

Agribusiness

Spark dials into the internet of agricultural things

Bill Bennett

Pat Verryt says Spark is working on an "internet of Things" project to help farmers.

He says: "Farmers will be able to access their farm management systems in real-time when out on the farm over Spark 4G Wireless Broadband or a low-power wireless area network.

"The centralised system will visibly demonstrate how the farm is performing day to day, while monitoring environmental parameters and a number of other real-time information factors that are critical to farming."

Verryt is the head of Internet of Things at Spark Ventures.

He says Spark's Connecting Farm concept is a new approach to dealing with on-farm information.

Internet of Things is the name given to machine-to-machine technologies that use small, low-power sensors embedded in objects and moves data between them and a central collection point.

Spark's "Connecting Farm" collects data from wireless, rugged sensors embedded in gates, fences and farm equipment. Sensors might also monitor soil conditions, water flow or even the weather.

This has been possible for some time, yet in the past it has meant dealing with different systems. Spark's approach uses Thingworx, which pulls everything together under a single umbrella.

Maiuku dairy farmer Tony Walters (pictured), the first to trial Spark's service, says for him the key is to use the technology to drive profitability.

Walters says the monitoring means he gets the information he needs without resorting to manual collection.

"With better access to precise data and less intrusive monitoring I can make more informed decisions and prevent wastage, ultimately resulting in better profitability."

Spark says the trial has been a success. Now the company is looking to extend its scope in a larger trial it is running in partnership with Fonterra.



Technology helps find gold

Fonterra has invested heavily into innovation and intellectual property. Now it has developed a new milk fingerprinting process, explains **Bill Bennett**

Fonterra is mining gold in the Waikato, extracting tiny particles of a natural protein called lactoferrin at the milk co-operative's Hautapu site near Cambridge.

Robert Spurway, Fonterra's chief operating officer global operations, says lactoferrin is known as "pink gold" because of its colour and high value.

There's a growing demand for lactoferrin in Asia. It generates huge returns in Japan where it sells in health foods, yoghurt and infant formula. The iron-binding protein has anti-microbial and anti-inflammatory properties, which helps the immune system.

Human milk contains a lot of lactoferrin, but there isn't much in cow milk. It takes 10,000 litres of milk and a lot of technology to extract a single kilogram. The protein is so precious that Fonterra measures its sales in kilograms, not tonnes.

The process is efficient. Once Fonterra has extracted lactoferrin, it can still use the milk for other purposes such as skim milk powder.

Last year Fonterra spent \$11 million upgrading the Hautapu site to double its lactoferrin capacity. Spurway says despite the growing demand, it is not something many other dairy manufacturers can deliver as it requires considerable investment in research and development, as well as capital to build extraction plants.

Fonterra's lactoferrin plant may deliver pink gold, but the co-operative's jewel-in-the-crown is its \$72 million instant quick freeze mozzarella production facility opened last year at Clandeboye, South Canterbury. Fonterra exports the cheese and most of it ends up in pizza.

At Clandeboye, a new natural process means Fonterra can produce mozzarella in six hours instead of the normal three months. Rural cheese-makers often use chemicals to speed production. They are not allowed to call that product mozzarella. You may see it sold as "pizza cheese". Speeding up the process isn't the only challenge for mozzarella makers. Most of the time,

cheesemakers sell blocks, which foodmakers then grate for cooking. The problem is that grating is inexact. So there are inconsistencies in volumes and cooking times. This means pizza makers and other food companies face extra costs.

Fonterra makes its quick freeze mozzarella pre-grated. Every piece is exactly the same size. Each scoop always has the same amount of cheese. This makes it predictable and manageable.

The Clandeboye and Hautapu facilities are top secret. Their processes use valuable intellectual property, and Fon says the secrecy underlines how much the co-operative values its investment. In some cases, the secrets extend to the stainless steel manufacturing equipment it uses. Fonterra considers that even the angle of connecting pipes is important enough to keep everything out of sight. Only a handful of people have been inside the buildings.

Fonterra's lactoferrin and instant mozzarella plants are part of its asset optimisation programme. The co-operative says it is investing in technology to differentiate itself in what is otherwise a commodity market. That means finding ways to extend its reach and open lucrative new markets.

This explains the secrecy. Fonterra made a huge investment in intellectual property, and is a leader in dairy research and development. It invests more than any other milk processor in innovation – last year it spent \$80 million. Fonterra also works in the Primary Growth Partnership programme with the Ministry of Primary Industries and DairyNZ to create new products and increase productivity.

Last year this partnership developed Milk

Fingerprinting, a technique using light analysis and sophisticated computing to perform a detailed analysis of milk. It cuts testing costs, in some cases by more than 90 per cent, and it reduces the time taken to process results.

Fonterra chief science and technology officer Jeremy Hill says: "Milk fingerprinting means instead of some tests taking days or weeks we can test hundreds of samples in seconds."

But that is not the only benefit – milk composition varies seasonally and between farms, so having a better understanding of a farm's output means the milk can be directed to a better suited product.

"Milk fingerprinting provides information about each farm's milk so rapidly that when combined with our sophisticated tanker scheduling system, we can now send our milk to the manufacturing site that will get the most value out of every drop," Hill says.

At Edgecumbe, Fonterra is upgrading its plant to capture lactose from the waste stream. The \$8 million project is applying existing filtration technology in a new way to double the amount recovered.

Fonterra director Mark Leslie says the change will reduce the co-operative's dependency on imported lactose and deliver savings. "Lactose is used mainly in standardising milk powder. The additional volumes of lactose we're now able to capture will be essential in supplying the new dryer opening soon in Lichfield – one of our most strategically important builds."

One stop for online farm data

Fonterra and the Livestock Improvement Corporation (LIC) plan to give farmers a single

online data portal to to help them make quicker and easier decisions. They aim to put all milk production and quality data, herd and pasture information as well as local weather forecasts in one easy-to-use web portal.

Fonterra chief operating officer farm source Miles Hurrell says farmers have lots of data sources, but they are all developed in isolation.

"Farmers have asked for a way to bring all those data sources together in one place. This would reduce the need for double entry of data. It will also give them the ability to benchmark their farm against others using aggregated data, leading to more productivity and profitability."

Fifty farmers will trial the online tool. The aim is to make the software adaptive. That way farmers will be able to get to the portal from desktop PCs, laptops, tablets or phones, and personalise their data.

Among other things, they will be able to see the milk production and quality information gathered by Fonterra. This will help them plan to increase yields and help identify possible problems, such as a sick cow.

Hurrell says Fonterra has noticed its farmers are becoming more and more digital. He says in the past year the use of data from Fonterra smartphone apps has doubled. To date more than 13,000 users have downloaded the co-operative's apps.

"Our farmers are rapid adopters of digital technology on farm and their feedback has led the design of our apps. Even farmers who previously said they'd never need a smartphone are telling us they can't imagine life without it," says Hurrell.