

Langley Press Release regarding Hypersonic Vehicles

From: **Alan Homan**
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From <http://db-www.larc.nasa.gov:12345/bb/pa/1/1/index.html>

What else is on the drawing board?

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NASA SELECTS MICROCRAFT, INC. TEAM TO FABRICATE HYPERSONIC VEHICLES

NASA has selected a team led by MicroCraft, Inc., Tullahoma, TN, to fabricate a series of small, unpowered experimental vehicles that will fly up to 10 times the speed of sound. The five-year project, known as Hyper-X, will demonstrate hypersonic propulsion technologies.

When the Hyper-X flies, it will be the first time a non-rocket engine has powered a vehicle in flight at hypersonic speeds -- speeds above Mach 5, equivalent to about one mile per second or approximately 3,600 miles per hour at sea level. A booster rocket will carry each experimental vehicle to its flight-test speed and altitude, where it will be launched to fly under its own power.

The cost-plus-incentive fee contract is worth an estimated \$33.4 million over the next 55 months. It specifies that the first of four Hyper-X vehicles is to be delivered in time for the first scheduled flight early in fiscal year 1999.

Team members working with MicroCraft will be Boeing North American, Inc., Seal Beach, CA; GASL, Inc., Ronkonkoma, NY; and Accurate Automation Corp., Chattanooga, TN

The Hyper-X project is conducted jointly by the Langley Research Center, Hampton, VA, and the Dryden Flight Research Center, Edwards, CA. Langley will manage the overall project while Dryden will conduct the flight tests.

"We're embarking on an ambitious series of Hyper-X flights to expand the boundaries of aeronautics and develop new technologies for space access," said Daniel S. Goldin, NASA Administrator. "Most impressively, these flights will begin less than two years from now. Under old ways of doing business it might have taken ten years to reach flight tests."

MicroCraft will be responsible for fabrication and flight-test support. This will include not only the four research vehicles but also one research vehicle-to-booster adapter for mating of the research vehicles to the nose of an expendable booster rocket. Each vehicle will be approximately 12 feet long with a wing span of about five feet.

"We are ready to prove this technology -- to be the first to fly an air-breathing vehicle at hypersonic speeds," said NASA Langley's Vince Rausch, the Hyper-X project manager.

Program managers plan to demonstrate hydrogen-powered, "air-breathing" propulsion systems that could ultimately be applied in vehicle types ranging from hypersonic aircraft to reusable space launchers.

A rocket carries its own oxygen for combustion. An air-breathing vehicle, the experimental Hyper-X, will burn oxygen in the air scooped from the atmosphere. Because of this, air-breathing hypersonic vehicles should carry more payload and/or offer longer range than equivalent rocket-powered systems.

Four flights are planned -- one each at Mach 5 and 7 and two at Mach 10. The Mach 7 flight comes first. The flight tests will be conducted within the Western Test Range off the coast of southern California.

Each Hyper-X vehicle will ride on the first stage of an Orbital Sciences Corp., Dulles, VA, booster rocket, which will be launched by the Dryden B-52. For each flight, the booster will accelerate the Hyper-X research vehicle to the test conditions (Mach 5, 7 or 10) at approximately 100,000 feet. There, it will separate from the booster and fly under its own power and preprogrammed control.

Ground tests and analyses of both vehicle and engine will be performed prior to each flight in order to compare flight and ground-test results. In addition, the Hyper-X Mach 7 and 5 vehicles will be tested prior to flight in Langley's 8-Foot High Temperature Wind Tunnel. The vehicles, with a fully operating ramjet/scramjet propulsion system, will be put through tests in the tunnel simulating many, but not all, Mach 7 and 5 flight conditions.

A ramjet operates by subsonic combustion of fuel in a stream of air compressed by the forward speed of the vehicle itself. In a conventional jet engine, the compressor section (the fan blades) compresses the air.

A scramjet (supersonic-combustion ramjet) is a ramjet engine in which the airflow through the whole engine remains supersonic. Scramjet technology is challenging because only limited testing can be performed in ground facilities. Hyper-X takes the next essential step in developing hypersonic, air-breathing technology.

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Images of the Hyper-X vehicles and additional information can be obtained at the following URLs:

[Hyper-X Images](#)

or

[B-52 Drop illustration \(1.5 Mb GIF\)](#)

[Hyper-X illustration \(870 K GIF\)](#)

NOTE TO EDITORS: Photos to accompany this release are available by calling the Langley Research Center, Hampton, VA, or the Dryden Flight Research Center, Edwards, CA, at the numbers listed above.

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by Catherine E. Watson

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