its Defense Sciences Office to improve the quality, quantity, and reliability of information gathered and transmitted by unattended ground sensors. The effectiveness of these sensors may be dependent on their precise location. Achieving optimal monitoring and communication often requires precise deployment of sensors.

Headquartered in Bethesda, Md., Lockheed Martin employs about 135,000 people worldwide and is principally engaged in the research, design, development, manufacture, integration and sustainment of advanced technology systems, products and services.

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