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Connected systems: interview with Sam Woodward

Sam Woodward is author of the Code of Practice for Connected Systems Integration in Buildings*. He is also Lutron's Customer Education Leader for Europe and Africa, managing Lutron's Lighting Control Institute in Europe. We catch up with Sam about what 'connected systems' means, what customers are asking for, and what electricians and installers need to know.*

Sam, what exactly is a 'connected system'?

A 'connected system' is one in which a number of devices communicate together in order to facilitate system features that any one product on its own would not be able to achieve. Connected systems offer building users more convenience, more comfort, a better sense of security, and even access to services when not in the building. Networks of devices designed as a system enable greater automation due to convergence of systems. For example, controlling your lighting, shading and temperature together or using one button to do a whole-building-off command that controls both lights and AV together.

Tell us about your experience. Have you worked in the area of connected systems long?

Yes, I've worked with a variety of connected systems. For a decade I focused on product development, designing dimming systems and software. I now teach lighting controls to electricians, installers, programmers, architects and specifiers, looking after customer education for Lutron in the Europe and Africa regions. However, I started my career in the entertainment industry, developing electronic control systems for film, TV and theatrical effects, primarily integrating lighting/laser and video systems with live pyrotechnics. The world of building automation may be a far cry from creating fireballs in a stadium for a pop concert [credits include special effects for James Bond, Lara Croft, and Robbie Williams], but many of the electrical principals behind safe and reliable connected systems are the same!

What drew you to this area of the industry?

This is a very exciting industry to be working in, with interesting projects, a wide variety of clients, and an ever-changing pallet of technologies. The IoT (Internet of Things – also known as M2M or Machine to Machine communication) brings many opportunities that enable technology to increase our standard of living or to enhance our working environment. We all have an imperative to conserve energy and to make buildings 'greener'. It's easier than you may think to conserve energy with modern reliable occupancy sensors, and integration with heating and lighting systems. I personally find that working with many different systems and learning from experts in different fields of technology, but at the same time building a unified whole system, to be endlessly fascinating.

How has the market grown, and what trends have led that development?

We are at an exciting time in the building automation industry right now with three simultaneous revolutions occurring. Firstly there is a tremendous renaissance in the design of good user interfaces for systems, both in terms of smart-devices and voice-control, but also with keypads and touchscreens that look less 'geek' and are easy to use by everyone. Controls need to be simple and accessible for all building users to operate, and should be clear in their operation; we are starting to see some great products that enable just that. At the same time there's a rapid rise in networking technologies; both wired and wireless, enabling devices and users to connect, often from anywhere in the world. Simultaneously the

lighting industry, which provides major elements of the connected building, is seeing a revolution in light-sources as LED replaces more traditional types of lamp and fixture. This not only contributes to energy saving, but also opens up exciting new artistic and aesthetic possibilities.

What trends are emerging now?

We are seeing a rise in the use of wireless systems for automation. This isn't new technology, as patents on wireless control systems date back decades now, but the increasing popularity of smart devices and networked systems are leading to a huge growth in adoption of wireless systems. As explained in *Code of Practice for Connected Systems Integration in Buildings*, this can enable systems to integrate in new ways, but installers do also need to be very cautious about the parts of the radio spectrum used, as the radio-waves are a very finite resource, and so do not assume that wireless networks can always be a direct or fully reliable substitute for wired systems.

At one point smart homes seemed to be the stuff of aspirational décor magazines or complicated technical discussions – are you seeing prices coming down and more mainstream demand for smarter homes?

Yes, very much so. Technology for energy-saving, or devices that increase our convenience, and systems that deliver new types of entertainment to our homes are mainstream now. Installers need to be cautious about compatibility issues between different systems, but it is certainly the case that useful systems can be installed for hundreds, rather than thousands, of pounds.

How successful can a retrofit be? Or do you need to start with a completely clean slate in order to have a really successful connected system for the home?

Retrofit systems can be very successful. Wireless products offer opportunities for installation where adding new cables may not be possible, but there can be risks in relying on entirely wireless systems. Installers should be careful of over-optimistic 'best case' indications of wireless range from manufacturers: instead ensure that you ask for real-world, indoor, guaranteed distances. Remember especially that the 2.4 GHz part of the spectrum is extremely congested in urban environments, and so alternatives should be considered.

There are a lot of various platforms, such as Apple HomeKit. Do you need to make your platform decision early on and stick to it, or is there a degree of flexibility?

As the IoT world is really still in its infancy there is not yet a dominant protocol, and so compatibility issues are a major challenge at the moment. There are many devices which 'speak' multiple different machine-to-machine languages, translating between different APIs (application programming interfaces), but often specialist programming skills are required to 'glue' them together. In designing a system always start with a detailed discussion on the specification of the automation behaviour required in a building. It is likely in the long-term that we will see buildings that are dominated by one particular set of protocols over another, but at the present time the sheer variety of electronic systems available will ensure that the 'Tower of Babel' remains with us for some time to come.

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How can Wiring Matters readers get involved with working with smart homes and connected systems?

Start by having a conversation with your customers about how they use their buildings and to consider how connected systems can bring convenience, energy-conservation and can also act as a useful way of complying with legislation such as Part L of the Building Regulations. There are various organisations, such as the IET and CEDIA, who have a lot of educational material in this area, and manufacturers have extensive education programmes to encourage and assist electricians who want to add more value to their jobs with this new technology.

Remember that the basic physical principals of system design are the same across all products, and so good preparation and planning of an installation will lead to a more successful project. The IET's *Code of Practice for Connected Systems in Buildings* gives extensive guidelines to engineer reliability into system designs.

Now is a great time to start adding more value to your projects by including and interconnecting this exciting technology.

Are you working on jobs that involve home automation, smart installations or the connected home? The IET's *Code of Practice for Connected Systems Integration in Buildings* is available to buy now for £60 (£51 for IET members).

In the Winter issue of Wiring Matters (due to be published in November) we will include more articles about the smart home. If there's anything specific you would like to learn about, please email us: wiringmatters@theiet.org