



PurePower™

PW1000G Engine News

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This Changes Everything.™

PurePower™ PW1000G
Engine Demonstrator
Displayed
At the
Paris Airshow

Pratt & Whitney
Celebrates the
Paris Air Show
Centennial

PW1000G Engine Demonstrator Test Results Are In!

Paris Airshow – Le Bourget, France, June 16, 2009



PW1000G Engine Demonstrator on display at P&W's Customer Training Center in East Hartford, CT

After analyzing more than 2,000 data points from more than 400 hours of testing, Pratt & Whitney confirmed that the PurePower PW1000G demonstration engine met all program objectives including performance, efficiency, acoustics and overall operational characteristics.

"The PW1000G demonstrator successfully completed a comprehensive four-phase test program, validating laboratory results obtained in 2007 and 2008," said Bob Saia, Vice President, Next Generation Product Family, Pratt & Whitney. "We ran a very challenging test program subjecting this engine demonstrator to the same tests required for airplane flight certification. This unprecedented demonstration program provides critical engine data prior to the PW1000G engine entering detailed design later this year."

Airbus and Pratt & Whitney engineers have reviewed the A340 flight test results and confirmed that the geared turbofan engine architecture will deliver a double-digit reduction in fuel burn when the initial PW1000G engine models enter service in 2013.

The joint engineering assessment also confirmed the high efficiency and operational reliability of Pratt & Whitney's innovative fan drive gear system. Testing confirmed the gear system's efficiency with lower than predicted heat rejection into the engine oil system. The demonstrator engine also confirmed the robust design of the gear after the aggressive test program. "After disassembling the gear system following the entire test program, all hardware was shown to be in excellent condition with little to no wear." Saia said.



P&W Commemorative postcard given away at Paris Airshow

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PW1000G Engine Demonstrator Results Are In! (continued)

In addition to fuel efficiency, performance and operability, the PurePower PW1000G engine demonstration program confirmed a 50 percent reduction in engine noise compared to today's quietest engines. Both external noise and that perceived in the cabin were significantly lower, confirming Pratt & Whitney's target of 20 dB below today's Stage 4 standard.

"We are delighted with the PW1000G engine demonstration program. The joint Airbus and Pratt & Whitney engineering assessments confirm our targets for the geared turbofan architecture," Saia said.

During the demonstration program, Airbus studied the installation aspects of the PW1000G engine and concluded that a geared turbofan engine can be developed and integrated with the airplane similar to a conventional turbofan engine. "The fan drive gear system was invisible to the airplane, with overall operation of the geared turbofan engine the same as today's conventional engines, only with lower fuel consumption and drastically lower noise."

The PW1000G engine is in the final stages of initial design and will begin detailed design later this year. Engine certification is scheduled in late 2011 to support entry into services on the Bombardier CSeries and Mitsubishi Regional Jet in 2013.

People Profile: Mike McCune, Fan Drive Gear System Part Family Manager



Pratt & Whitney has been developing the Fan Drive Gear System (FDGS) for over two decades and Mike McCune, Fan Drive Gear System Part Family Manager, has been there since its inception in 1987. Mike joined Pratt & Whitney in 1983 and has since held various positions in acoustical technology, compressor aero, turbine aero, structures, advanced engine programs, and mechanical systems. He holds a BS in Physics from Fredonia State University, a BSME from Syracuse University and a MSME from Rensselaer Polytechnic Institute. Today he leads the Fan Drive Gear System Part Family design and test team.

The FDGS design configuration began in 1989 with a two year study on the effects of design and field experience on gear system durability. This study, part of Pratt & Whitney's Ultra High Bypass program culminating in 1992 with the Advanced Ducted Prop, investigated flaws in previous gearbox designs.

Throughout its development, the FDGS program has faced many challenges. Despite these challenges, Mike has believed in the Fan Drive Gear System technology from the beginning. Mike says, "The FDGS is a simple design that becomes quite obvious once you see it. The gearbox works, not because of complexity, but because of simple principles that gearbox designers previously missed, such as understanding effects of lubrication---that's the secret to the fan drive gear system---along with managing misalignment. Gears are designed to run in a theoretical position, move them out of that position, and they fail."

Over the past two years, Mike has hosted scores of customers at Pratt & Whitney's dedicated FDGS Rig Test Facility in Middletown, CT. These customers uniformly come away impressed with P&W's technology and rigorous testing regime, as well as by Mike's depth of knowledge regarding geared architecture.

Mike says that he enjoys his contributions to the program and continues his dedication to its challenges. To "do things people tell you can't get done" is his driving force. He believes the FDGS is the future of Pratt & Whitney, and that it is what sets us apart from the competition.

Above: Mike McCune in front of the PW1000G Engine Demonstrator during B747 Flight Test in Plattsburgh, NY.

Right: Fan Drive Gear System Part Family Team (Left - Right): B.Sheridan, D.Shaughnessy, M.Walsh, R.Ferrara, R.Martins, J.Moran, M.McCune, J.Coffin, D.Daley, T.Haugh, J.Tran



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