

World Military History Blog

Advanced engine, hearing protection on display at museum

August 30, 2008 at 3:16 am (<https://worldmilitaryhistory.wordpress.com/2008/08/30/advanced-engine-hearing-protection-on-display-at-museum/>)



(<http://www.cafepress.com/TEAMultimedia/838249>)

Threading the Needle

A US Air Force B-1B Lancer strategic bomber creates the "Sight of Sound" as a condensation bubble forms when the jet breaks the sound barrier. Find "Threading the Needle" as a framed art print, poster, or 12-month calendar print at The PatriArt Gallery. (<http://www.cafepress.com/TEAMultimedia/838249>)

The first aircraft to fly by pulsed-detonation engine power, along with associated hearing protection technology — both developed by the Air Force Research Laboratory at Wright-Patterson AFB (OH) — became additions to the National Museum of the U.S. Air Force during an Aug. 25 ceremony at the museum annex at the base.

Members of the AFRL's Propulsion Directorate developed the pulsed-detonation engine, which logged a record-breaking manned flight Jan. 31 at Mojave, Calif.

With test pilot Pete Siebold at the controls of the modified Long EZ aircraft manufactured by Scaled Composites, the pulsed-detonation engine, or PDE, achieved a speed of over 120 mph and 60 to 100 feet altitude, producing more than 200 pounds of thrust. It marked the first successful flight powered by pulse-detonation technology.

During the flight, Mr. Siebold wore an Attenuating Custom Communications Earpiece System, or ACCES, integrated with a standard military flight helmet for acoustic protection from noise generated by the engine. The deep-insert, custom-molded ACCES technology is a product of an earlier collaboration between members of the 711th Human Performance Wing's Warfighter Interface Division, Battlespace Acoustics Branch and Westone Laboratories, Inc., under a cooperative research and development agreement.

The demo flight culminated a collaborative effort led by researchers in the Propulsion Directorate and its on-site contractor Innovative Science Solutions, Inc. and supported by those in AFRL's Human Effectiveness and Air Vehicles directorates. The team overcame a multitude of technical challenges to prove that pulse detonation is a feasible technology that would be more economical and use less fuel than traditional jet engines.

Instead of burning fuel for propulsion, an air and fuel mixture is ignited and detonated in repeated, controlled explosions inside open-ended tubes resembling exhaust pipes. When detonation moves through the tubes it creates a supersonic shockwave that continually pulses and generates thrust.

Researchers from the 711th HPW determined acoustic exposure limits and provided the hearing protection system. Noise levels in the cockpit of the PDE-driven aircraft reach 130 decibels, compared to about 100 decibels for a typical fighter jet, said AFRL research audiologist John Hall. Without ACCES protection, a PDE pilot would be unable to

communicate with crew and would suffer hearing loss after only two flights.

In presenting the hearing protection system to the museum, Mr. Siebold said ACCES technology “allowed the flight to take place and me to retain my hearing.”

Both technologies were developed using off-the-shelf components. The PDE incorporated an eight-cylinder automotive engine and ACCES leveraged Westone’s commercially available communications equipment used by musicians.

According to Fred Schauer, PDE program team leader, the PDE could be capable of powering future aircraft up to four times the speed of sound.

“This engine offers the capability of static to near-hypersonic flight with good supersonic efficiencies,” he said. “PDEs could make sense for missions that require efficient supersonic cruise and/or boost from low to high speeds.”

John Schutte
(AFP)

About these ads (<https://wordpress.com/about-these-ads/>)

Entry filed under: [American Military History](https://worldmilitaryhistory.wordpress.com/category/american-military-history/) (<https://worldmilitaryhistory.wordpress.com/category/american-military-history/>), [Aviation History](https://worldmilitaryhistory.wordpress.com/category/aviation-history/) (<https://worldmilitaryhistory.wordpress.com/category/aviation-history/>), [Modern Military History](https://worldmilitaryhistory.wordpress.com/category/modern-military-history/) (<https://worldmilitaryhistory.wordpress.com/category/modern-military-history/>). Tags: [ACCES](https://worldmilitaryhistory.wordpress.com/tag/acces/) (<https://worldmilitaryhistory.wordpress.com/tag/acces/>), [AFRL](https://worldmilitaryhistory.wordpress.com/tag/afrl/) (<https://worldmilitaryhistory.wordpress.com/tag/afrl/>), [Air Force History](https://worldmilitaryhistory.wordpress.com/tag/air-force-history/) (<https://worldmilitaryhistory.wordpress.com/tag/air-force-history/>), [Air Force Research Laboratory](https://worldmilitaryhistory.wordpress.com/tag/air-force-research-laboratory/) (<https://worldmilitaryhistory.wordpress.com/tag/air-force-research-laboratory/>), [Attenuating Custom Communications Earpiece System](https://worldmilitaryhistory.wordpress.com/tag/attenuating-custom-communications-earpiece-system/) (<https://worldmilitaryhistory.wordpress.com/tag/attenuating-custom-communications-earpiece-system/>), [Aviation History](https://worldmilitaryhistory.wordpress.com/tag/aviation-history/) (<https://worldmilitaryhistory.wordpress.com/tag/aviation-history/>), [Military Aviation](https://worldmilitaryhistory.wordpress.com/tag/military-aviation/) (<https://worldmilitaryhistory.wordpress.com/tag/military-aviation/>), [National Museum of the U.S. Air Force](https://worldmilitaryhistory.wordpress.com/tag/national-museum-of-the-us-air-force/) (<https://worldmilitaryhistory.wordpress.com/tag/national-museum-of-the-us-air-force/>), [Pete Siebold](https://worldmilitaryhistory.wordpress.com/tag/pete-siebold/) (<https://worldmilitaryhistory.wordpress.com/tag/pete-siebold/>), [pulsed-detonation engine](https://worldmilitaryhistory.wordpress.com/tag/pulsed-detonation-engine/) (<https://worldmilitaryhistory.wordpress.com/tag/pulsed-detonation-engine/>), [Supersonic Flight](https://worldmilitaryhistory.wordpress.com/tag/supersonic-flight/) (<https://worldmilitaryhistory.wordpress.com/tag/supersonic-flight/>), [US Air Force](https://worldmilitaryhistory.wordpress.com/tag/us-air-force/) (<https://worldmilitaryhistory.wordpress.com/tag/us-air-force/>), [USAF](https://worldmilitaryhistory.wordpress.com/tag/usaf/) (<https://worldmilitaryhistory.wordpress.com/tag/usaf/>), [Wright-Patterson](https://worldmilitaryhistory.wordpress.com/tag/wright-patterson/) (<https://worldmilitaryhistory.wordpress.com/tag/wright-patterson/>).

[The Battle of Hampton Roads \(March 8-9, 1862\) PAVE LOW dedicated into AF Armament Museum](#)

[Trackback this post](#)

Blog at WordPress.com. The Blix Theme.

