

European regulators sign up for new spectrum monitoring system

A new technology for spectrum monitoring, profiled in *PolicyTracker* a year ago, is rapidly moving into the mainstream following a year-long spectrum mapping contract on behalf of Ofcom.

by Michael Newlands

Several European regulators are in the process of deploying British start-up company Cambridge Radio Frequency Services' (CRFS <http://www.crfs.co.uk/index.html>) RFEye technology, which is also being used by telecoms industry stakeholders, and military and homeland security operations.

When we reported on the Ofcom trial run of the technology last year just before it got underway (*PolicyTracker* August 2008 **Will country-wide spectrum analysis revolutionise the wireless industry?**) the regulator's Head of Research and Development William Webb told us: "We've long thought it's worth knowing everything you can about spectrum utilisation. The way we have been operating is a bit like running a company without a management system. You might well be doing everything perfectly and you might buy a system and find out you were perfect, but equally you might find out you were inefficient in certain areas and things need tightening up. "We don't have a lot of information about how spectrum is being used either geographically or by frequency band. We can't really be sure what we are doing is right, or if we aren't missing a trick"

Until being approached by CRFS, Ofcom had been considering deploying a traditional fixed-node network around the country but dismissed this as being too expensive. The CRFS system, with much smaller mobile nodes which could be easily fitted in cars, proved to

be both considerably cheaper and more flexible.

Now that the contract is over and the results have been delivered to Ofcom, where they are still being studied, Webb is delighted with the outcome.

"CRFS did everything we asked them to do," Webb says. "Firstly they demonstrated that collecting measurements in this way was practical as it had never been done before. All previous measurements were done from static. Then they were able to deliver a set of measurements in a great software package which enables us to look at any frequency of interest anywhere in the populated part of the country, and find out to some degree what is going on in terms of signal strength," he said.

"That is the challenge we set them and they delivered against that challenge and it shows this is a very practical way of collecting measurements going forward. If we decided in the future Ofcom needed to collect spectrum utilisation data then I'm pretty sure this is the way we would go. It seems to have huge cost advantages compared to any other approach and speed advantages as well. It was primarily a research project which has shown this is the way to go and it is cheap, effective and produces some great results.

"As a bonus we actually have a set of results as well, a first class set of measurements taken -- covering the whole of the UK -- which we can use for spectrum management purposes."

A new monitoring network

CRFS co-founder and CEO Alistair Massarella said Ofcom had been impressed by the way the data had been analysed and displayed. "They had never seen spectrum displayed in that way before," he said, "and it gives an excellent picture of how spectrum is used across the UK, both legally and

illegally." He pointed out the data acquired for Ofcom belongs to the regulator, and so CRFS is now in the process of building its own extensive database and deploying both mobile and fixed nodes around the UK, starting with the main population centres.

The RFEye nodes have been designed with mass production in mind to keep costs right down, Massarella notes, and as they are of no use to anybody else they do not have to be deployed in secure locations. "Fixed nodes can and are being installed in people's lofts rather than in locations such as secure GSM masts. That's a great way to cost effectively roll out a network as you are not paying expensive roof rights."

For mobile nodes, which fit onto a car's roof, the company pays a small fee to a network of independent sales people with their own vehicles who are on the road every day. They do not need to know how to operate the nodes, just to make sure they are turned on and a green light is showing.

European deployments

"We have now commercialised all of our systems and have new customers around Europe, most of whom are regulators," he said. The company is supporting large-scale rollout of mobile and fixed nodes in European cities.

"European regulators see the use of the RFEye system as a significant step forward and a new way of thinking in the world of spectrum monitoring and management," says Massarella. "Regulators are now looking at business information which can be gleaned from spectrum monitoring. They want to understand the information from their networks and make decisions based on what spectrum is being used and where and when."

Webb is pleased other regulators are following Ofcom's lead and says: "The

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more regulators that do this the greater the economies of scale will be on buying any equipment and there will also more people to compare results with. You wouldn't expect results in the UK to be exactly the same as in other countries although European regulators have similar bandplans. The more people doing these kind of measurements, the more scope there is to look for interesting things and unusual things across the spectrum bands."

While nothing startling has come to light as a result of the monitoring done for Ofcom, the regulator has learnt new things it would not have known. "In a few cases we have discovered out of band emissions into a neighbouring band that we had not expected.

"The monitoring clearly shows the users of one particular band needs better filtering and if we were going to auction the band we would need to do some tightening up or make sure the problem was clearly noted in the auction proceedings. There were several cases like that – things which were not a big surprise but are well worth knowing."

Other uses

On the commercial front, the RFEye database will allow customers to check up on spectrum they want to buy or sell. "If a piece of spectrum is going to be released the person selling the spectrum needs to know it is fit for purpose and the person buying the spectrum can have access to reports to see if anything needs clearing up before buying," says Massarella. "The regulator may have stipulated an operator must achieve a certain amount of coverage by a certain date as part of the licensing terms and we can quickly and easily check that for example."

CRFS has also started working with

"secret service-type people" who, from a homeland security standpoint, have an interest in what spectrum is being used, when it is being used and where it is being used.

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There are also military applications. "Because of the small size and hardy packaging and low power consumption RFEye nodes can be used in a variety of situations for battlefield spectrum management, and there are military systems integrators looking at a variety of applications in theatre," he says.

Forthcoming Olympics

Going forward, the company hopes to be involved in spectrum monitoring and management for the London Olympics in 2012. The monitoring data already delivered to Ofcom has been put to use in this respect already, according to Webb. "It is valuable in looking at the current spectrum utilisation around the Olympic venues just to make sure that we have a good grasp of frequencies we think we can allocate to the Olympic committee for wireless mikes and cameras and so on.

"We can make sure these bands are being used as we thought they were. We have had some suggestions that we could potentially change the application base for VHF broadcasting and squeeze a more channels in by taking a look at coverage, overlaps and frequency gaps between channels. That is quite a useful check on whether or not we can tweak the rules for allocation of broadcasting."

CRFS are also tendering to provide equipment to Ofcom although Massarella

points out they must be realistic as multinationals with thousands of employees will also be tendering.

The idea of interfacing the monitoring equipment with existing equipment at the regulators is something CRFS has already been working on. One example is the LStelkom spectrum licensing software deployed by Ofcom and most other European regulators. "Although we also have our own proprietary software, we realise it is important to be able to work with incumbent systems and particularly systems regulators have already spent a lot of money on," says Massarella.

"At Ofcom our monitoring systems interface into their licensing system so the nodes know where they are, what licenses are currently deployed in that area and their occupancy status. We also interface into other European regulators' systems."

While Massarella maintains CRFS is providing "the next generation of management systems", Webb says he is not sure that spectrum management systems run in generations. "CRFS has developed a very interesting alternative approach to spectrum management and monitoring that has not been demonstrated by anybody else, and it has its particular place. But equally there is a place for other existing systems and CRFS is not going to replace what currently exists and begin a new era." But he does think that by interfacing RFEye with other tools "it can be part of an overall more holistic spectrum management package and that would be very sensible and very powerful."•

CRFS is running an open industry day to demonstrate RFEye on October 6 at its Cambridge offices. To register email industryday@crfs.com