

## Building Management As A Service: A DISCUSSION WITH JAMES MCKENZIE



IMAGE COURTESY OF PHOTONSTAR

*Dr. James McKenzie,  
CEO of PhotonStar  
LED Group plc*

### PhotonStar CEO talks about halcyon cloudBMS system

Heating, ventilation, air conditioning and lighting represent the largest energy costs for businesses and prime targets for suppliers of Smart Building systems. Vendors claim that understanding detailed energy usage patterns and being able to control and manage consumption based on that information will deliver results to the bottom line very quickly.

PhotonStar, a leading British designer and manufacturer of intelligent lighting solutions, is using IBM's cloud-based [Watson™ IoT Platform](#) to help deliver an affordable, integrated building management system that can be retrofitted to almost any building to reduce operational costs and increase levels of service for building owners and occupiers.

The new product, called [halcyon cloudBMS™](#), is based on PhotonStar's next generation wireless lighting control system, [halcyon PRO2™](#). With a halcyonPRO2 platform in each building and configurable cloud-based analytics, cloudBMS delivers an extremely capable multi-site Building Management as a Service (BMaaS™) solution. The low cost of entry and monthly subscription approach enables own-

ers of small- to medium-sized businesses to reduce energy and operating costs and realize new insights into their operations.

In a recent conversation, James McKenzie, PhotonStar CEO, talked about the halcyon cloudBMS system, the Watson platform, and how it helped the company expand into a new market.

### *How did you get started in providing building management services?*

Historically, PhotonStar was in the LED lighting business. Around 2008, we began adding microprocessors to our products, which we manufacture ourselves, to help us do circadian lighting: systems that dynamically change spectral content throughout the day to mimic that of the sun. We have a patented color-mix technology called ChromaWhite that allows us to efficiently manage spectral content via multiple LED channels.

The initial push to expand beyond lighting came from our existing customers. They started saying, 'It's all very well having smart lights, this is great and saves us energy, but all these other environmental factors need

controlling, too.'

Emergency lighting in the U.K., for example, needs to be tested once each month. Our lighting customers in large installations already had onsite staff, but those with many remote locations had to send out a facilities person monthly to each location just to turn a key and test the system.

If you've got a large building, you usually can afford to have a facilities guy on-site all the time, so that doesn't really cost anything. The really expensive situation is where you've got lots of remote sites. A typical 350-site retail outlet would require 4200 emergency lighting tests per year. With Halcyon, the test is conducted monthly and reported via cloud and email, ensuring safety compliance at the lowest cost. Nobody needs to visit, and the cost savings give a payback in less than one year.

Intelligent control has been shown to deliver 50% energy savings in wired control buildings. But 80% of the building stock in the developed world already exists, and you can't afford to add that wired infrastructure to existing buildings.

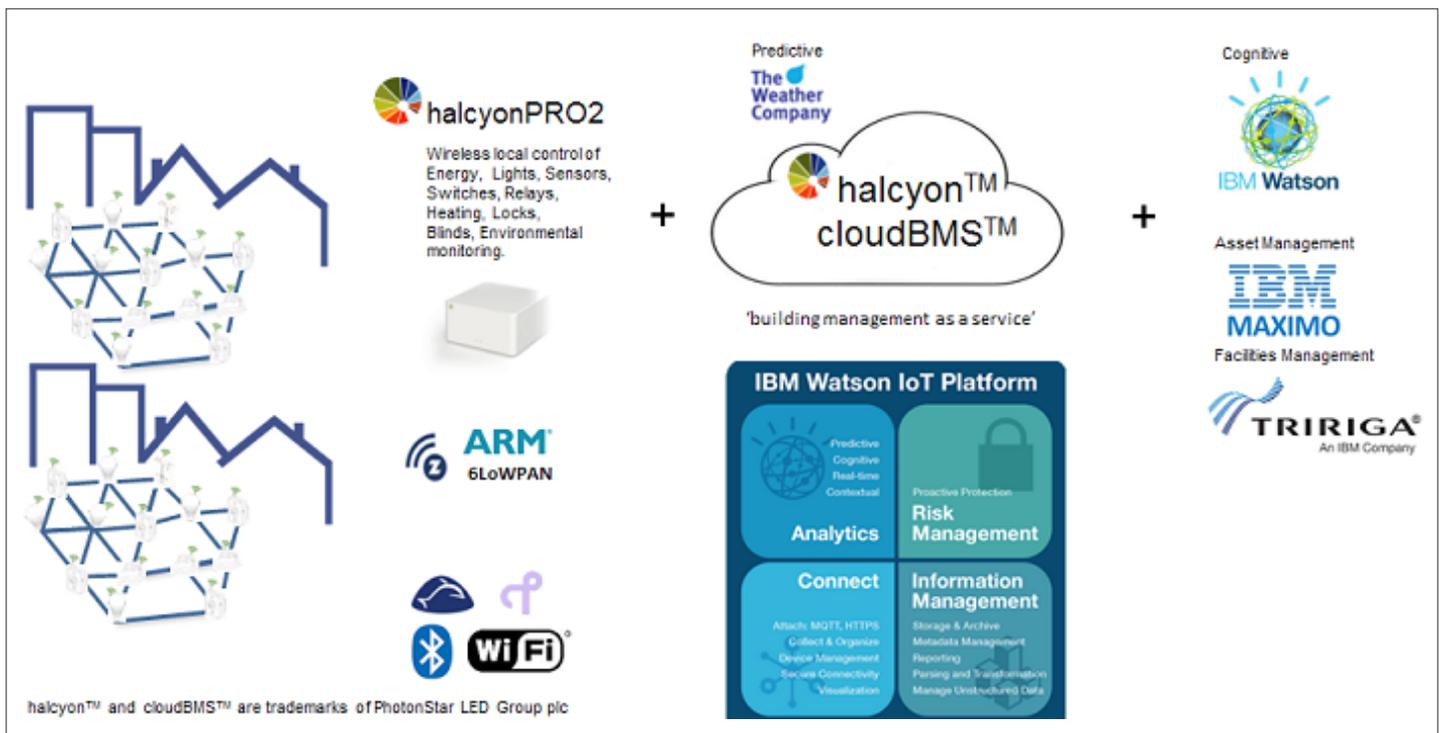
So we started looking at the broader challenge of facilities management in existing buildings. We have these control functions – lighting, ventilation, air-conditioning – and we've also got emergency lighting, which costs people money.

The best way to do this cost-effectively is to start with our halcyonPRO2. It's always been based on industry-standard ARM technology and wireless protocols such as WiFi and 6LoWPAN because it's so cheap and flexible. So how do we expand that to help manage energy in buildings?

This all sounds quite ambitious, but IOT technology is extremely cost-effective and only your imagination limits what you want to do.

We started down that path in 2014 and started expanding halcyon into these other areas. By 2015 it was effectively a building management system by itself, but facilities managers with multiple sites have to make all the really important decisions centrally. For example, in retail outlets or large offices, you need to aggregate globally the control functions and dashboard them, manage them, look at them. And then, of course, ultimately you want to be able to intelligently manage all of your buildings.

We then realized we needed to connect the system to the cloud if we wanted to be able to deliver an effective service across multiple locations. And that's when our cloudBMS was born, building on the Halcyon wireless control system. We've built our cloudBMS product and service on top of the IBM Watson IOT platform.



PhotonStar's halcyon cloudBMS product leverages the power of IBM's Watson IOT platform to provide multiple services for building facilities and asset management. At the building level, the system runs on the halcyonPRO2 hardware platform, which is powered by ARM processor and microcontroller cores. In the cloud, Watson provides analytics, risk management, and access to APIs for weather forecasting, asset management, and other functions. (Image courtesy of [IBM](#))

### **What are some specific examples of how halcyon cloudBMS can help customers?**

One of our customers is a student hall of residence provider here in the U.K. Their biggest energy problem is that students go home - say at the end of term - and they leave the windows open and the heating on. Now you've got to go around hundreds of rooms, turn the heating down and shut the windows and so on. We can't help them with the window problem, but in fact, the real cost comes with the heating.

That customer can now issue a command through the halcyon cloudBMS system, lever-

aging the security features in IBM's Watson IoT platform. And we're able to turn off the heating across the whole complex in one go because we know the students aren't there.

It's a great use of advanced technology to avoid the cost of an expensive service. Otherwise, they'd have the choice of sending a person into every single room to check the heating or just leaving it on and paying the cost while nobody is there.

During the term, another common situation involves noise and disruptive behavior disturbing other students. Perhaps there's a party and someone's trying to study.

Either way, the provider wants to be able to monitor noise. Rather than send someone out to the site, they then can call the disruptive student or simply let them know that they're aware of the situation and they know who's responsible.

And of course, there are always students who lose their keys or have them stolen. Downstream control of the access control system can save the cost of a service call.

As another example, keeping frozen food at the correct temperature is a critical function in the restaurant business. A commercial freezer has an alarm that sounds if the temperature starts to rise. After closing time, though, nobody's there to hear it. By the time the staff arrives next morning, the freezer's burned out, the food's ruined, and the restaurant can't trade.

With cloudBMS and the Watson IOT platform, we can monitor the state of the freezer and the freezer temperature, so we can set up an escalation rule that responds to this possibility. If the temperature rise occurs at 10:00 am and there are people in the building, we alert the manager via email, call, or text to fix the problem, most commonly an open door. If it's after hours, the system can start calling people who've got keys. Worst case, we can send an engineer to site before before all the food gets ruined!

The potential savings are huge; you're putting 50 or 100 dollars' worth of monitoring hardware on a freezer to protect against a critical asset failure which could cost you \$200,000 loss of trade. One failure and you've paid for the whole installation. So that is a really compelling use case.

We showed a live demo of a restaurant system at IBM's [Interconnect Conference 2016](#). Halcyon CloudBMS generated simulated faults which traveled via the cloud to Maximo, IBM's asset and maintenance management package, which then generated a work order. That was a great demonstration of where the future lies; it's great to have the system indicate the fault, but then something's got to manage that asset. So there's a natural connection between the customer systems we're talking about and Maximo or the TRIRIGA facilities management package, which are easily integrated into the Watson platform.

### ***What led you to the IBM Watson IoT Platform?***

We looked at lots of cloud providers, the big names. Many people said they had cloud platforms, but they really didn't – just a collection of charts, slides and vaporware.

We picked the Watson IoT Platform for a number of reasons. First, Watson IoT was developing quickly; we could see that IBM

was putting the investment into the platform so that we'd be able to move very rapidly from concept to product within a twelve-month period.

Second, there was a synergy between IBM's historical customer base and the kind of customers who'd be interested in our product. IBM Maximo and Tririga products are the number one asset and facilities management software packages in the world, and that's what we started working and prototyping with, because it's a very robust system and it can be easily integrated from the Watson IoT perspective.

Clearly, this service model only works if we've got an incredibly reliable platform with robust security protection. If it falls over – if the cloud crashes or the internet's down – everything falls apart. So we've got to have utmost reliability to allow the commercial success of this platform. With the IBM system, we were able to just get going and start developing and delivering solutions for our customers.

### ***How does the development process work?***

It starts with understanding cost problems and what costs our customers money. Everybody's subtly different, but they all have the energy management challenge.

We listen to what our customers say, and

we write dashboards so they can visualize the system. We sketch out our intentions, and then begin to architect the system on a massive set of whiteboards. We look at the data flows and what needs to go where in the system, and what needs to be done locally – obviously you can't have the lights not responding locally because the Internet is down when you press the switch.

We set up a number of rules to govern items such as fault detection. Those are acted upon locally in the halcyonPRO2 server, but we feed all the data through to the Watson IoT platform so that we can leverage its various APIs.

Then we start deciding which Watson components we will need for the system to deliver a certain function for a user. Clearly it's taken a while for us to understand all the relevant APIs, and of course, the IBM teams are enhancing those APIs constantly through a continual investment process.

We also talk a lot to the development teams at IBM and make suggestions for improvements, so we're able to move the platform slightly and push it towards where we need it to be commercially.

Now the system itself has been architected, and we move to the customization stage. We talk with our customer to understand additional problems are they're trying to

solve, and we can very rapidly show them new dashboards, and new ways of visualizing data. The visualization tools are built into the IBM Watson platform so it's a very interactive process with the customer and we can quickly pull things together.

### ***How long did it take to get started?***

We developed our first cloud-based customer care platform in ten days. We were amazed that happened. I was expecting someone to tell me it'd take three or four months. But we got a programmer in, defined what we wanted, and were able to deliver a fully working system that hasn't needed tweaking, rewriting or changing. We were able to do all it in ten days, and that included the Christmas holidays!

### ***What's the next step for cloudBMS?***

One of the other reasons we work with IBM and their huge investment in Watson is that we eventually want to make buildings think for themselves. Once the data's been collected and the information's in the cloud, we're able to use Watson's cognitive component and its cognitive API to be able to ask the building questions such as 'How can I save additional energy?'

Watson can respond with recommendations to help the building to think for itself,

manage itself, further reduce energy, report events; basically, to function better and save the owner money.

For example, the platform might look at historical data and inputs from the IBM's The Weather Company, and decide to heat up the building earlier than normal, with lower overnight electricity rates, because it forecasts that tomorrow's going to be particularly cold. At Interconnect, we demonstrated an adaptive blind system that uses the Weather Company API to determine local cloud conditions and the angle of the sun to accurately predict the best position for the blinds and adjust them as the sun moves during the day.

That's only a glimpse at how far this can go. Halcyon cloudBMS is our first product, but we will be adding others, and we have identified several possibilities for the future. Lots of new business models and lots of business opportunities flow from this advanced technology becoming available.

### ***Any last words?***

We're a small business, and I think that's a key point. Our revenue was about 7 million pounds last year, and we've got about 90 people total, so our development team clearly isn't huge. We were able to put a product like this together in a very short at very low cost because we're leveraging a

lot of IBM investment and capability that's already in place.

Hooking up with IBM Watson IoT has opened up an area of new revenue for the company. It's allowed us to move up the food chain – from supplying connected lighting

systems to becoming a building systems integration company.

We would never have dreamed of stepping out of our comfortable lighting space if there wasn't a platform as powerful as this to build on.

#### **ADDITIONAL INFORMATION**

- Read the full case study: Environmental sensors and cloud based analytics deliver IoT-based Building Management as a Service <http://www.ibm.com/common/ssi/cgi-bin/ssialias?htmlfid=WWC12363USEN>
- Learn more about Watson IoT Platform <http://www.ibm.com/internet-of-things/roles/engineer/>
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