ACUTRONIC Inertial Testing Services – a new approach for MEMS inertial testing

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ACUTRONIC's new inertial testing service allows more accurate and more comprehensive testing of inertial devices and modules while reducing total test cost.

Micro-electro-mechanical systems (MEMS) devices use semiconductor fabrication technology to create sensors and actuators on the microscale. In recent years, a number of new MEMS-enabled applications have spawned a large growth in the MEMS industry. One of the highest growth areas is a class of devices known as inertial sensors (accelerometers, gyroscopes, and magnetometers). The pervasive nature of MEMS inertial sensors is illustrated by new applications in mobile phones, motion enabled gaming devices, digital still cameras, notebook computers, and automobiles, to name just a few.

There is a clear trend in the MEMS industry toward fabless companies and outsourcing. While mainly evident in outsourcing of the fabrication steps to dedicated MEMS foundries, the trend is growing in all aspects of MEMS design, development, and testing as well. At the extreme, there are some MEMS companies that consist entirely of only one or two persons.

While traditional semiconductor devices are tested electrically, MEMS devices require a physical stimulus – in the case of inertial sensors this is precise movement. Functional testing for MEMS devices is obviously very specific. Each class of device not only needs a test system capable of providing the required stimuli, but the test equipment designer should also understand the physics of the stimulus, how it affects the tested device, and how to interpret the resulting measurements. It is a significant challenge to perform dynamic testing. For many MEMS companies, this expertise either does not exist in-house, or the company cannot afford to dedicate scarce resources to the design and maintenance of test equipment.

ACUTRONIC has identified this market need for MEMS inertial testing equipment, expertise, and services. Our approach to address this need is two-fold. First, we are providing a test facility and equipment dedicated to the testing of inertial devices. Second, we will soon offer turnkey inertial test equipment for in-house development and production.

We are therefore pleased to announce the launch of the ACUTRONIC inertial testing service facility. This new test facility will contain an AC277 two-axis rate table, an AC130 single-axis rate table, and an AC150 angular vibration table. At a later date we will also offer many of the more traditional "shake and bake" tests.

Initially the facility and equipment will be available on a daily rental basis. In the near future, we will also offer a suite of turnkey inertial tests, based on test standards created by the Gyro and Accelerometer Panel of the Aerospace Electronics Systems Society of the Institute of Electrical and Electronics Engineers, as well as tests developed by ACUTRONIC. We will also modify these standard tests or even provide completely custom tests.

This approach offers several benefits to companies developing inertial sensors and modules. Companies can avoid the large capital investment to build and staff their own test facility, especially during the development phase. MEMS device designs typically go through a time-consuming iterative design/fabricate/test/revise process. More accurate and comprehensive data in each iteration can reduce the total number of cycles, resulting in faster time-to-market and lower development costs. The new services also allow companies to focus their limited resources on design and development of the device itself, rather than designing, building, and debugging test equipment. Finally, independent device testing provides credibility to device manufacturers with their customers.

ACUTRONIC recognizes that customers are concerned about maintaining the security of their proprietary test data. Customers have complete control over their data and are provided with a dedicated hard drive that they can either lock up on-site or take with them. An internal test data network, separate from the main facility network, ensures data isolation. A separate customer entrance isolates the facility and makes it available 24/7. A test technician is assigned to be on-call to assist customers during their engagement. Electrical, mechanical, and software engineering support are available as needed.

Our vision is to become the world's leading center of excellence for testing of inertial devices, and make this expertise available and affordable to inertial sensor companies.

Future articles will discuss turnkey test equipment products for in-house development and production testing.]