

Bomber Becomes Focus Of Quiet Aircraft Effort

Robert Wall/Washington

The Defense Advanced Research Projects Agency has selected Lockheed Martin and Northrop Grumman to refine their work on a quiet supersonic airplane, after reprioritizing the project's objectives to focus more on long-range military aircraft than reconnaissance.

The U.S. Air Force already has begun several relatively low-level research and development projects that could give rise to its future bomber, the B-X, which isn't expected to enter service inventory until around 2037. However, the Darpa effort on quieting technology could feed the future bomber's design.

The two system integration efforts cost about \$2.5 million each. Additionally, Northrop Grumman has been given a \$3.4-million contract to demonstrate sonic-boom mitigation technology on a modified F-5E. The aircraft has been adapted with a "nose globe"—a 4-ft. nose extension with modifications to the forward half fuselage—that is supposed to alter the sonic boom profile on the ground to produce less noise. The deal is to culminate in several test flights to measure sonic boom pressure on the ground.

During the second phase, General Electric is to conduct advanced-propulsion-system studies. Moreover, the engine house is to refine high-performance nozzle and advanced fan technologies.

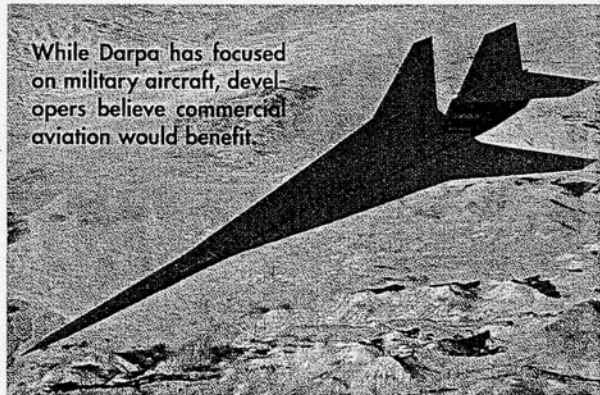
Arizona State University also will receive about \$700,000 to demonstrate potentially applicable technologies—in the area of "distributed roughness to inhibit crossflow instabilities for natural laminar flow on swept wings."

The two integration contracts are focused on designing an aircraft with a gross takeoff weight of 100,000 lb. Performance goals include a cruise speed of Mach 2.0-2.4, and an unrefueled range of 6,000 naut. mi., while carrying a payload fraction of 20%.

Sonic boom force should be no more than 0.3 lb. per sq. ft. Darpa officials believe a boom force of 0.5 lb. per sq. ft. would allow unrestricted overland operations; and 1.0 lb. per sq. ft. would enable flight over land in specific corridors. Darpa compares the quiet supersonic aircraft performance objectives with Concorde performance which has a gross takeoff weight of 400,000 lb., can cruise at Mach 2 for 3,550 naut. mi. and has a payload fraction of approximately 7%.

As part of the system integration efforts, Northrop Grumman and Lockheed Martin are to cooperate with GE

to define performance, size and weight parameters for the engine. They also are to build and test structural components to failure, to assess performance. A primary goal is to improve swept-wing laminar flow for reduced drag using real-wing configurations. Darpa contends that prior studies showed that "high efficiency and low sonic boom could be achieved simultaneously in a properly



While Darpa has focused on military aircraft, developers believe commercial aviation would benefit.

integrated vehicle." Critical technologies to do so include "passive supersonic laminar flow for decreased drag, configuration optimization for sonic boom reduction, propulsion integration including high efficiency inlets and nozzles for maximum propulsive efficiency, and advanced structural concepts and subsystems to minimize vehicle empty weight." Darpa believes no single technology would enable a quiet supersonic aircraft, but that several need be closely integrated. The entire project is estimated at \$35 million. ☛