

Making sense of sensors

Graham Smith, CEO of Senceive, talks to Abigail Tomkins

CES asks sensible questions of the sensor maker

SENSORS: Too many? Not enough? In the right place? In the wrong place? Too big? Too small? Too much automation? Not enough automation? Graham Smith, CEO of wireless sensor developer Senceive, answers all...

Is size everything?

On one level size is important – and it is something I was very focused on in the early days. But, now more priority is given to ease of deployment, accuracy and precision, reliability, and something that lasts a long time without you having to do much to it.

It is about not needing to change a battery for 12 to 15 years; not having to clean it as you would a prism; and getting one sensor to provide different kinds of data required by different people in different circumstances.

What makes an intelligent monitoring system intelligent?

Real intelligent monitoring is the integration of sensor nodes together in one system, enabling them to automatically do things without human intervention. The idea is that if a node triggers, it talks to other nodes around it. For example, if one node moves it can trigger an image from a camera and automatically report that.

How far does the automated response to triggers go before a human intervenes?

We're not ready for machines to make all the decisions for us, especially in

safety-critical environments. They can aid decision making, but they absolutely cannot take that decision.

Ultimately, intelligent monitoring is about enabling a civil engineer to make decisions as best as they humanly can. Sensors take the data so far, and then it flows through other systems and software to produce charts, graphs, 3D visualisations – whatever is required to display that data clearly to aid decision making.

Sensors are added on to structures, when will we see them embedded within them?

We embed them now. We've embedded a complete series of tilt sensors and strain gauges inside the concrete lining of London Underground's Northern Line extension. The face of the node is completely flush in line with the tunnel. The long battery life means the unit will talk to the gateway for 10 to 15 years. The components are modular – you can just unscrew the casing and if technology improves in the next 15 years you can plug that in instead.

There is so much potential, especially with the advent of smart cities. If somebody building a high-rise asked if we could integrate sensors in there, yes we could. But somebody has to really think about the data to do that. You can pepper a building with sensors but monitoring the data for the first five years will be like watching paint dry. There will be some movement, but to all intents and purposes nothing will happen. You need someone visionary enough to think; I'm going to do that and while I'm not interested in the data for the first five years, I will be from years 10 to 15. You need foresight – and budget – to do that. There are all kinds of cute things you could do today providing you've got someone who actually

appreciates why they would want that data in the future.

Is rail leading the way with sensor technology?

Rail, construction, mining and dams are all widely monitored with sensors. Major rail projects like HS2 are certainly driving the uptake.

At the moment, we've got over 4,000 sensors on the Bromford Viaduct on the M6 just outside Birmingham, including 2,000 vibrating wire strain gauges – it could well be the most monitored structure in the world! It's a complex viaduct. It has cars whizzing along the top and there are massive seasonal variations. HS2 is going to run alongside it and we are collecting two years worth of baseline data before work starts. Although it could be 10 years of data when you look at how HS2 is progressing!

Is two years of baselining unusual?

Generally we get about four-and-a-half minutes! The idea of anything more than a week or two weeks of baselining is a miracle. Somebody suggests a year, I'm thinking, wow! And this one is two years. They are definitely belt and bracing it.

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It's good, because you will get variations from one year to the next based on circumstances. Long may that continue.

Is there a danger of overusing sensors?

Yes, there is. You need to find a balance. That is true of all technology. You have to be careful talking about not enough projects using new technology, because not all new technology works. You have to be careful about the choice of technology, whatever it is. That said, there's a bit too much manual stuff still going on for my liking.

500 of our wireless tilt sensors are installed on the rail track as part of the A14 upgrade, and I'm sure Mark Lawton, the chief surveyor there, could just as easily talk about the overuse of sensing as he could the benefits of it in place of manual monitoring. Pretty much all the surveyors we deal with would tell you that the judicious use of technology is the key.

*Graham Smith, CEO of Senceive, was talking to Abigail Tomkins
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