BUSINESS NEWS

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World class technology in Andreas
Energy control technology you might expect from a global corporate

I don't know about you, but I was slightly gobsmacked last week to read that for the month of July the Isle of Man was the sunniest place in the British Isles.

I read this news shortly before driving from Port Erin to Andreas under a leaden grey sky to meet one of the two inventors of Rayzig.

More about them later, in the meantime what is Rayzig and why does it matter?

WIRELESS NETWORKING

Rayzig is a "Wireless Mesh" based system for controlling devices.

A Wireless Mesh is a form of low-cost data network using low-powered radio to communicate with multiple remote devices - such as sensors / meters or controllers / switches. These devices will be spread out across a large area so that installing the cabling for a hard-wired control system would be expensive - especially if that means digging up pavement or routing out the plaster in the walls. Wireless control starts to make sense very quickly when the alternative is installing cabling, but Wireless can be challenging over large distances because high-power radio transceivers are expensive and require big antennae - this is where the Mesh comes into play. "Mesh" describes a network where each low-cost device can relay / route / re-transmit messages to its neighbouring devices, so a Wireless Mesh can be used to connect devices over a large area by enabling data to "hop" from one device to another until it reaches its destination.

ENERGY SAVING

Most use cases of Wireless Mesh networks to date have been used in Utility "Smart" metering or energy control. In Smart Metering a wireless mesh is increasingly being used to enable water, gas or electricity meters distributed over a large area, for example a housing estate, to communicate meter readings back to a central point. In energy control applications wireless mesh networks are typically being used to control

Tony Verrall

Ian Sumner

large numbers of light or heat sources. Imagine the control of thousands of street lamps in a town or the lighting and heating in a large industrial setting such as a factory or warehouse.

That significant energy savings are possible through centralised automation of heat and light usage is blindingly obvious, but many organisations have not installed energy management systems because the cost of installing the network cabling and controls is not justified by the potential energy savings. Rayzig addresses this problem by eliminating the cabling with cheap wireless controls, opening up opportunities for many more organisations to better manage energy consumption by retrofitting control to their existing infrastructure and reducing the cost of including energy management in new builds.

SUPERIOR TECHNOLOGY

The idea of using radio communication for energy management controllers is far from new.

One of the most commonly wireless technologies for this, ZigBee, dates back to 1998 and has evolved over time.

The developers of Rayzig originally set out to use ZigBee for their wireless mesh but ran into technical challenges as they scaled up the size of the wireless mesh network. As a consequence they switched horses in late 2013 and adopted a brand new technology called Atmel Lightweight Mesh, which as its name implies is a more compact and efficient approach explicitly designed for the implementation of large wireless mesh networks, overcoming some of the limitations and costs of ZigBee.

Rayzig is one of the first large scale systems developed to exploit the scalability and efficiency of Lightweight Mesh.

SCALE

Atmel Lightweight Mesh has been independently evaluated as offering over ten times the performance of ZigBee for some applications, making it much better suited for large wireless mesh deployments, and RayZig have capitalised on this by enabling up to 8,000 nodes in each mesh, with each node controlling up to four devices. Therefore a single Rayzig network can individually control up to thirty-two thousand devices.

This is the sort of scale needed to manage all of the street lamps in a town, or all of the lights in a large industrial complex.

People with experience of managing such large numbers of devices will appreciate that Rayzig's designers recognised that in enabling such large networks there was a need for versatile, effective and easily managed local and remote configuration of all parts of the system. Substantial thought and effort went into the design of the data and user interface for configuration of Rayzig modules in order to enable large-scale manageability, and the system provides automatic cataloguing of all nodes in a network by the gateway module via which all configuration changes are made.

The gateway module of a Rayzig network may be accessed locally and via an private network or the Internet, enabling

There are very few practical applications which will need to control more devices than is possible with a single Rayzig network, but each Rayzig network has its own identification so if more devices need controlling the answer is simply to implement multiple networks. The city of Los Angeles in the USA has over 140,000 street lights - and every one could be individually controlled using a handful of Rayzig networks.

DALI

I've focused on lighting control intentionally, because so have the inventors of Rayzig. Wireless mesh networks can be used for controlling many types of devices but lighting is one of the most common business cases, and Rayzig includes specific modules for addressing the Digitally Addressable Lighting Interface (DALI) capability of luminaires which allows the control of their brightness. Consequently the control of a device via Rayzig is not restricted to On/Off, if the devices are suitably enabled then Rayzig can be used to control the output of heating and cooling systems.

INVESTMENT

The capabilities of the Rayzig system have come at a cost - to date around twenty thousand man-hours of development have been invested by the inventors, in creating both the hardware and the software of what appears to be a complete product. Rayzig is basically ready for market, needing only the work of obtaining CE approval before it can be sold in Europe. The readiness of the technology and the readiness of the market gives the inventors a dilemma - go to market with Rayzig themselves, engage sales and distribution partners, or sell their technology to an entrepreneur or business which can.

INVENTORS

The inventors and developers of Rayzig are both very experienced, respected, senior engineers and Information Technology professionals. They're also necessarily getting on in years.

Tony Verrall studied Aeronautical Engineering and Design at Loughborough University, then undertook a Masters Degree in Control Engineering at Sheffield University where he met Ian Sumner.

Dr Sumner studied engineering at the University of Cambridge and then worked for British Nuclear Fuels as an electronics/instrumentation design engineer.

He then changed career to medicine, qualified as a doctor, and as GP he developed one of the early computer patient management systems in

the mid 1980's.

Tony originally moved to the Isle of Man to work for Airship Industries. Alongside this he started, and still runs, a computer consultancy where many unique projects have been developed, and the concepts for Rayzig were spawned from one of these.

Over the last six years Tony and Ian have created, from a bungalow in Andreas, a scale and sophistication of energy control technology which one would more expect to come from a global corporate such as Siemens or Philips.

Given their age, skills and resources they realise that it's time to let go of their baby and hand over the baton to someone who can realise the huge potential it offers.

TIMELY OPPORTUNITY

Inventing new technologies and bringing them to market is not merely a matter of producing something clever. The first electric car was built in 1837 but it was not until the late 1800s that electric cars became popular - and in the early 1900s they were rapidly overtaken by the newer petrol engine technology which offered greater range and ease of refuelling. Timeliness is critical; today the electric car is in the ascendancy because it is seen to be more energy-efficient and less polluting than diesel or petrol vehicles.

The UK Government has recently made a raft of major funding announcements about UK national industrial strategy focusing on better use of energy - including Smart Metering, Batteries, Electric Vehicles and Energy Management, because it claims there is the opportunity to help the UK save up to £40 billion on energy costs by 2050.

Energy management has become the hot topic of the 21st century and control technologies such as Rayzig, for deployment in large installations such as factories, hospitals, hotels, warehouses, street lighting etc., are now in tune with the needs of government and business.

The inventors of Rayzig can be reached via admin@ rayzig.com and the website is at http://www.rayzig.com