Boeing, DARPA to Develop Hypersonic Missile

The Boeing Company has entered into a $10 million agreement with the Defense Advanced Research Projects Agency (DARPA) to develop an affordable, next-generation strike missile that can travel at hypersonic speeds to counter time-critical threats.

The 18-month Affordable Rapid Response Missile Demonstrator (ARRMD) agreement calls for the Boeing Phantom Works to design and conduct developmental tests of two different hypersonic vehicle concepts, each capable of cruise speeds of more than Mach 6. Another key objective is to demonstrate that such missiles can be produced for an average unit flyaway price of only $200,000.

"Our leadership in the development and integration of low cost hypersonic weapon technologies helped establish this agreement," said John Fox, ARRMD program manager for the Boeing Phantom Works. "Through the development and evaluation of two different concepts, we will be able to provide the most affordable and effective low-risk solution possible."

ARRMD is being developed for launch from aircraft, surface ships and submarines to quickly counter time-critical targets, such as newly detected mobile missile launchers, and to effectively penetrate deeply buried command centers. From a safe, standoff range of more than 400 miles, the hypersonic missile will be able to reach its target in less than seven minutes.

The two ARRMD vehicles are both designed to deliver a 250-pound payload within about 30 feet of the target by employing an INS/GPS (inertial navigation system/Global Positioning System) guidance system that Boeing developed for the Joint Direct Attack Munition. The vehicles differ, however, in their airframe and propulsion approaches.

One vehicle has a long, wide, flat shape, which will allow it to ride on its own shock wave for reduced drag. This "waverider" concept will be propelled by a supersonic ramjet (scramjet) engine currently being developed by Pratt & Whitney for the U.S. Air Force.

The other vehicle has a more traditional cylindrical shape. It will use a dual-combustion ram/scramjet engine originally developed by Johns Hopkins University Applied Physics Laboratory for the U.S. Navy but now being adapted for ARRMD by Aerojet.

Both propulsion concepts will employ one or more solid rocket boosters to accelerate the missile to the ram/scramjet engine take-over speed.

The development of the two ARRMD concepts will be performed by integrated product teams comprising Phantom Works personnel in Seal Beach, Calif.; St. Louis, Mo.; and Duluth, Ga.; Aerojet personnel in Sacramento, Calif.; and Pratt & Whitney personnel in West Palm Beach, Fla., and San Jose, Calif.

If ARRMD performance and affordability objectives can be demonstrated under this phase of the agreement, DARPA plans to continue with a 30-month producibility and flight test demonstration program with one or both of the hypersonic concepts.

A successful ARRMD program would allow the Department of Defense to pursue an engineering and manufacturing development program as early as 2004 and have an operational missile in the U.S. Navy and Air Force fleets by 2010.

The Boeing Phantom Works, where ARRMD is being developed, is an advanced R&D unit that specializes in providing innovative, affordable solutions to its aerospace customers.

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