

# HYBRID DUAL-TORQUE ENGINE



A novel energy efficient modular hybrid power system for special requirements applications

**Industry:** Propulsion systems

**Target:** To supply a novel propulsion system to applications where energy efficiency, reliability, safety, flexibility, modularity, low noise, and special concepts of operations are prioritized

**Key IP:** Patent pending gear box and software technology

**Primary Product:** TIGON has designed and developed a proprietary, hybrid multi-torque propulsion system. Input may come from a combination of select combustion and/or electric engines. Mechanical output goes to a single shaft. The design can also handle one input and two outputs for special applications. Tigon sells to commercial customers and contracts with Government Agencies.

**Business Drivers:**

- Fresh, proprietary and projectable technologies
- Performance, quality, reliability
- Reduced application failure risks
- New green technology initiatives
- Noise reduction, acoustic stealth
- Bio/Diesel fuel opportunity for aircraft
- APU and diverse applications

**Key team Members:**

Jean Koster, President & CTO: Professor of Aerospace Engineering Sciences, University of Colorado at Boulder  
Trent Yang, Board of Directors,  
Chris Finnoff, Board of Advisers  
Gauravdev Soin, graduate student  
Alex North, undergraduate student  
Tyler Drake, undergraduate student

**Financial:** Tigon EnerTec is a Delaware Corporation. Start-up funding is provided by eSpace Inc. and the Renewable and Sustainable Energy Institute (RASEI).

February 9, 2012

**Tigon EnerTec, Inc.**

We are a propulsion system(s) integrator that designs modular, energy efficient, and eco-friendly modular propulsion systems to increase safety, performance, and reliability of operation. Tigon EnerTec focuses on the product's "variable optimization", or the ability of the platform to adapt to a variety of applications or Concepts of Operations (ConOps).

**The Opportunity**

Tigon will bring new levels of energy conservation and economically viable solutions to the unmanned aerial systems industry, which is estimated to be a \$63 billion dollar market<sup>1</sup> by 2015. According to the Energy Bulletin, in fiscal year 2005, the US military consumed approximately \$8.5 billion dollars worth of fuel, with nearly 70% going towards Jet fuel applications. There is a desire to introduce environmentally cleaner fuels in aviation as seen from recent NASA budgeting. The system is also capable of operating in quiet mode, where acoustic noise is significantly reduced.

**The Solution**

Tigon EnerTec's patent pending gearbox technology offers the ability to optimize the vehicle performance for a specific ConOps, while still maintaining flexibility to achieve multiple mission scenarios. Examples: Engines can be operated collaboratively or individually; Battery and fuel volumes are tailored to missions requiring a defined payload volume and endurance; Fuel consumption reduced by 20% or more; Operational stealth capability can be included to allow quiet insertion of Navy Seals or UAS; The use of two engines allows for increased safety/reliability and performance upgrades. In reverse design, the gearbox input can come from one power source, operating two separate outputs.



**Action**

We research and design efficient and eco-friendly propulsion systems satisfying operation specific requirements; capitalizing on the growth and developments in green technology, such as diesel/biodiesel, batteries and fuel cells. Engines are custom-off-the-shelf products integrated with Tigon's patent pending gearbox. Tigon EnerTec is seeking research and development partners who commercialize UAS, GA aircraft, Boats, Specialty Vehicles, Auxiliary Power Units, to fund and further develop, manufacture, and commercialize our hybrid multi-torque propulsion system for their air-, marine-, ground-vehicles, etc., integration.

**More Information**

For additional information or to schedule a presentation detailing this timely opportunity, contact [Jean.koster@tigonenerotec.com](mailto:Jean.koster@tigonenerotec.com), or visit <http://tigonenerotec.com>

[1]"U.S. Military Unmanned Aerial Vehicles (UAV) Market Forecast 2010-2015 | Market Research Media." *Market Research Media | Premium Market Analysis*. 9 Apr. 2010. Web. 22 Sept. 2010. <<http://www.marketresearchmedia.com/2010/04/09/unmanned-aerial-vehicles-uav-market/>>.