

## U.S. Army Selects AVL and Achates Power to Develop Next-Generation Combat Engine

*Companies to design and build military engine that demonstrates the superior fuel efficiency, high power density and low heat rejection of the Achates Power opposed-piston, two-stroke technology*

**SAN DIEGO – Dec. 19, 2012**—[Achates Power, Inc.](#)—a developer of radically improved internal combustion engines that increase fuel efficiency, reduce greenhouse gas emissions and are lower cost—today announced that it and [AVL Powertrain Engineering, Inc.](#) were awarded a contract from the U.S. Army Tank Automotive Research, Development and Engineering Center ([TARDEC](#)). The contract, worth a total of \$4.9 million, is for design and construction of the Next-Generation Combat Engine. To serve a wide range of U.S. combat and tactical vehicles, the engine will deliver superior fuel efficiency, high power density and low heat rejection and will be multi-fuel capable.

To meet the program requirements, AVL proposed an engine based on the Achates Power opposed-piston, two-stroke technology, which includes more than 1,000 unique innovations covered by patents and patent applications.

When benchmarked against leading, conventional diesel engines, the Achates Power engine demonstrates:

- Lower cycle average brake-specific fuel consumption
- Similar engine-out emissions levels
- Less than 0.1 percent fuel-specific oil consumption
- Reduced weight and complexity

Achates Power has accumulated more than 3,600 hours of dynamometer testing and achieved 47.5 percent brake thermal efficiency. The brake thermal efficiency advantages demonstrated by the Achates Power engine are published in SAE International Paper [2011-01-2216](#) and include:

- Less heat transfer due to a lower ratio of surface area-to-volume in the combustion chamber caused, in part, by the elimination of the cylinder head;
- Leaner, faster and earlier combustion;
- More favorable relationship between the compression and expansion ratios realized from asymmetric timing of the intake and exhaust events;
- Higher effective flow area due to ports on each end of the cylinder; and
- Higher scavenging efficiency from a high stroke-to-bore ratio.

“These results validate the engine’s technical merit and are the reason that we chose to work with Achates Power on this program,” said Don Manvel, Chairman, AVL Americas.

“Since first releasing our engine’s results, we have demonstrated a steady increase in brake thermal efficiency, all while meeting the toughest, global emissions standards,” said David Johnson, CEO, Achates Power. “And with high brake thermal efficiency—combined with the engine’s flat fuel map, very low engine-out soot and demonstrated durability potential—we have the utmost confidence that we will meet TARDEC’s program objectives. Over the next few years, we look forward to collaborating with AVL on the final design of this Next-Generation Combat Engine.”

David Merrion—former executive vice president of engineering at Detroit Diesel, Achates Power technical advisory board member, and two-stroke engine expert—added, “Achates Power has made excellent progress overcoming the challenges commonly associated with two-stroke engines: emissions, fuel economy, oil consumption and durability. The fact that their engine has very high efficiency and power density, along with low heat rejection to coolant, makes it well suited for military applications.”

### **About Achates Power, Inc.**

Achates Power, Inc. has developed radically improved internal combustion engines that increase fuel efficiency, reduce greenhouse gas emissions and are lower cost. Founded in 2004—by serial entrepreneur and influential physicist Dr. James Lemke—with the mission to build better, more efficient engines, the San Diego-based company has an experienced staff of engineers and scientists focused on applying their proven technical know-how and expertise, coupled with the industry’s leading-edge testing, simulation and analysis tools. Achates Power has received widespread recognition from groups such as *BusinessWeek*, AlwaysOn, The Guardian and Cleantech Group for its leadership in the cleantech sector. It is backed by top private equity firms Sequoia Capital Partners, RockPort Capital Partners, Madrone Capital Partners, InterWest Partners and Triangle Peak Partners. For more information, visit [www.achatespower.com](http://www.achatespower.com), [www.twitter.com/achatespower](https://www.twitter.com/achatespower) and [www.youtube.com/achatespowerinc](https://www.youtube.com/achatespowerinc).

### **About AVL**

AVL is the world's largest privately owned company for development, simulation and testing technology of powertrains (hybrid, combustion engines, transmission, electric drive, batteries and software) for passenger cars, trucks and large engines. The high tech company employs 5,250 people worldwide. Turnover in 2011 was 830 million Euro.

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