

## Monitor - ISSN 1472-0221

The Newsletter for Data Acquisition and Control  
Issue 260 June 2020

Good afternoon and thanks for subscribing. We hope this email finds you safe and well.

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### Contents

- \* [The Rise of Virtual Machines](#)
- \* [Your DAQ Questions Answered](#)
- \* [Data Acquisition News Round-Up](#)

### The Rise of Virtual Machines

Web link: <https://www.windmill.co.uk/virtual-machine.html>

#### What is a Virtual Machine?

A virtual machine (VM) is where a software program behaves like an actual "machine", instead of connecting hardware to the computer. Virtual hardware runs on the host machine, emulating a computer-controlled system.

For example, a virtual machine can emulate a different operating system to the one running on the computer. This allows you to run, for example, Windows software on a Linux operating system.

#### Why use a Virtual Machine?

Virtual machines have many benefits. They can be deployed almost anywhere, regardless of the operating system or configuration of the host. They cut down the need for physical hardware and make systems independent, improving security and reliability. VMs are isolated from each other and their hosts and system resources are divided between the virtual machines. You can migrate any virtual machine to any physical server.



## Using Virtual Machines for Data Acquisition

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Virtual machines are more and more widely being used for data acquisition. Let me give you an example. A system to count people, cyclists and vehicles has now removed the need for the counting hardware and is operating as a virtual machine. It uses a computer vision algorithm to detect people and so on. Previously the software algorithm ran within a counting and data logging box. Now the algorithm has been developed and packaged as a virtual device, analysing a video feed and counting people: no counting hardware. The virtual people counter makes information available in real-time, to reporting dashboards and smartphone apps. It can run alongside, but isolated from, other virtual devices.

## Hypervisors - the running environment for Virtual Machines

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Virtual machines run under a hypervisor. There are two types of hypervisor. One runs on the underlying operating system. This is called a type 2 hypervisor and is useful for running on personal computers. Examples include Oracle's Virtual Box and VMware Workstation Player. A type 1 hypervisor runs on the "bare metal" and accesses the hardware directly: it is the operating system. Examples of these are VMware vSphere and Microsoft's Hyper-V.

If you need more information about data acquisition using virtual machines please [get in touch](#).

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### Your Data Acquisition Questions Answered: Continually Measuring Strain on a Pipe

#### Question

We will be conducting a hydro-test on a fibreglass pipe + joint at 95 degree C temperature with test pressure of 220 bar for a duration of 1,000 hours. Strain gauges will be attached inside the pipe to record the strain readings in the pipe throughout the duration of the test. Your data logger should record and transmit the data to a computer. What would you recommend?

#### Answer

Providing the logger is to be outside the test unit and at a normal temperature, then the [Microlink 851-SG](#) would be suitable. The 851-SG package comprises an 851 data logger, a strain connection box and Windmill data acquisition software. Just connect your strain gauges to the strain box, plug the box into the 851 Data Logger and away you go. The Windmill software will continuously log data to the computer. For more details see <https://www.windmillsoft.com/daqshop/strain-data-logger.html>.

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### DAQ News Round-up

Welcome to our round-up of the data acquisition and control news. If you would like to receive more timely DAQ news updates then follow us on [Twitter](#) - [@DataAcquisition](#) - or grab our [rss feed](#).

#### Researchers print graphene sensors to monitor food freshness

Researchers use high-resolution printing technology and graphene to make low-cost biosensors to monitor food safety.

Source: Iowa State University  
<https://www.news.iastate.edu/>

#### Comb on a Chip: could revolutionise clocks, telescopes and telecommunications

A device known as a laser frequency comb, with its hundreds of evenly spaced, sharply defined frequencies, can be used to measure the colors of light waves with great precision.

Source: NIST

<https://www.nist.gov/>

### Smart system supports increase of wind energy use

A 'smart' system that controls the storage and release of energy from wind turbines will reduce the risk of power cuts and support the increase of wind energy use world-wide, say researchers at the University of Birmingham.

Source: University of Birmingham

<https://www.birmingham.ac.uk/>

### Graphene smart textiles developed for heat adaptive clothing

Graphene integrated clothing can lower the body temperature of the wearer in hot climates.

The University of Manchester

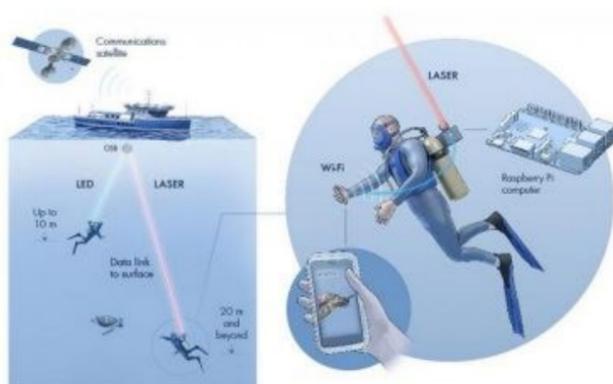
<https://www.manchester.ac.uk/>

### Aquatic internet and underwater WiFi approaches

Aquatic internet that sends data through light beams could enable divers to instantly transmit footage from under the sea to the surface.

Source: SCUBA News

<https://news.scubatravel.co.uk/>



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