

TM

TechniTalk

Summer 2012

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 twentieth edition of **TechniTalk**, 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.

Bridge project at NPL

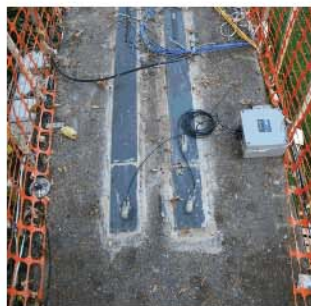
Techni Measure, along with several other companies, have been involved in an interesting project at the National Physics Laboratory site in Teddington, where a disused footbridge has been subjected to all kinds of tests, in order to discover modes of failure and enable testing of various sensor systems in the field. With MicroStrain now having the ability to offer Cloud Computing for a range of their products, using their WSDA Data Aggregator as the link, it was agreed that we should try to set up a wireless modem link to the Cloud, to reflect what might be necessary out in the real world of large structure monitoring. The aim with this system was to allow MicroStrain, Techni Measure and NPL to monitor on-line what the sensors are doing, via the Cloud, from wherever they were. The sensors in this case were two wireless 2g range triaxial accelerometers (G-Link) in waterproof boxes, which were mounted on the bridge surface at the centre point and at the far end (Pictures 1 & 2). There was also a multi-channel wireless strain system (V-Link), that has three channels set up to monitor the strain from three strain gauges mounted near the end of two 4m long carbon fibre reinforced polymer (CFRP) panels installed on the top deck. (Picture 3). This was also mounted in a waterproof box. All three boxes contained enough battery power to allow the sensors to monitor and transmit data on a predetermined schedule, for at least 2-3 months. The three nodes were set up to operate in a synchronised mode taking data at 64Hz for 70 seconds every 5 minutes, and transmitting this wirelessly to a base station (WSDA) that acts as a computerised link and control module, and situated in a nearby monitoring building. This in turn was connected to a wireless modem operating with a SIM card, allowing access to the Internet.



Picture 1



Picture 2



Picture 3

Although MicroStrain has set up such systems successfully in the USA, it was the first time this has been tried in this way overseas, and there were several initial problems in getting all the system to operate properly. Consequently the start of monitoring was delayed until these problems were sorted out, and the vibration testing of the bridge was missed, however eventually live data has been streamed successfully to the Cloud for over two months.

There has not been much change in the accelerometer signals, but there is a lot of variation in strain output during each 24 hour period, which is probably largely related to temperature variations in the composite reinforcing panels. There are also some positive strain readings (tension) that show excursions of about 140 microstrain on the two days of testing, when large weights were suspended from the end of the bridge (picture 4). Each tank weighed about 1200 kg when full. Please ask for further details of this project.



Picture 4

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Issue 20

High Temp Accelerometer



Dytran Instruments has introduced the model 3316C, a high temperature accelerometer featuring a charge mode element mounted in a hermetically sealed, miniature Inconel housing. Capable of operating at temperatures up to +482° C, the model 3316C utilizes the latest in planar shear technology.

In order to operate at such high temperatures, the model 3316C was designed with a unique, Dytran patented feature. Units employ a "silver window" on the top cover of the accelerometer housing, which provides oxygen access to the crystal at high temperatures whilst maintaining the unit's hermetic sealing. The 3316C weighs just 5 grams and has a height of just 0.91 mm. It is offered with a sensitivity between 1 and 2 pC/g, with a 10KHz upper frequency response, and has a 5-40 tapped hole and 10-32 radial connector.

With its durability, broad operating temperature range and miniature, lightweight design, the 3316C is ideal for high temperature environments where mass loading is a concern including automotive vibration studies, exhaust system analysis, engine vibration analysis and Environmental Stress Screening (ESS). To prevent ground loop interference at high temperatures, it is recommended to use model 6998 isolated mounting block in order to isolate the sensor from the mounting surface. Additional recommended accessories for model 3316C include the model 6946A hard-line cable assembly and model 4752B in-line charge amplifier.

For more information about the model 3316C or other high temperature products, please contact us. We would be very pleased to discuss any application that you may have for high temperature vibration measurements.

Inertial Measurement Unit

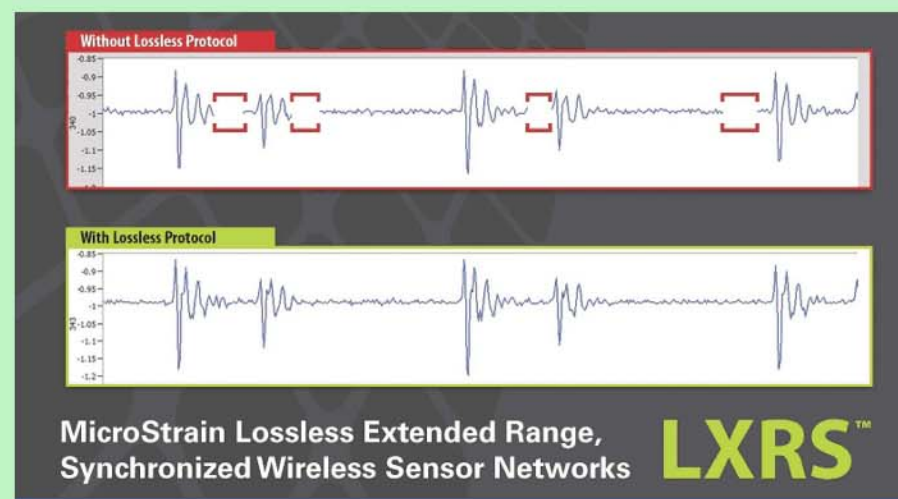


MicroStrain have just released the 3DM-GX3-15, which is a miniature IMU, and offers users who do not need magnetometers a lower cost, lower power option to the popular 3DM-GX3-25, yet still maintaining the same high quality inertial performance. The addition of the 3DM-GX3-15 completes the GX3 family of products.

The 3DM-GX3-15 offers a range of fully calibrated inertial measurements including acceleration, angular rate, delta Theta, and delta Velocity vectors. It can also output computed orientation estimates including Euler angles (pitch and roll), rotation matrix and quaternion. All quantities are fully temperature compensated and are mathematically aligned to an orthogonal coordinate system. The 3DM-GX3-15 architecture has been carefully designed to substantially eliminate common sources of error such as sensitivity to supply voltage variations.

The 3DM-GX3-15 is initially sold as a starter kit consisting of an IMU module, RS-232 or USB communication and power cable, software CD, user manual, and quick start guide. Applications include marine, automotive, communications, camera & platform stabilisation, biomechanics and robotics. The 3DM-GX3-15, along with the rest of the GX3 family, now include new improved gyros. This means all of the units in the GX3 family offer extremely low dynamic g-sensitivity, higher powered shock survivability, and lower noise. Also new MIP API is now integrated across the family of inertial sensor products, providing greater flexibility, and enabling seamless interchange of GX3 units without changing software. We would be pleased to discuss any application where this module could be used, and we would be pleased to visit you to discuss solutions.

Product News

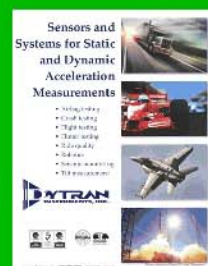


Lossless Wireless Systems

MicroStrain's new Lossless Extended Range Synchronized (LXRS™) Wireless Sensor Network combines a groundbreaking lossless data wireless communication protocol with ultra-stable precision time sync and network scalability to enable many wireless sensor nodes to communicate to a single base station over long distances.

When data is received without errors by the WSDA base station, the WSDA sends an acknowledgement that these packets were received. Data that is not acknowledged remain within each LXRS sensor node's non-volatile memory for re-transmission according to the network scheduler. Data is time-stamped by each node at the time of analogue-to-digital (A/D) conversion, therefore, even when re-transmitted, all data is accurately time stamped. LXRS protocols enable highly reliable data collection from scalable networks of wireless strain, acceleration, torque, force, temperature, etc. Under most operating conditions, users will enjoy 100% reliable (i.e., lossless) data transmission. This is very important when working in harsh operating environments or when the system may be subject to periodic RF interference. Critical experiments, that may be difficult to set-up or replicate, can benefit from LXRS reliability. Synchronized data collection, combined with LXRS data acquisition, allows users to select lower sampling rates, because there is no need to over sample. In many cases, users can also use reduced radio transmission power levels, which leads to longer battery life and enables energy harvesters to be used in lieu of primary batteries.

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



New DC Accelerometer Brochure

DC response sensors are used for a variety of high sensitivity, low frequency vibration measurements of acceleration and deceleration and long transient motion events. Included among the models highlighted in the new brochure is the 7500A series, a family of ultra low noise, single axis, MEMS DC accelerometers, the triaxial 7503A series, and the new VibraScout, as featured in this Newsletter.

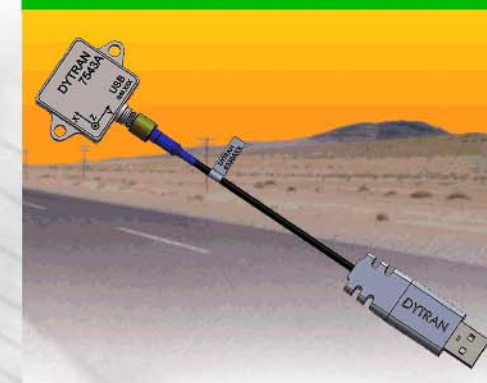
New Capacitance Electronics



Capacitec have introduced a new dual channel design of high specification electronics for their range of capacitance sensors. The new Capteura™ 200 Series offers Capacitec's highest stability and lowest noise solution for displacement measurements, when used in conjunction with any of the Capacitec line of non-contact displacement, gap and hole sensors.

The Capteura™ 200 Series combines two amplifiers onto each card allowing it to be twice as dense as most systems, and its small modular size requires a smaller rack enclosure. The Capteura™ 200 Series is available in three different form factors. The 208 rack holds up to 8 channels, the 216 rack holds up to 16 channels, and the stand-alone 200-ENC single card enclosure allows for 1 dual channel card to be used in a dedicated aluminium enclosure. This 200-ENC system includes a built in modular clock/driver card in the rugged enclosure, and an external universal AC/DC power adaptor along with a 12ft long analogue output cable and a 12ft target grounding cable. The rear panel of the 208 and 216 rack enclosures provides one BNC female connector for each primary analogue output in single-ended mode, plus a 24-pin D-Sub connection, having an additional analogue output connector offering differential analogue output options. On the rack systems the extra slot holds the 200-C Oscillator card with optional DAQ 8 channel A/D to USB module, and either an AC or DC power supply is included. Please ask for further details on these new electronic systems or for any advice you may need for any non-contact displacement or gap measurements.

USB Triaxial Accelerometer



Dytran Instruments has introduced the 5340 digital USB accelerometer system, which they are calling the VibraScout. Employing a triaxial DC accelerometer (7543A) with a MEMS capacitive sensing element, and housed in a hermetically sealed titanium case, this system simply links to a computer via a USB cable.

Tailored for zero to 1.6KHz frequency applications, the VibraScout offers continuous logging and display of 6 outputs - triaxial X, Y, and Z acceleration data, temperature, as well as roll and pitch, with the ability to save to a .txt file using the supplied license free Windows compatible analysis software. This software also allows auto and smart triggering modes, digital filters to improve signal/noise, and FFT calculations. The full-scale vibration range is 16g, but the maximum shock level is specified as 10,000g. Power is drawn from the USB supply of the computer, thus providing quick and easy field data collection. Internal electronics use this DC supply to generate the correct supply for the internal temperature sensor, as well as the three variable capacitance accelerometers configured orthogonally for X, Y, Z outputs. The temperature range of the sensor is from -40 to +85°C, the cable connection is on the side, and mounting is accomplished using two screws. Applications would include Noise, Vibration and Harshness testing (NVH), as well as seismic monitoring, ride quality, rollover studies and tilt measurements. Please ask for further details on this new VibraScout system, or for any advice you may need on any suitable applications. We have the products and expertise to solve most vibration measurements.

Who's Where ?

We thought that this time we would show where most of our suppliers are situated in the world. Those in Europe we can contact quite quickly, but communication with Japan and the USA can be delayed due to the time difference, and depending on the time of day.

- | | |
|----------------|--------------|
| 1. TML | 2. Dytran |
| 3. MicroStrain | 4. Conax |
| 5. Schriber | 6. AEP |
| 7. Sakae | 8. Capacitec |
| 9. Hansford | |



Techni Measure on Show...

Exhibitions booked for the rest of 2012 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.

30th August
BSSM-EMEX at Glasgow University

5 - 6th September
INSTRUMENTATION at Aberdeen

25 - 26th September
SENSING TECHNOLOGY at NEC Birmingham

7 - 8th November
ADVANCED ENGINEERING (Auto) at NEC 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.

Tech Note

What is ... SensorCloud™ ?

Sometimes finding enough storage space to hold all data acquired is a real challenge. Some people invest in larger hard drives, whilst others prefer external storage devices like memory sticks or CD's, or even delete entire folders worth of old files in order to make space for new information. Some however are choosing to rely on a growing trend-cloud storage.

Cloud storage is a way of saving data to an off-site storage system maintained by a third party. Instead of storing information to your computer's hard drive or other local storage device, you save it to a remote database, and the Internet provides the connection between your computer and the database. Cloud storage has several advantages over traditional data storage. For example, if you store your data on a cloud storage system, you'll be able to get to that data from any location that has Internet access, providing you have the correct access codes. You would not need to carry around a physical storage device or use the same computer to save and retrieve your information. With the right storage system, you could even allow other people to access the data, turning a personal project into a collaborative effort. Also instead of installing a suite of software for each computer, you'd only have to load one application, or use existing programmes on the cloud site to allow complex data analysis. There are already hundreds of different cloud storage systems. Some have a very specific focus, such as storing Web email messages, social networking data, digital pictures, videos and music. Others are available to store all forms of digital data, including books, files and measurement data.

MicroStrain's SensorCloud™ is a unique sensor data storage, visualization and remote management platform that uses powerful cloud computing technologies to provide excellent data scalability, rapid visualization, and user programmable analysis. Originally designed to support long-term deployments of MicroStrain wireless sensors,

SensorCloud now supports any web-connected third party device, sensor, or sensor network through a simple OpenData API. SensorCloud is useful for a variety of applications, particularly where data from large sensor networks needs to be collected, viewed, and monitored remotely. Structural health monitoring as in the NPL Bridge project, and condition based monitoring of high value assets, are applications where commonly available data tools often come up short in terms of accessibility, data scalability, programmability, or performance.

With secure HTTPS/SSL web access standard, SensorCloud simplifies data sharing and analysis for team members spanning multiple locations, it helps groups better coordinate event responses with flexible alerts, and it allows teams to collaborate on code development for MathEngine applications. Data owners can also expand their audience by sending invites to domain experts to view their data set, assist with analysis, and develop advanced, custom-tailored data processing applications. Please ask for further information.

