TM TechniTalk

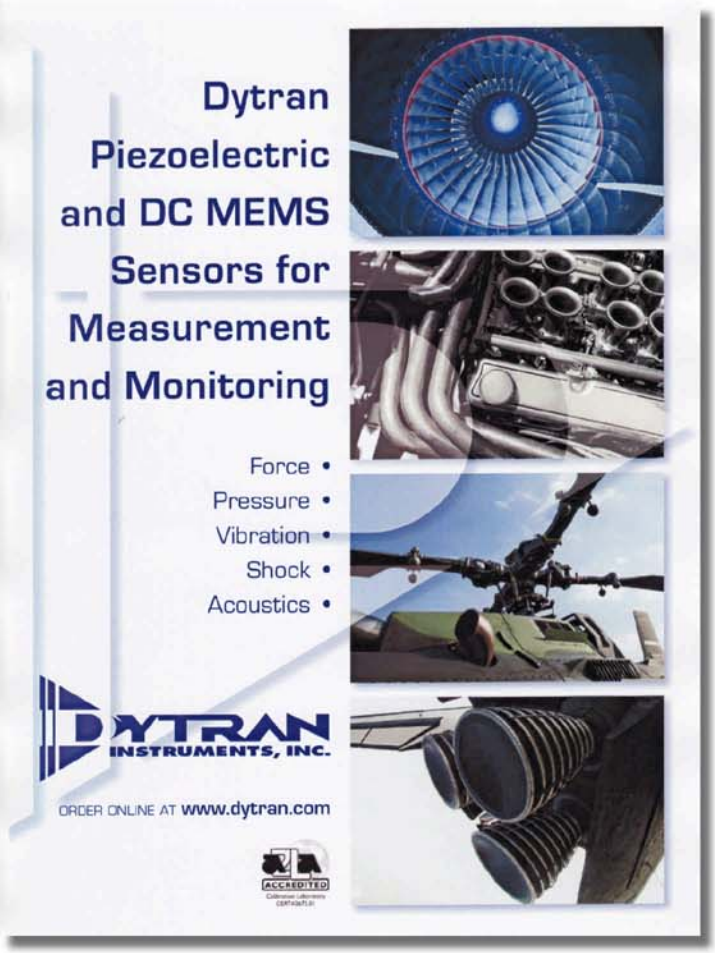
Spring 2011

Welcome to the Techni Measure Newsletter

Whether you are reading this for the first time or have been following our series of publications, we hope that our eighteenth edition of **Techni*Talk***, continues to inform readers of new products, whilst providing technical suggestions on how or where these products might be used. If you are reading this for the first time and want to be added to our contact list for future copies, or you would rather receive this publication electronically in the future, please let us know.

New Dytran Catalogue

In recent years, the range of piezoelectric sensors from Dytran Instruments has increased to such an extent that bringing out a new catalogue that features all their products, has been a difficult task. Consequently there have been two New Product Leaflets produced instead, whilst work has been ongoing on updating their complete catalogue offering. Their web site www.dytran.com has until now been the main source of information on these new products, but this new publication draws together their entire current product offering in one 125 page catalogue, which can therefore be used for reference from your bookshelf. When we get our first shipment of copies over here, we would be pleased to deliver one to anyone who needs one, hopefully combined with a visit so that we can discuss some of the new products now included.



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Issue No.18

Product News

Extended Range Wireless

The new mXRS range of wireless nodes from MicroStrain offer a much longer transmission range (up to 1km), as well as excellent synchronisation between multiple nodes, that can now be controlled from just one of the new WSDA-Base USB base stations.

At the heart of MicroStrain's extended range synchronized (mXRS) system is the WSDA-Base, which uses exclusive beaconing protocols to synch precision timekeepers embedded within each sensor node in the network. The WSDA-Base also coordinates data collection from all sensor nodes. These include the SG-LINK-mXRS, used for strain gauge applications, the G-LINK-mXRS, which is a triaxial accelerometer, and the new DVRT-LINK-mXRS that powers the MicroStrain range of displacements sensors. Users can easily program each node on the scalable network for simultaneous, periodic, or burst mode sampling with the Node Commander software, which then automatically configures network radio communications to maximize the aggregate sample rate. Support for hundreds of simultaneous sampling wireless sensor nodes is possible with node to node synchronization of +/- 32 microseconds and an ultra-stable on-board precision timing reference of +/- 3 ppm over a typical industrial temperature range. Extended wireless communication range is possible up to 1 km.

For additional information on this new range or any of the other wireless systems available from MicroStrain, please let us know details of any possible application.

Bracket-style Accelerometers

Dytran Instruments has recently introduced two new bracket style accelerometers. The model 3302A, a biaxial IEPE accelerometer, and the single axis model 3091A, are designed to provide dynamic vibration monitoring within Active Vibration Control (AVC) applications typically found on commercial and military aircraft.

Utilizing an innovative biaxial design, the model 3302A incorporates the mounting bracket and sensing elements in a single package. This feature facilitates improved sensor performance while eliminating the costs associated with employing separate accelerometers and mounting brackets. The design also offers reduced mass (30grms) as compared to conventional sensors and mounting. As an IEPE sensor, the model 3302A features built-in electronics, eliminating the need for an external charge amplifier and converter. The 3302A design features quartz sensing elements, operating in shear mode and packaged in a compact, hermetically sealed, case isolated, stainless steel housing.

The design and function of the single axis 3091A is very similar, and both models offer a measurement range up to 500g, with a 10mV/g sensitivity. With good durability, unique bracket-style mount and performance characteristics, these sensors are ideal for high-reliability aircraft vibration measurements, Health & Usage Monitoring Systems (HUMS), Rotor Track & Balance (RTB) and transmission vibration monitoring, or any other vibration measurement where mounting by such a method would be an advantage.

Please ask for further details on these new series of bracket style accelerometers, or for any advice you may need on any suitable applications.

New Gapman Gen3

Capacitec have introduced an upgraded replacement for their long established Gapman product. The new Gapman Gen3, includes many improvements and additions, yet will be offered at about the same price. One of the most obvious changes is the high brightness, high resolution, active matrix OLED display, which also shows the stored step changes and units.

The Gapman Gen3 non-contact design, features a dual capacitive sensor mounted on a thin wand, for easy insertion into very thin gaps down to 0.19mm, with versions measuring up to 3.00mm. This wand can be integral to the hand held meter, or mounted in a remote wand holder, for ease of use in tight situations. There is also a contact type sabre that requires no ground connection, and can be used to measure gaps between any materials. The meter is built into a tough plastic case, and can run on internal batteries, or via the USB connection from mains power or from a computer. On-board memory allows 10,000 data points to be collected, and the system is supplied with data reader software, for download of data via the USB link and storage into CSV format for computer analysis or reporting. These systems can be used for measuring gaps in aircraft assemblies, film production, laminator roller gaps, or anywhere there is a small gap that needs to be set up very accurately. The resolution is 0.254 microns, with a ±0.05% full-scale repeatability, and an accuracy of ±0.5% F.S.

Please ask for a copy of the new brochure describing this new system, and if you have any questions regarding the measurement of gaps in general, we would be pleased to visit you to discuss any possible application.

Inertial Module with GPS

MicroStrain have released the second in their new series of GX3 Inertial Measurement Systems. The 3DM-GX3-35, high-performance, miniature AHRS (attitude heading reference system) with GPS, combines MEMS sensor technology and a highly sensitive embedded GPS receiver, for use with an external antenna.

The module incorporates a triaxial accelerometer, triaxial gyro, triaxial magnetometer, temperature sensors, and a dedicated 32-bit processor running a sophisticated fusion algorithm to provide orientation, inertial, and GPS measurements. Data from the GPS receiver is time synchronized with the inertial sensors and all inertial and GPS data are available as custom user packets (either by polling or continuous stream). The system offers a range of output data quantities, including fully calibrated inertial measurements: acceleration, angular rate, and magnetic field, or deltaTheta & deltaVelocity vectors. It can also output computed orientation estimates: Euler angles (pitch, roll, and yaw (heading)); orientation matrix; or quaternion. GPS data quantities include LLH position, NED velocity, ECEF position and velocity, DOP data, UTC time, GPS time, clock info, GPS fix, and SVI. The 3DM-GX3-35 has a dual communication interface which supports USB and RS-232, and versions are available from 1.7 *g* to 50 *g* and 50°/s to 1200°/s. The data output is fully customisable, with inertial data up to 1000 Hz and GPS data up to 4 Hz. Applications include marine, automotive, communications and biomechanics.

We would be please to discuss any application where this module could be used, and we can visit you to discuss solutions.

Miniature Load Cells

TML have introduced to their range of miniature strain gauge load cells, two new transducers with only 2 and 5 Newton full-scale ranges. Having a weight of only 1 grm, these sensors can be used for applications that require small lightweight load measurements.

These CLS load cells are 12mm diameter and 4mm high to the top of the load button. They have a 2m integral cable like the rest of the series, which have ranges up to 10kN. They are widely used for measuring load distribution or loads in structural model testing or as a sensor for industrial machinery. These load cells have a 350 Ohm resistance full bridge construction, which requires an excitation of about 3VDC, typically supplied from many strain gauge amplifier systems. The body is made from stainless steel, is epoxy sealed and designed for adhesive mounting. Each sensor comes supplied with a calibration certificate and connection instructions, and if required can be supplied along with a digital panel meter to condition the sensor, and display the load measured in any unit required. These meters can also be supplied with several output options, including alarms and 4-20mA.

Please ask for details of the full range of CLS load cells, which includes these two low ranges, and if you have any questions regarding the measurement of load in general, we would be pleased to visit you to discuss any possible application.

Who's Who ?

Our new secretary Sam Brown, has been with us now for 9 months, and is the voice you may hear on the end of the phone. She lives locally to our office and we wish her many happy years of working here at Techni Measure. The only problem is that she is camera shy so we are not able to show a picture this time. Please make her welcome when you call and don't ask about cats or rugby!

Techni Measure on Show...

Exhibitions booked so far for the rest of 2011, are listed below. We would be pleased to meet with anyone to discuss possible applications for our wide range of products and if you need tickets or further information, please let us know.

8th September
EMEX at Edinburgh

14 - 15th September
SENSORS & SYSTEMS at Farnborough

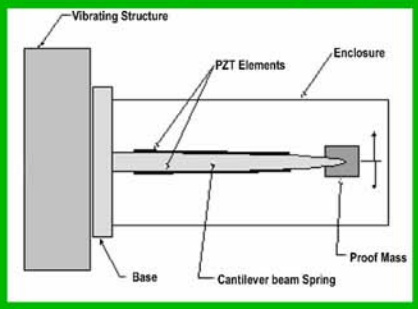
28 - 29th September
SENSING TECHNOLOGY at Birmingham

Please remember that if it is not possible to attend any of these shows and you need a demonstration or explanation of any of our products, we will always be pleased to visit you instead.

Tech Note

What is ... Energy Harvesting ?

Energy harvesting is a relatively new term for describing the powering of low power electronic sensor systems so that they can be used truly wirelessly, without the need for batteries that will eventually need recharging. There are several sources in the environment that can be "harvested", with the most popular being vibration, strain, temperature, and light. A common method for harvesting vibration uses a cantilever beam, to which one or two layers of piezoelectric materials are attached, to generate an electrical charge/voltage. The frequency range can be adjusted by attaching a tip mass to alter the natural frequency of the harvester to match the operational frequency and thus maximise the energy output. Another method to harvest power from vibration utilizes the electromagnetic effect of a moving magnet in a coil of wire (or vice versa), which again can be tuned for maximum output at resonance. There are devices on the market now that are optimized for use with piezoelectric accelerometers, for industrial condition based monitoring. Harvesting power from strain is also usually harvested from vibration. A piezo patch device is stuck to the surface of the vibrating structure, thus generating charge/voltage.



Whilst a piezo-electric or inductive device can generate 10's to 100's of Volts, a thermo-electric device or small solar panels will generate only micro amps and millivolts. The use of thermoelectric technology as a means of energy generation is dependent on a temperature gradient between the surface that energy is to be harvested from, and the ambient air temperature. The energy produced may be in the range of a few tens of microwatts to hundreds of milliwatts depending on the size and specification of the Peltier or thermopile device, and the temperature differential applied across it. Maintaining a temperature differential across the harvester is dependent on airflow, without which the 'hot side' and 'cold side' temperatures will eventually equalise due to thermal conduction and no energy will be generated.
The use of photovoltaic technology as a means of energy generation using outdoor light is common, as there is high energy content in sunlight. However, indoor fluorescent and incandescent lighting produces many orders of magnitude less power than that of typical outdoor light. The energy produced (typically 10's to 100's of microwatts) from indoor light is too low to instantaneously power a wireless sensor node. The electronic devices that work with these harvesters therefore need to have the ability to utilize these very low inputs, and such a device was featured in the last edition of TechniTalk. The EH-Link wireless node is a self-powered sensor, harvesting energy from ambient energy sources, and is compatible with a wide range of generator types, including piezoelectric, electrodynamic, solar, and thermoelectric generators. In addition to multip
Link features an on-board triaxial accelerometer, relative humidity sensor, temperature sensor, and signal conditioning for a Wheatstone bridge which is compatible with strain gauges, load cells, torque sensors, and pressure transducers, all in a miniature