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Up, Up and Away

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A winged rocket booster that will fly back to the launch site after separation for same-day reuse, rather than falling into the ocean; spacecraft that can be returned to space within hours of landing on earth; aerospace vehicles capable of sustained flight at more than five times the speed of sound.

The University of Dayton Research Institute was awarded Wednesday, April 20, a $48.6 million-ceiling, five-year Air Force contract for research and development of these and other technologies designed to significantly reduce the cost, maintenance time and risk involved in air and space-missions. The Air Force Research Laboratory's High Speed Air and Responsive Space Vehicle Technologies (HARSVT) program contract includes an initial obligation of $167,417 for reusable booster and hypersonic air and space vehicle concepts. Work will be performed at the University of Dayton Research Institute.

Program manager Tim Fry, group leader for experimental and applied mechanics in the Research Institute's aerospace mechanics division, said researchers will perform concept design, feasibility analysis and testing of technologies and structures designed to advance the development of high-speed air and space vehicles that are not only reusable, but can be rapidly returned to flight.

"Disposable flight hardware is expensive and wasteful, so the Air Force is continuing its focus on reusability," Fry said. "But there's an equal focus on 'operationally responsive access' technologies that will allow the Air Force to very quickly return a vehicle to space – in the same day or even within hours."

Current reusable systems, such as the space shuttle, are labor intensive and require months and thousands of man hours to inspect, refurbish and prepare for relaunch, Fry added. "Our goal is to cut that time substantially."

Fry said one of the primary goals under HARSVT – pronounced "harvest" by researchers – is the development of technologies that will advance and support a reusable booster system concept. Equipped with wings and rudder, a reusable booster would be designed to fly back to its launch site for rapid reuse. Some current booster systems are designed to separate and freefall into the ocean, where they must be tracked, located and towed to land. Boosters that have not sustained excessive damage are stored and later refurbished for possible relaunch.

"That's an enormous amount of time, energy and cost that could be substantially reduced by moving to a structurally efficient, reusable system that flies under its own power back to the launch site,"Fry said.

Additional research efforts will focus on technologies that improve operability, reliability and controllability of high-speed vehicles.

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