



Northrop Grumman sees QSP as leading to a future long-range strike aircraft (above)

boom strength. "It's like putting on a very long nose," says Wlezién. "The challenge is in the energetics."

Another active method of boom reduction being investigated is the thermal keel, a linear ramjet which has the effect of virtually lengthening the aircraft and spreading out the initial pressure rise, reducing boom loudness. "Airframers are looking at whether they can integrate the technology," says Wlezién.

But such solutions may not be needed. "A key finding of our studies was that the QSP goals could be achieved without active or exotic boom reduction technologies, which are too immature," says Boccadoro.

Making history

Northrop Grumman hopes to prove aircraft shaping is sufficient by flying the F-5 Sonic Boom Demonstrator (SBD). "We are on the verge of making aviation history," says Boccadoro. "We have never done a low-boom supersonic flight before."

Low boom is not about reducing shock waves, he says, but about changing the sonic boom signature by shaping the aircraft to stop shock-waves coalescing into a classic "N-wave". The F-5 SBD will have a reshaped forward-fuselage to modify pressure distribution and produce a non-coalesced boom with a "flat-top" signature.

"A flat-top signature is a substantial manipulation of the pressure wave," says

Boccadoro. Lengthening and blunting the F-5's nose will strengthen the bow shock, while reshaping the lower fuselage will control the pressure rise behind the shock, managing the compression and expansion waves to prevent coalescence.

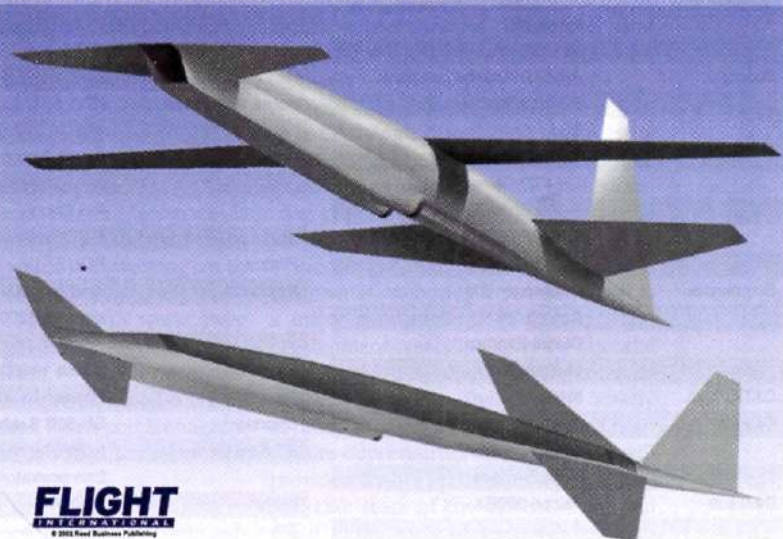
While the goal of the test is to prove the pressure wave can be manipulated into a shape that persists to the ground, it will result in a quieter boom. "We expect the F-5 SBD to generate a flat-top wave with a

substantial reduction in the magnitude of the initial overpressure as a result of shaping," says Boccadoro.

If the F-5 tests succeed, the next step could be a low-boom, efficient supersonic demonstrator, although nothing has been funded beyond QSP Phase 2. "The goals look reasonably attainable. In Phase 2, the contractors must make a compelling case the vehicle is doable," says Wlezién. ■

PART TWO FOLLOWS NEXT WEEK

BOEING QUIET SUPERSONIC PLATFORM CONCEPT



FLIGHT
INTERNATIONAL
© 2002 Reed Business Publishing