

XXXX Boeing won the same amount and is supported by Higher Space and Communications, Ball Aerospace and TRW.

DARPA is also developing micro adaptive flow control (MAFC) technology for various military applications, including aircraft and munitions. By injecting small-amplitude disturbances into flows where natural amplification occurs, large-scale system benefits can be realized. Boeing, for example, is developing high frequency oscillation adaptive flow control for aircraft, and Georgia Tech is developing self-correcting projectiles using closed-loop flow control in a spinning projectile and control for grenades and

developed by DARPA and Boeing, which is building two technology demonstrators. The CRW features a unique reaction drive rotor system, combining the speed of a fixed-wing aircraft (in excess of 375kt) with the flexibility of rotary-wing flight.

At the same time, DARPA and Frontier Systems are gearing up for flight trials of the long-endurance A160 Hummingbird UAV, which has applications for helicopters. The Hummingbird is a UAV-size air vehicle would have a 24-36 hour endurance. The Hummingbird has intelligence-gathering, long-range communications relay. The patented Hummingbird allows for very low disk



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Phillips, K.A.S. (2001) Concept of Operations for Unmanned Ground Vehicles (UGVs), NATO-Research & Technology Organisation (RTO) Conference Paper, Istanbul

the tanks and light armored vehicles. The idea is to establish vehicle design criteria from a "clean sheet" perspective since no human crew would be required. Multiple contracts for UGCV proto-typing and test are awarded. The R&D effort will run for nearly four years, with each contract worth as much as \$9 million. Tactical Mobile Robotics (TMR) are also expected to find their way onto the battlefield or special weapons and tactics (SWAT) operations. TMR storm troopers would go into areas that human commandos can't fit in or couldn't survive. They would not be tele-operated; they would receive their instructions in advanced for autonomous operations. The demonstrations of the Canard Rotor/Wing (CRW) aircraft are set for early 2001. The next generation high-altitude vertical takeoff and landing (VTOL) UAV is being



Tactical Mobile Robot (TMR) on the ground.

additional X-45 prototypes are planned for the program. The UCASV air vehicle has a stealthy, tailless, 27-foot-long airframe with a 34-foot wingspan. It weighs 8,000 pounds (empty) and can carry a 3,000 pound payload. The UCASV advanced technology demonstration is being carried out under a \$131 million, 42-month cost-share contract.

For more on DARPA research activities, click on: www.darpa.mil

Ramon Lopez serves as Washington Correspondent for Flight International magazine.