

# TECAT TODAY

## TECAT's Tidbit Corner

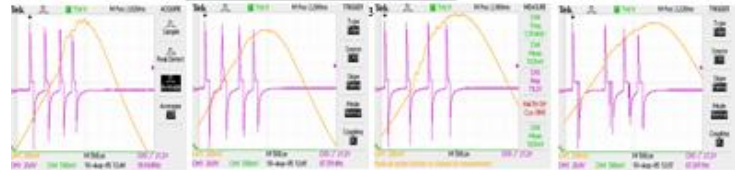
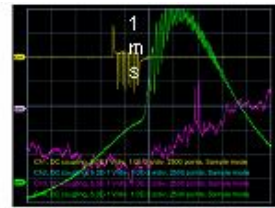
- Torque Telemetry is a wireless method of recording torque measurements from any rotating device.
- Magneto-Rheological fluids are suspensions of magnetizable particles in a carrier fluid.
- The first 'books' were made on clay tablets back in 3800 BC.
- Rudolf Diesel obtained a German patent for the Diesel engine in 1892.
- The city of Ann Arbor was founded in 1824.
- Find more information about other TECAT projects online at: [www.tecatengineering.com](http://www.tecatengineering.com)



## DOD SMALL BUSINESS PROPOSALS

On July 14, TECAT submitted three promising proposals to the Department of Defense's Small Business Innovation Research (DoD SBIR).

The first proposal, entitled "Design and Testing of a Common Rail Multi-Pulse Fuel Injection System and a Magneto-Rheological Fluid Follower For Variable Valve Timing and Lift", addresses the need for diesel engines that have higher power density, improved fuel economy, and reduced specific heat rejection. TECAT's proposal incorporates an electronically controlled, multi-pulse fuel controller with stratified injection techniques. This design improves air utilization and subsequent power density. The design proposal also includes electronically controlled magneto-rheological fluids to vary valve lift and timing on a cyclic basis. This enables dynamic cycle optimization under varying load and speed, thereby reducing power consumption.



Injector voltage and cylinder pressure from both single fuel injection and multi pulse fuel injection events with varying injection timings.

The second proposal also entails optimizing diesel engine design. The solicitation requires that the engine performance meet a minimum power density of 0.95 horsepower per pound of engine weight. TECAT has already conducted extensive thermodynamic analysis of a high power density engine, and predicts that we can exceed this minimum requirements, producing a prototype with

over 1.5 horsepower per pound and almost 2.5 horsepower per cubic inch displacement. The REVOLUTION™ engine technology offers a compact diesel power plant capable of producing a wider torque range, high specific power output, and optimal thermal energy management. It offers unprecedented levels of performance, fuel economy, and emissions charac-

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## TECAT'S TORQUE TELEMETRY DIVISION OFFERS INVESTMENT OPPORTUNITES

Tecat's Torque Telemetry system (T3) is unmatched in the industry for both size and power consumption. As such, our torque measuring device can be used in places that no others can fit, opening up whole new markets to this important data.

Tecat is already working closely with the racing industry to build driveshafts with the T3 system installed. We are also working on the next generation design, to ensure that we continue to maintain our competitive edge. While we are now ready to bring this technology to the mainstream

market, we are positioned to offer equity in this torque telemetry division for investors or strategic partners. Please contact Laura Dillmann, VP of New Business Development, at [ldillmann@tecatengineering.com](mailto:ldillmann@tecatengineering.com) for more information. Ω

## TECAT'S NEW HOME

In early June, TECAT moved into their new office located in Ann Arbor. TECAT now has a 3000 square foot facility with over 1600 square feet of shop space. The shop floor contains a well equipped machine shop, complete electronics shop, and plenty of



TECAT Machine Shop

room for our larger prototyping efforts. Our office space includes a large library, conference area, and ample room for our engineers to spread out. We invite you to visit us at our new location at 4668 Freedom Drive. Ω

## CARD MACHINE FOR THE BINDERY INDUSTRY

TECAT is nearing completion on the first Cover Automated Removal Device for the book bindery industry. The bindery industry takes old paperback books, removes the covers, and installs identical looking hard back covers, to restore the look and longevity of these resources, many of which are no longer in print.

Our client came to us with a unique problem, and TECAT has developed a remarkable solution. For our client, everything in the bindery process has been automated, with the exception of removing the paperback covers from the original books. These are

removed by hand, creating a bottleneck in the process and occasionally resulting in carpal tunnel syndrome for the employees. Upon completion of this first unit, however, the process will require only one operator, who can load both sides of the machine. The CARD machine then feeds the books individually to a laser cutting station at the center. The old covers are cut off with extreme precision and dropped into a bin, while the remaining book block moves on to the next step in the



CARD Machine

bindery process. TECAT engineers have designed and built all of the electronics in house. Our new facility also allows us to fabricate parts in house, and build a unique solution for a unique problem. Ω

*TECAT designs and builds unique solutions for unique problems.*

## SBIR PROPOSALS

(Continued from page 1)

teristics. To learn more about this exciting technology, please visit our website at [www.tecatengineering.com](http://www.tecatengineering.com), and click on REVOLUTION™.

The third proposal involves improving sprays of diesel fuels, using technology previously developed to improve the sprays of non-woven polymers. The submission, entitled 'High Frequency Forced

Excitation of Intermittent High Pressure Nozzle Flows for Improved Atomization and Entrainment Characteristics', introduces a cross-discipline technology into the modern common rail diesel injector. High frequency excitation of fuel near the orifice opening, utilizing a controllable resonance system, significantly improves atomization and spray distribution for existing injection pressures and nozzle orifice dimensions. This

technology also improves entrainment of fresh charge near the nozzle orifice and stabilizes the flame while reducing lift off length. Significant enhancements in spray stability, atomization and air entrainment are all key requirements for emerging gasoline direct injection technologies, as well.

We will keep you posted on TECAT SBIR selections through this newsletter. Ω