MagCanica

Job Announcement :: Design and Development Engineer

Full Time and Summer Positions

February 2008

Company Overview

MagCanica, Inc. designs, develops, and manufactures wireless torque sensors and rate-of-change-of-torque sensors (ROC) for high performance applications such as automotive racing powertrains, and turboshaft engines and associated rotorcraft transmissions. MagCanica is a product-focused technology company formed in early 2000 with offices in San Diego, CA and Pittsfield, MA. We are actively seeking new members to join our engineering team as we continue growing in 2008. Drawing on the high energy level and extensive technical background of a group of talented Stanford, MIT, and UC-Berkeley mechatronics engineers, world-renowned inventor Ivan J. Garshelis leads MagCanica's technical team. With expertise in magnetomechanics, mechatronics, sensors and control systems, MagCanica has distinguished itself by solving some of the most challenging torque measurement problems facing the automotive racing and aerospace industries. Presently, MagCanica supplies products and provides engineering services to various racing teams throughout the world across all the major series (Formula 1, ChampCar, NASCAR, and American Le Mans), and to the US Navy's Air and Sea Systems Commands in conjunction with Rolls-Royce Corporation.

Core Competencies

MagCanica's core competencies are primarily in the following areas of technology development and low-volume manufacturing:

- Torque, ROC, speed, and power measurement on rotating machinery
- Magnetoelastics and characterization of magnetic properties of functional steels
- Torque sensor packaging for harsh environments
- Signal conditioning circuit design
- Mechatronics and systems integration involving concurrent mechanical, magnetic, and electronic design
- Analysis of dynamic torque and ROC data on automotive and rotorcraft powertrains

Job Description

The lists below describe the types of tasks a MagCanica Design & Development Engineer would typically be responsible for carrying out. Typical projects involve a combination of mechanical design, electronics, experimental testing and analysis, managing suppliers, liaising with clients, attending dynamometer and track testing sessions, and applying the science of magnetoelastics toward developing practical devices. MagCanica engineers have the opportunity to be intimately involved in all aspects of the engineering cycle: R&D, application engineering, manufacturing, and field support.

Sample Technical Tasks:

- Lead the design and development of custom torque sensor solutions for various automative racing, aerospace, and commercial applications. Carry a product from initial concept through final production and testing, often requiring travel to Europe for track test and race support, monitoring of system installation, and client interaction.
- Develop new signal conditioning circuits for new sensors and systems, integrating microcontroller based intelligence into existing analog measurement circuits, customizing power input and/or signal output parameters for a given application.
- Engineer and upgrade customized electromechanically driven testing apparatus and machines for applying mechanical loads or magnetizing shafts. Write and upgrade software (typically in LabView and/or Matlab) to control these machines and analyze and evaluate torque sensor data generated on test rigs, dynamometers, and track vehicles.
- Conduct and supervise testing programs including temperature, thermal cycle, vibration, overload, electromagnetic interference, and magnetic compatibility testing.
- Develop novel sensor packaging and transducer concepts for new applications such as NASCAR racecar application, turbine engine internal shaft application, and oil drilling tool application.

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Current Applications		Future Applications	
Formula 1 and ChampCar Racing Powertrains	Rotorcraft Powertrains	New Torque Sensor Applications	New Products
Kinetic Energy Recovery System (KERS) Motor-Generator Units for Hybrid-Drive vehicles	Turboshaft engine output shafts	Miniature electric motors	Combined Torque, Speed, & Power Sensor
In-vehicle driveshafts (half-shafts)	Helicopter tail rotor driveshafts	Surgical tools	Combined Torque & Bending Sensor
In-vehicle clutch shafts (transmission input shafts)	Helicopter main rotor driveshafts	Oil Drilling	Rate-of-Change of Torque Sensor
Full powertrain dynos (engine, gearbox, and diff.)	Hovercraft transmission input shafts		
Transmission dynos (gearbox and differential)			
Full engine and mono-cylinder dynos			

» Contribute to transitioning the existing torque sensor product line from a low-volume product to a medium-volume production capability by developing and implementing streamlined manufacturing, assembly, and logistics processes as well as implementing Design for Manufacturability.

» Work with MagCanica's R&D team to develop new magnetoelastic and/or mechatronic products such as integrated torque/speed sensors, multi-axis stress gauges, and non-destructive evaluation (NDE) probes and scanners.

Sample Other Tasks:

» Analyze and professionally document laboratory test, dyno test, and track data pertaining to the systems and/or components described above.

» Assist in upgrading company infrastructure in the areas of information technology, marketing, and client relations.

» Assist in drafting and presenting technical proposals to prospective and existing clients.

» Contribute to the creation of technical papers, articles, and patens. Attend conferences and present peer-reviewed papers to world experts in the field.

Job Qualifications

For full-time positions, a Master's degree in mechanical, electrical, or aerospace engineering is preferred but outstanding applicants having only a Bachelor's degree will also be seriously considered. A concentration in sensors, control systems, or mechatronics is recommended though not required. In general, being comfortable with both mechanical and electrical/electronics aspects of design and development is very important. An interest in applied physics is often helpful. For summer internship positions, we are seeking master's candidates or undergraduates with at least two years of prior undergraduate study at the time of the internship.

Proficiency in Microsoft Office (Word, Excel, Powerpoint, Outlook, Project), Matlab, and 3D solid modeling (e.g. SolidWorks, CATIA, or ProE) software packages is expected. Experience with circuit layout and simulation software such as the OrCad suite would be helpful, as would be experience operating machine tools such as a lathe and/or a milling machine.

The Type of Person We Are Looking For

We are looking for self-motivated engineers who have the ability to learn quickly and possess outstanding interpersonal and technical skills. Our approach to engineering is highly interdisciplinary and involves a unique combination of theory and execution. This means carrying out rigorous analysis and experimentation, and then actually building and testing functional hardware. MagCanica engineers contribute to and experience all aspects of the design and development cycle across a broad range of relevant technical disciplines, all the way from R&D to actual installation and field operation. We are looking for individuals who are highly flexible and can work effectively even with limited supervision. Successful candidates will have the ability to interact positively and effectively with clients and colleagues from all over the world.

Training

MagCanica provides a combination of on-the-job and formal training. The prospective candidate will likely be expected to carry out an apprenticeship program (typically lasting several months) at our Pittsfield, MA technical center in order to be exposed firsthand to Mr. Ivan J. Garshelis, our Chief Technical Officer, and learn about the fundamentals of our technology. Following such a period, he or she would be based in the San Diego, CA area and carry out periodic formal training in various areas of interest.

The Unique Experience We Offer

MagCanica offers the opportunity to work in a small, dynamic, product driven company. We work on cutting-edge technology with some of the most demanding clients in the automotive and aerospace industries throughout the United States and Europe, and increasingly in Japan as well. Frequent travel to client sites and track tests throughout the US and to Europe can be expected. MagCanica delivers unusually high levels of responsibility and visibility with clients early in one's career, and most importantly, is a home for real engineers.

Compensation & Benefits

In addition to competitive salary compensation, MagCanica offers a yearly performance-based bonus, yearly merit salary raise, 3 weeks of vacation, and 10 holidays per year. Benefits include medical, dental, workers' compensation, disability, and life insurance as well as a 401K program. MagCanica works hard to allow employees the greatest possible personal flexibility while achieving our overall engineering and business objectives.

Contact Information

Please send your resume in PDF or DOC format to either of the following:

» Email: recruiting@magcanica.com
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