

# INCISOR™

for the short  
range connectivity  
environment

Video enabled  Issue 137

August 2009



## WHAT IS NEXT FOR THE SMARTPHONE?

### THIS ISSUE

A BITTER HARVEST: ZIGBEE GREEN POWER

INCISOR WPANEL REVIEW: THE FUTURE FOR HIGH POWER WPAN

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# play nicely and be calm

During July it looked like we could be about to see a major spat kicking off between two of the short-range wireless industry's technology management companies.

The ZigBee Alliance announced that it was to pursue energy-harvesting as a way of eliminating the need for batteries in its wireless sensors. This is very much the territory of the EnOcean Alliance, and at first glance it looked as if ZigBee could be about to seriously infringe EnOcean's IP. Not for the first time, there was a degree of hysteria in the media. Here at Incisor we like to think that we track the WPAN industry a little more closely than the broadstroke tech media, and so Dean Gratton put on his J B Fletcher outfit (don't tell me you don't know who J B Fletcher is ....) and got to the bottom of the story. Dean was given a great deal of help by both the ZigBee and EnOcean Alliances, and we would like to thank all who contributed. You can read Dean's excellent story on page 12.

And Incisor is finally extending its web reach. Although I personally have been on Facebook, MySpace and LinkedIn for some time, I had resisted Twitter. However, a conversation with a (much younger than me) ecosystem manager at our sponsor CSR, who knows about these things much better than I do, persuaded me that I was only putting off the inevitable. So, I bit the bullet and signed up for Twitter too. And I have launched a WPAN World discussion group on LinkedIn.

On page 15 you will find details of how to track me/us on these various social and business networking sites. And it would be great if you could join in and interact with us too.

You know it makes sense.

**Vince Holton**  
**Publisher & editor-in-chief, Incisor / IncisorTV**

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As momentum gathers around Bluetooth low energy, IncisorTV provides an overview of the technology



IncisorTV commercial for CSR & SiRF to mark the merger of the two companies

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Yes, we did it, we became Tweeters.

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## CSR and SiRF combine

As the last issue of Incisor was going to press, CSR and SiRF Technology Holdings announced that they had completed the merger between SiRF and a wholly owned subsidiary of CSR. The related press release said that the merger yields an enlarged development team, a strong IP portfolio, and a broad base of market leading customers who would now be able to deliver connectivity and location technologies in a diverse range of devices. Examples cited included mobile phones, personal navigation devices, in-car navigation and telematics systems, laptop and netbook PCs, mobile internet devices, digital cameras, gaming machines, cellular accessories, and consumer electronic devices.

Joep van Beurden, CEO of CSR said, "In bringing together the combined capabilities and broad range of CSR and SiRF technologies and platforms, we have created a new force in the industry and a world class organisation with the commercial, technical and operational scale to build on CSR and SiRF's existing customer relationships and deliver the next generation of connectivity and location enabled products.

"Our strategic goal is to address the existing and emerging needs of our combined customer base for connectivity and location technologies. The potential applications and benefits to the end user of connectivity plus location are only just starting to open up, and these exciting new opportunities will be driven by our unique combination of leading location technologies and connectivity solutions."

"CSR and SiRF have a shared vision of using innovation to bring the benefits of wireless connectivity and location to mainstream consumers and enterprises and to enable new and exciting user experiences," commented Kanwar Chadha, co-founder of SiRF and newly appointed board member and Chief Marketing Officer

of CSR. "We believe that through this merger, our customers and consumers will derive benefits from a much stronger player whose focus is on delivering best in class connectivity and location platforms."

"Technology innovation represents the foundation for both CSR's and SiRF's success in the market place," said James Collier, co-founder, board member and Chief Technology Officer of CSR. "We look forward to combining the complementary expertise of our teams to take innovation to the next level in our multifunction radio and system platforms to address emerging customer and market needs."

For CSR's customers, the merger with SiRF means CSR's Connectivity Centre products are augmented by GPS technologies that enjoy widespread adoption. SiRF brings to CSR a strong IP portfolio in GPS and assisted GPS (A-GPS), dead reckoning and location centric platforms. In the other directions, SiRF's customers benefit from enhancements to SiRF's Location Platforms, with CSR's Connectivity Centre capabilities and strategy of Smart Integration.

The enlarged CSR group will have its global headquarters in Cambridge, UK, with SiRF's headquarters in San Jose, California becoming CSR's US headquarters. The combined CSR group now joins the list of the world's top 10 fabless semiconductor companies, with a combined customer list including six of the top seven handset manufacturers, the top five personal navigation device makers, the top two automotive telematics suppliers, and other leading auto and consumer electronics providers.

## Bluetooth SIG promotes Innovation World Cup

If you haven't heard about the Bluetooth Innovation World Cup, it is all about the Bluetooth SIG looking for new applications

and products using Bluetooth low energy technology. This is part of the SIG's campaign to establish Bluetooth as the non-proprietary standard in the sports and healthcare sectors.

The programme has attracted some big name sponsors from both the technology and sporting goods industry. Nokia signed up as the main sponsor, while Freescale is the preferred technology partner, supporting participants by providing SDKs and developer kits for acceleration, pressure, touch and proximity sensors to enhance product development. In addition, Nordic Semiconductor, STMicroelectronics and Texas Instruments are also sponsoring the Bluetooth Innovation World Cup.

One company that has entered the competition is Brunel, a service specialist that specialises in HR consultancy, secondment and recruitment solutions, which joined the competition with a view to innovation generation and cross-industry exchange.

From the 7th to 10th of February 2010 the winner of the Bluetooth Innovation World Cup – the Innovator of the Year – as well as three runners up will be awarded alongside the world's largest sporting goods trade show - ispo winter 2010. Their ideas will be showcased as part of the Wearable Technologies Show.

The competition called upon innovators, athletes, and other technology fans worldwide to submit their new ideas for using Bluetooth low energy technology in the world of sport, fitness, and healthcare before 31 July 2009.

Oh, and this story gave us an excuse to use the picture at the top of the page, which commemorates the last time England won another World Cup. Just 33 years ago. Sigh.



## Nokia #1 choice for mobile navigation in Europe and Russia

According to a study conducted by Frost & Sullivan amongst European and Russian consumers, Nokia is the number one choice for mobile navigation over other leading handset manufacturers.

The key objectives of the study were to analyse consumers' awareness of, and level of satisfaction with different types of navigation systems (e.g. PND, mobile phones), the different features available (e.g. navigation, 3D imagery, voice guidance, touch screen), location-based services (e.g. car and pedestrian navigation, traffic information, social networking) and other telematics features. The study also aimed at evaluating consumers' perceptions and willingness to pay for different types of navigation systems, their features and location-based services as well as determining consumers' brand awareness and perception.

According to Frost & Sullivan, GPS-enabled devices is a fast growing market segment in Europe, with more than 30 million devices shipped in 2008 and close to 80 million devices expected to be shipped by 2010. In Russia in 2008, the market for navigation-enabled mobile devices grew to over 300 000 units, representing a share of more than 60% of the overall navigation market in Russia.

Altogether 3 119 interviews were conducted for this survey in France, Germany, Italy, Spain, United Kingdom and Benelux, in addition to 600 interviews conducted in Russia. According to the study, 62% of the non-owners of a navigation system in Europe and 77% in Russia consider Nokia as the leading brand for delivering mobile navigation.

Commented on the findings, N. Praveen Chandrasekar, Program Manager, Telematics and Infotainment at Frost & Sullivan said,

"Nokia has clearly excelled in identifying growth opportunities in a maturing mobile handset market by integrating GPS in a large number of its handsets, making them navigation-ready. With a target of enabling a majority of its new devices with the GPS feature by 2010, coupled with the acquisition of mapping and software companies like NAVTEQ and gate5, the company is clearly building a strong presence in the mobile navigation markets in Europe and elsewhere.

According to Frost & Sullivan, Nokia's acquisition of NAVTEQ last year has enabled it to aggressively venture into the mobile navigation space with a strong product portfolio. With the recent launch of Ovi Maps for mobile and web, the company is expanding its market presence into the service space within the mobile navigation market.

## AT4 wireless first with Bluetooth 3.0 qualification services

Spanish company AT4 wireless tells Incisor that it has carried out the first authorized qualification of a Bluetooth 3.0 (with EDR) controller design tested in a Bluetooth Qualification Test Facility (BQTF). This was also the first design qualified using a Bluetooth Qualification Expert (BQE).

And what was this first Bluetooth 3.0 enabled product? It was the NavLink 6.0 (NL5500) solution from Texas Instruments (TI). TI's NL5500 solution combines assisted global positioning satellite (A-GPS), Bluetooth, as well as FM receive/transmit capabilities. TI used AT4 wireless services to certify its solution to allow handset manufacturers to begin designing NavLink-based products using the Bluetooth 3.0 standard.

Other manufacturers are now able to use AT4 wireless facilities for Bluetooth 3.0 testing and qualification based on the latest Bluetooth 3.0 test specification, which was

launched in April this year. AT4 wireless already offers testing and qualification services for Bluetooth 1.2/2.0/2.0+EDR/2.1/2.1+EDR/3.0 technologies.

"We are very proud of such success, as we continue leading Bluetooth qualification activities being able to test and qualify the first Bluetooth 3.0 controller design in our facilities less than two months after the new core version was released. We are very happy to work together with key Bluetooth players like TI to help them achieve their Bluetooth goals," said Jose de la Plaza, AT4 wireless Telecommunications Laboratory Manager. "We expect to announce very soon our service extension to also cover high speed wireless LAN (802.11)."

## CSR dev kit for iPhone and iPod touch

CSR has announced the availability of a development kit based on BlueCore5-Multimedia that is said to speed up and simplify development of Bluetooth-enabled Works with iPhone and Made for iPod certified accessories. This means that accessory developers can take advantage of the streaming music over Bluetooth capability available on Apple's iPhone 3G, iPhone 3GS and second generation iPod touch running iPhone OS 3.0.

Based on CSR's BlueCore5-Multimedia silicon, the development kit includes a development board and software.

"We're very pleased to be involved in developing enabling Bluetooth accessories for such high-profile devices", said Anthony Murray, Senior Vice-President of CSR's Audio and Connectivity Business Unit. "We now offer our customers the fastest possible route-to-market in developing iPod and iPhone accessories with Bluetooth. Both the iPhone and iPod touch are exciting products to be developing accessories for, and we look forward to the innovative and creative products our customers generate as a result of this."



## Broadcom reports Q2 results

The wireless semiconductor companies have been making public the state of their finances at the end of Q2, and they haven't been making joyful reading. Most recently, it was Broadcom's turn.

Net revenue for the second quarter of 2009 was \$1.040 billion, up 21.9% compared with Q1 2009, but a decrease of 13.4% compared with the \$1.201 billion reported for the second quarter of 2008. Net income was \$13.4 million, or \$.03 per share, compared with a net loss of \$91.9 million, or \$.19 net loss per share for the first quarter of 2009, and GAAP net income of \$134.8 million, or \$.25 per share for the second quarter of 2008.

Incisor readers will probably remember that in April this year, Broadcom and Qualcomm announced that they had entered into a settlement and multi-year patent agreement. Under the agreement, Qualcomm will pay Broadcom \$891.2 million over a four-year period. In connection with this agreement, Broadcom recorded a \$65.3 million gain on settlement and \$67.3 million of licensing revenue in the three months ended June 30, 2009.

Net revenue for the six months ended June 30, 2009 was \$1.893 billion. This represents a decrease in net revenue of 15.2% from the \$2.233 billion reported for the six months ended June 30, 2008. Net loss for the period was \$78.5 million, compared with net income of \$209.1 million for the six months ended June 30, 2008.

As you would expect, Scott McGregor, Broadcom's President and Chief Executive Officer was looking for the positives. "Despite the continued global economic uncertainty, Broadcom's results for the second quarter reflected a return to a more stable ordering pattern and the ramp of new products from our end customers. In the second quarter, Broadcom generated strong

sequential revenue growth, with product revenue near the top end of the range provided in April. We are pleased that research and development and selling, general and administrative expenses once again increased less than anticipated from the first quarter of 2009, reflecting our continued focus on maintaining solid financial discipline. In addition, we generated strong cash flow in excess of \$325 million from operations."

## Market for wearable wireless sensors grows fast

According to a new study from ABI Research, a new wave of interest and investment in wireless body sensors will help healthcare providers to improve treatment as well as increase efficiency and cut costs. Key to these benefits is the development of wireless sensors to measure important body parameters and communicate the data to remote systems.

ABI predicts that over the next five years the market for wearable wireless sensors is set to grow to more than 400 million devices. Demand will come from the professional healthcare, home healthcare and sports and fitness markets, but these markets will develop at different speeds and will support different applications. The sports and fitness market represents more than 90 percent of the market today.

"These are very early days for wearable wireless sensors in the healthcare market, but a number of factors are coming together to support strong growth over the next five years," says principle analyst Jonathan Collins. "Technology and product development, wireless protocol standardization, and the potential already seen in sports and fitness monitoring will help drive investment in the healthcare market."

Bluetooth Low Energy, ZigBee, 802.15.4 and proprietary offerings are all under consideration for wearable wireless sensor systems and the industry is keen to turn to standardized products wherever possible.

## Rugged in-vehicle SBC platform with integrated GPS and Bluetooth

UK company Trident has announced the IVP-7500 SBC platform from VIA. The VIA IVP-7500 features GPS and Bluetooth communication devices onboard the SBC, and is aimed at in-vehicle device development for system integrators.

The GPS module enables positioning and time information to be used in applications such as on or off board navigation and geo-tagging. Wireless peripheral connectivity is also enabled through use of the Bluetooth module.

The solution is ruggedized so that it is capable of withstanding the rigors of transportation applications such as car PCs, fleet management, digital tachograph, odometer and security applications. Measuring 114mm x 185.5mm, the IVP-7500 can be employed in a variety of dashboard implementations, including one or two DIN designs as well as discrete, in-seat and headrest designs.

Powered by a fanless 1GHz VIA Eden processor and the VIA CX700M2 embedded chipset, the VIA IVP-7500 supports up to 1GB DDR2 system memory, IDE 1.8" hard drive support with FFC and SD card support, HD audio and a range of display technologies including an LCD panel interface, TV-out and VGA outputs. Camera ports include A/V and V-CAM for monitoring applications.

# Openly M2M



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open standard alliance

**No single wireless technology works in every machine-to-machine context. That is why Wavenis was created for one specific device category: ultra-low-power and long-range wireless communications. No broadband. No intensive multimedia. Just important data, transmitted wirelessly and reliably every time.**

The Wavenis Open Standard Alliance is an independent, non-profit organization that promotes and coordinates Wavenis technology efforts worldwide. Its members are recognized leaders in the M2M industry, bringing together a wealth of experience and expertise. As a technology standards body, Wavenis-OSA is leading the Wavenis technology roadmap, publishing the public specifications for the Wavenis communication platform and working to define M2M application services to meet ever-evolving market demands.

Learn more at [www.wavenis-osa.org](http://www.wavenis-osa.org)



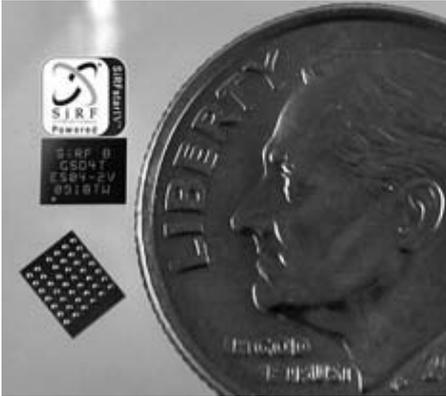
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together



wireless



## CSR debuts SiRFstarIV location-aware architecture

Following its merger with SiRF, CSR is wasting no time consolidating its position in the location as well as WPAN markets. It has launched its SiRFstarIV location-aware architecture with SiRFaware self-assisted, micro-power GPS technology that enables consumer devices to always be location aware. And crucially, according to CSR's release, without draining batteries and without requiring network aiding. CSR also introduced its first SiRFstarIV-based product, the GSD4t receiver, which offers a solution for enabling mobile phones and other space- and power-constrained devices to have the always-available geo-awareness consumers are demanding.

CSR explained that the essence of the SiRFstarIV breakthrough is its ability to continually maintain "better-than-hot-start" conditions in the GPS receiver for fast location fixes without having to be kept fully turned on all the time and draining battery power. Until now, designers of mobile devices were forced to completely turn off GPS receivers when not in use to conserve power, causing start-up delays when a location application needed to get a new location fix quickly. The SiRFaware technology overcomes this barrier with or without network aiding while consuming only 50-500 microamperes of current.

"With consumers expecting reliable location services everywhere, we had to rewrite the traditional rule book on GPS architectures and create a new, low-energy way to maintain continuous location awareness without draining the device battery or requiring network assistance," said Kanwar Chadha, Chief Marketing Officer for CSR and Founder of SiRF. According to Chadha, SiRFstarIV opens the door to the more widespread use of GPS in digital still cameras and camcorders, hand-held games and a wide variety of portable consumer electronics devices.

The SiRFstarIV architecture core is comprised of a GPS location engine, smart location sensor interface, adaptive micro-power manager and active jammer remover. CSR listed a number of benefits of the SiRFstarIV core:

- Twice the search capacity of the previous SiRFstarIII architecture, resulting in enhanced sensitivity, reduced time-to-fix and improved positional accuracy
- Advanced micro-power management and integrated switched-mode regulation that maintains hot-start conditions with minimal energy (50-500 microamperes)
- Intelligent MEMs sensor support (for accelerometers and other sensors) that improves the location experience, enabling greater contextual awareness, more sophisticated energy management and enhanced indoor positional accuracy
- Advanced DSP technology that actively searches for jammers and removes them prior to correlation for maximum GPS performance and design troubleshooting

CSR's first implementation of the SiRFstarIV architecture, the GSD4t host-based platform, is optimised for mobile phones and other space and power-sensitive consumer devices.

"Radio frequency interference within a portable consumer product, such as from embedded Bluetooth, Wi-Fi and mobile radios, as well as LCD screens, can easily inhibit GPS performance, and often does not become apparent until shortly before the product is due to go into production," said Dave Huntingford, Director of Product Management for CSR's Handset Business Unit. "Our unique active jammer removal not only solves this issue, but can pinpoint for designers much earlier in the development process the precise strength and source of these interfering signals, enabling them to be contained in the design phase rather than in later, more costly test phases."

CSR told Incisor that the SiRF GSD4t host-based GPS receiver is available now in sample quantities, with production quantities planned for October.

## Bluetooth attach rates rise, while market falls in 2009

Market research company In-Stat reckons that [Bluetooth](#) is on track to increase attach rates in many key market segments. However, the recession is taking its toll on the end equipment markets for Bluetooth, and ABI predicts that Bluetooth-enabled equipment shipments will shrink 4% in 2009.

Within the Bluetooth market, however, it is not all doom and gloom. In-Stat rates the Bluetooth 3.0 + High Speed specification, announced as the next official standard in April, 'a true breakthrough'. "The new standard is an integrated solution that capitalizes on the two most successful wireless technologies to date, Bluetooth and 802.11," says Brian O'Rourke, In-Stat analyst. "This will allow Bluetooth to move large data files, such as music, videos, and photos at a rate similar to Wi-Fi. Up to now, low data rates have been a big stumbling block for Bluetooth in the Consumer Electronic (CE) market."

In-Stat's research found the following:

- Bluetooth semiconductor revenue will approach \$4 billion by 2013. Bluetooth 3.0 will represent the largest share of semiconductor revenue by 2012.
- Shipments of devices with Bluetooth will rebound to growth in 2010.
- 43% of In-Stat's survey respondents are very or extremely familiar with Bluetooth. Among those 34 and younger, the percentage is over 60%.
- The Bluetooth attach rate for mobile phones is expected to be 63% in 2009.

The report, "Bluetooth 2009: Low Energy and High Speed Join the Party", covers the worldwide market for Bluetooth technology and profiles of Bluetooth silicon competitors.



## CSR releases Q2 and half-year results

CSR's second quarter results were towards the higher end of revenue guidance, which the company must see as encouraging. Following completion on schedule of the merger with SiRF Technology Holdings, Inc. ("SiRF"), CSR confirmed that it was confident it would secure at least the previously stated \$35m of annualised cost synergies within 60 days.

CSR revenue increased 40% to \$113m (from \$81m in the first quarter) including a one week contribution of \$2m from SiRF. On a standalone basis, CSR revenue increased by 37% to \$111m, in line with guidance of \$95m to \$115m. Gross margin increased by 0.1% points to 41.2%. On a standalone basis its gross margin increased by 0.5% points to 41.6%.

There was an underlying operating loss of \$4.6m, down from \$16.5m in the first quarter. On a standalone basis the underlying operating loss was \$3.2m. The actual operating loss of \$26.3m, was up from \$21.2m in the first quarter.

There was a strengthened balance sheet with combined net cash balance of \$396m. Both CSR and SiRF increased their cash balances during the quarter. SiRF revenue on a standalone basis increased 41% to \$48m (from \$34m in the first quarter), ahead of guidance given of \$42m to \$46m.

Commenting on the results, Joep van Beurden, CSR's CEO said: "CSR performed well during the quarter, delivering revenues towards the upper end of our guidance. This reflected strong operational management with tight cash control, as well as the substantial ending of customer de-stocking. We continue to make good progress on our new product pipeline and design wins, in

particular with excellent results in securing new additional leads for BC7000 and increased customer interest in our Wi-Fi solutions. In parallel, SiRF delivered second quarter revenues above its guidance and gained significant design wins across its customer base.

"The combination with SiRF has significantly strengthened our market position and growth platform, as well as increasing our financial strength. We now offer customers a comprehensive set of innovative GPS/GNSS (Global Navigation Satellite Systems), Bluetooth and embedded Wi-Fi solutions. As end consumers increasingly demand greater wireless connectivity to their phones, cars, laptops, Netbooks and other consumer electronic devices, so our own customers attach increasing levels of importance to connectivity offerings such as ours.

"For the medium and longer-term, we remain excited about the growth prospects in our markets, driven by the increasing demands for more wireless connectivity. We are creating a substantial and leading supplier of connectivity and location platforms, stronger positioned to realise the potential that we see for the company."

CSR's third quarter revenues are expected to be between \$195m and \$215m.

## Out-of-hospital wireless healthcare poised for rapid growth

The Healthcare industry worldwide is faced with an urgent need to reduce costs while at the same time having to cope with the effects of rapidly aging populations and a growing incidence of chronic diseases.

Taken together, these threaten to overwhelm existing healthcare systems, according to Beecham Research, a market analyst and consulting firm specializing in M2M connected services - aka the "Internet of Things".

"Part of any solution is wireless healthcare monitoring, which is poised for immediate and rapid growth in spite of current economic difficulties" according to Bill Ingle, author of Beecham Research's new Market Brief on Wireless Healthcare and Fitness Monitoring.

Ingle's report focuses on the rapidly developing business of out-of-hospital healthcare monitoring, a major opportunity for cellular and other wireless technologies. Using the U.S. healthcare market to illustrate issues affecting nearly every healthcare system worldwide, Ingle looked at the background and key drivers behind this opportunity. Also included is analysis of relevant technologies, current players, impediments to growth, disruptive developments, the closely related consumer fitness monitoring market and those alliances and partnerships now powering market development.

Beecham's conclusion is that wireless healthcare has traditionally lacked the size and depth of other M2M service sectors, but that this is changing rapidly.



## Bluetooth SIG says low energy has high potential

The Bluetooth SIG is ramping up its promotion of the low energy version of Bluetooth. A press release published recently focused on the sports industry, suggesting that the integration of different electronic devices to provide data and performance profiles is becoming the norm. The keyword is Motion Tracking, referring to the use of motion sensors to gather and record bodily movements. The suggestion is that being able to monitor physical exertion and courses of movements in real-time can contribute to increased training efficiency and helps avoid incorrect and unsound training.

Current technologies tracking movement in sport include digital sensors to measure speed, distance, heart rate, and strength as well as GPS sensors for real-time monitoring or tracing of distance profiles. By integrating sensors in sportswear, motion trackers can be worn close to the body and still be unobtrusive and comfortable.

The SIG believes that in combination with radio technologies such as Bluetooth low energy, these tools will become easier to integrate with readout devices such as mobile phones, watches or computers. Not only that, but there are direct benefits all around - devices will benefit from the economical power consumption and the wearer can expect to improve his or her athletic activities through as a result of the better data they are receiving.

As reported elsewhere in this issue, and aiming to promote lots of new sports and fitness applications, the Bluetooth SIG has established a competition for new application ideas - the Bluetooth Innovation World Cup. Product and application ideas in the fields of sport, fitness and healthcare will be evaluated by a panel of experts and

the winner will be awarded with a QID voucher and a Euro 5,000 cash prize. The winners will be announced and presented at the ispo winter 2010 event.

## Bluetooth low energy: OEM hopes and promises

IMS Research has also been looking at the Bluetooth low energy market, and observes that while the specification is nearly upon us and the IC vendors are committed, where are all the original equipment manufacturers (OEMs)?

IMS says that it anticipates many new partnerships and collaborations between IC vendors and OEMs; and, more interestingly, between makers of dual-mode Bluetooth low energy-enabled products and makers of single-mode ones. However, IMS believes that there is current concern over the progress in developing single-mode devices.

It is still too early to see the proof, but many believe that single-mode devices will need a year lifespan for there to be real value in the low-energy standard. Today, the market is waiting for evidence that there will be several single-mode devices available, and with this guaranteed. In the meantime, makers of dual-mode Bluetooth low energy-enabled products are anxiously monitoring the ecosystem around low energy before committing to incorporate a high volume of dual-mode ICs.

According to Fiona Thomson, Research Director of IMS Research's Connectivity group, "What is clear is that this is a new standard and that it is potentially very valuable. With dual-mode device shipments alone, the market will reach millions of units in 2011." Beyond this, the standard is creating a new market ecosystem which includes new manufacturers, many of whom

have not produced wireless products before. This will take time; however, with the support of the Bluetooth SIG, IMS Research told Incisor that it is confident that these new companies will successfully get products to market round the world.

## USB, Bluetooth grab consumer mindshare

Well, it has been a while in coming, but it seems that the concept of connecting devices without wires may be gaining traction in the minds of consumers. According to research from In-Stat, while USB is still the most popular and most used interface among users on both home and business PCs, Bluetooth is proving highly popular on cell phones. According to an In-Stat survey of US consumers, both interfaces are well known for multiple uses at home and at work.

Recent research by In-Stat found the following:

- USB is the most-used digital interface in home and work PCs, followed by 1394, Bluetooth, DVI and HDMI.
- Well over half of respondents own a mobile phone with Bluetooth technology; with nearly 60% of them using it to connect a Bluetooth headset.
- Over 25% of respondents with HDMI ports on their PC said they used HDMI to connect their PC to their Digital television (DTV).

Here at Incisor we haven't seen the report, so we don't know whether In-Stat looked at the crossover between the two most popular interfaces - USB and Bluetooth - the world of Wireless USB. A couple of years ago we were told to expect that Wireless USB would be commonplace in consumer devices by now. It hasn't happened yet. Will it? Anybody at the USB Implementers Forum that wants to update us will be made welcome here at Incisor Towers.



# What next for the smart phone?

By Raj Gawera, VP Marketing Handset Business Unit, CSR

**In terms of current technology the smartphone has pretty much every base covered. It takes care of our emails, diaries, work calendars, phone calls, music, photos and videos, social media, and its on-board GPS tells us where we are and the best route to get where we need to be. In fact the smartphone has almost caught up with the laptop and it's streets ahead already for battery life.**

The convergence of the smartphone and the laptop, in particular the notebook, is something that has been debated many times. Today's smartphone already has the processing and memory power of a laptop from ten years ago so it's hardly surprising that people are wondering when the functionality from a modern laptop will make it into a phone, and indeed if that will make the laptop redundant.

The laptop will always have a key role to play for mobile business and communications but the increased functionality of the smart phone will see it replacing other devices that play a large part in our lives, from the MP3 players and cameras that it already rivals, to bank cards, keys, heart monitors, medical devices and remote controls. The smartphone's multiple wireless technologies provide an advantage that a dedicated device can never offer, for example a camera phone can use GPS to geo-tag it and then Wi-Fi to upload the photo to a social networking site.

The smart phone will never replace a laptop and neither will it replace high end consumer goods such as digital SLR cameras and MP4 players, but the majority of people don't need 80GB of music or a big camera, they need a few GB of music and 5MP camera that will take half decent photos and this is where the smartphone is best placed to take over. Original music phones only had a memory with enough room for a handful of tracks, but with expandable memory options a smartphone is now offering up to 12GB of space for music. Multiple wireless technologies give the smartphone the edge, for instance by using the on-board Wi-Fi the phone can also stream internet radio or an FM transmitter allows music to be played on a car stereo.

Through CSR's Connectivity Centre products, handset makers can include GPS, Wi-Fi, Bluetooth, Bluetooth low energy and FM all on a single module, with more room for more to



be included. While it is practical for smartphones to include this high level of functionality it's not for cameras or MP3 players to do the same. The biggest advantage that the smartphone has over a dedicated device such as a camera is the wide range of wireless technologies that it offers, most of which are already built in.

There are also plenty of additional functions that are starting to appear in smartphones and features that will see impressive growth in the coming years. Remote controls have already converged into a single multifunction unit, but with the predicted massive growth in Bluetooth low energy why not include such functions into the phone? You can already use your phone as a remote for laptops through Bluetooth; Bluetooth low energy can take it to the next level by allowing you to control home entertainment equipment, garage doors and even home automation systems such as heating and lights. The built-in GPS could allow the phone to switch on the garage remote function when you return home, switch on the remote for the projector or laptop at work when you're in the office or even switch off your heating as you leave the house.

Thanks to the growing interest in Near Field

Communications (NFC) you could leave your wallet at home and store your bankcard details on your phone instead. CSR demonstrated working NFC silicon at Mobile World Congress in February. The technology could even replace your car keys; many new cars feature keyless entry and ignition, requiring the key-fob to just be within a certain distance for the start button to work. There's no reason why this technology couldn't be embedded into a phone to cut down on the number of devices we need to carry with us.

All of this will be enabled through the smart integration of wireless technologies as illustrated in CSR's Connectivity Centre. The key user benefit for this technological approach is that people should not need to notice what particular technology is at work, only the service that they are receiving as a result. They select location, not switch on GPS; they choose to surf the web, not to activate Wi-Fi to take them onto a wireless access point. With its Synergy software, each technology in CSR's Connectivity Centre works seamlessly together, enabling the best technology to be used for each purpose without the user having to choose between them.

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## WOULD YOU LIKE TO TARGET THE PEOPLE ON THIS PAGE WHEN MARKETING SHORT RANGE WIRELESS PRODUCTS, APPLICATIONS OR SERVICES?

Listed on this page are just a few recent Incisor subscribers, added to a database built over 8 years.

- Incisor covers Bluetooth, Ultra Wideband, ZigBee, Wi-Fi, RFID and NFC.
- Read by an estimated 25,000 readers
- At 1500+ companies.

Incisor is not a consumer publication, and therefore doesn't claim to be read by hundreds of thousands, or even millions. We address those people all over the world that are seriously interested in wireless technology – the decision makers and technology influencers.

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# A bitter harvest: ZigBee Green Power

by Dean Anthony Gratton

ZIGBEE HAS BEEN SOMETHING OF A CONTENTIOUS SUBJECT OVER THE LAST FEW YEARS OR SO. IT HAS RECEIVED SOME MODERATE ATTENTION AT INCISOR, BUT NOTHING SENSATIONAL THAT WOULD MAKE US SIT UP AND START TAKING NOTES. ARGUABLY, A LOT OF THE ZIGBEE NEWS HAS BEEN LACKLUSTRE AND LIKEWISE, IT HAS DRAWN SOME OF US TO SEVERAL UNFOUNDED AND PREMATURE CONCLUSIONS, ONE OF WHICH MIGHT HAVE BEEN, "COULD THIS BE THE LAST CURTAIN CALL FOR ZIGBEE?" ZIGBEE ISN'T NECESSARILY A NEWBIE WIRELESS TECHNOLOGY, BUT DESPITE ITS LONGEVITY IT STILL SEEMS RELATIVELY NEW; IF YOU LIKE, IT'S STILL WRAPPED UP IN ITS PACKAGING.



## ZigBee enters the healthcare market

ZigBee endeavours to address multiple low energy wireless solutions within health, home and building automation, along with a number of 'coming soon' applications. More recently, the ZigBee Alliance was endorsed by the Continua Health Alliance ([continuaalliance.org](http://continuaalliance.org)), as it was suggested that ZigBee has "superior power efficiency and networking capabilities" (ZigBee Enters Health Care Market, Incisor July 2009). Nonetheless, it has been suggested that the technology isn't as prolific as the ZigBee Alliance seems to suggest ([zigbee.org](http://zigbee.org)). Likewise, some still argue that ZigBee continues to suffer from coexistence and interoperability issues which are plaguing many of its member companies.

The basic premise of any wireless product is to offer coexistence and interoperability with multiple manufacturers, but some reports have indicated that this simply doesn't happen with ZigBee and ZigBee PRO or, at the very least, that some manufacturers are experiencing issues with what is perceived to be a proprietary technology rather than an industry recognised standard. Arguably controversial, and further heated by accusations from antagonists suggesting that the Alliance has self-declared the technology as a standard, yet it is still to be recognised by the IEC, ISO and so on. What some of you may not know is that ZigBee comprises two significant components, which make up its current solution and technology. The first is the radio, which is based on the IEEE 802.15.4 standard; however, the majority of ZigBee's technology is founded within a software protocol stack that sits on top of the radio – a fact that is often misunderstood and the mainstay upon which ZigBee's IP is invested.

### What's that blip on our radar?

So, what brings ZigBee to our attention this month? The current blip on our short-range radar, is ZigBee's most recent announcement (June 2009, [zigbee.org](http://zigbee.org)) of its Green Power offering – a prophecy perhaps of an imminent bitter harvest. Having been featured within Incisor for two consecutive months now, we could speculate that the ZigBee Alliance's marketing machine must be doing something right, right? Yes, the ZigBee Alliance announced a new feature set, namely the ZigBee Green Power specification, which is planned to be completed circa end of 2009. We pestered the Alliance for additional information and perhaps a sneak preview,

but they were keeping their cards close to their chest. Nevertheless, the Alliance's Kevin Schader, Director of Communications (and the PR group) was very supportive and provided a better perspective of the new feature set, albeit a helicopter view, as the scope was very new.

However, before we begin to broach the nature of the controversy that ensued following their announcement, let's fill in some blanks for those who might be new to this particular topic. It seems traditional, as part of our 'saving the world' mantra, to throw a little 'green' into the product portfolio – after all it's been the colour populating most of our headlines at Incisor over the past few months. Both classic Bluetooth and Wi-Fi are power hungry technologies and therefore often raise 'green' issues, but, then again, they do offer very different applications to those afforded by ZigBee. In more recent news, we have seen both Wi-Fi and Bluetooth strive to become greener in their applications and technologies. In the low power domain, a number of companies offer low energy solutions, which directly compete with ZigBee; for example, Z-Wave ([zen-sys.com](http://zen-sys.com)) and EnOcean ([enocean.com](http://enocean.com)), which employs a number of clever energy harvesting techniques that date back to the early 1990s (EnOcean technology emerged from the Siemens group, where the spin-off company that became EnOcean GmbH had previously invented the technology). But ZigBee already boasts a low power theme and has proudly done so since its inception; however, with its Green Power specification it offers something a little different and this is where the controversy begins.

### EnOcean is synonymous with energy harvesting

EnOcean is primarily the proponent company offering energy harvesting techniques and commercial solutions in over 100,000 buildings. The technology dates back to early 1990s where Siemens originally conceived the technology and, with over a decade's experience, the company has accumulated numerous patents that not only detail techniques, but extend to some fundamental applications, several of which are publicly available on their website (see [enocean.com/en/products-technology](http://enocean.com/en/products-technology), courtesy of Graham Martin, Chairman, EnOcean Alliance). At Incisor, we also became privy to other numerous patents, which baffled us somewhat as to how ZigBee could possibly move forward with any energy harvesting solution whilst EnOcean had it so well-covered and protected. So, we caught up with

Graham Martin, EnOcean's Alliance Chairman who couldn't publicly offer us any comment, although he did support his perspective on the issue with some comprehensive reference material.

In starting to write this story we made several assumptions based on initial information, but looking more closely at the press releases and following up on a number of pertinent questions to the ZigBee Alliance with a 'pull no punches' stance, we eventually arrived at a very different conclusion. Inevitably, we were caught up in the furor of the ZigBee Alliance venturing into developing energy harvesting technology and trampling all over EnOcean's well-established IP territory. Crikey, it's all too easy to wag the proverbial finger, as was initially the case with ZigBee's new Green Power specification, where the Alliance allegedly purported energy harvesting techniques, offering a new generation of batteryless ZigBee products; something which was ringing a familiar bell – reminding us perhaps of the very same energy harvesting techniques first presented by EnOcean and quite clearly now a bone of contention between the two companies.

### IP infringement – that's just suicide!

Neither the ZigBee Alliance, nor any other company for that matter, could afford a battle in court surrounding IP infringement – no-one would be that stupid, right? But let's take a closer look at the Alliance's press release: dated, June 29, 2009 (also available on its website) which states "The ZigBee Alliance, ... today announced development of the ZigBee Green Power feature set to establish a global standard technology for self-powered devices operating through energy harvesting techniques. These devices will communicate seamlessly with existing ZigBee and ZigBee PRO networks and will enable maintenance free, environmentally friendly products that eliminate the need for wires and batteries." Let's translate this into English!

The first point in the release is the definition of a new feature set, which will establish a global standard for self-powering devices – doesn't sound like anyone is developing any new technology here! When we asked Alliance execs to clarify, they intimated that their software protocol stack, the part of the ZigBee offering that they have heavily invested in, would be modified to support energy-harvesting-enabled devices. Eh? What? What did we miss? Surely, you're developing new →

technology and techniques that are going to conflict with existing IP, right? Well, apparently, not! Instead, Kevin Schader, Director of Communications, ZigBee Alliance confirms "ZigBee Green Power is an enhancement to the ZigBee and ZigBee PRO [protocol] stacks." Schader continues to explain, "It will allow energy harvesting devices, regardless of manufacturer, to join a ZigBee network."

### What, another protocol stack?

Naturally, many antagonists would be raising some inevitable issues regarding another change to the protocol stack, as ZigBee has already suffered from some backwards incompatibility problems with its early stacks. But, with the delivery of its new feature set, it's certainly going to be one to watch. Schader was quick to remark "ZigBee Green Power is backward compatible with existing ZigBee devices and networks." Presumably, the Alliance can't afford another faux-pas whilst maintaining and promoting a technology to a diverse market. It seems the ZigBee Alliance is working towards some kind of wireless utopia in enabling its devices to extend and connect with energy-harvesting-enabled devices. Dare we say, it's offering an outstretched arm to technologies such as EnOcean?

It seems that many analysts initially reacted to ZigBee's press release with the attitude that it was nothing less than a corporate suicide note, but let's recall an old saying, "there is no such thing as bad publicity except your own obituary" (Brendan Behan). Was lack of tenacity

and ability to focus on anything other than the PR 'headline' reason enough for others to wonder if ZigBee was writing theirs? It seems a shallow pool for ZigBee's PR to drown in. Nonetheless, when actually taking the time to read the press release in full, alongside unequivocal support from the Alliance and applying a generous measure of good common sense it seems ZigBee's Green Power feature set is merely an enhancement to their protocol stack which, in turn, the Alliance hopes will support a global ecosystem of multiple products from multiple manufacturers. Anyhow, we shall be watching ZigBee's evolution of its Green Power offering very closely, along with monitoring EnOcean's reaction.

You see, all this wireless stuff can be exciting and is certainly not for the faint hearted!

About the Author  
Dr Dean Anthony Gratton is a bestselling author, writer and telecommunications consultant. He has authored several patents, contentious articles and a number of bestselling books on wireless technology. He has worked within the telecommunications industry for over sixteen years and provides consultancy to a number of high profile companies.



You can contact Dean at [incisor@deangratton.com](mailto:incisor@deangratton.com) and read more about his work at [www.deangratton.com](http://www.deangratton.com).

## Snippets

### Handset shipments show signs of improvement

The handset vendors have been telling the research companies that it is a frosty market out there but according to ABI Research there is a spring in their step as 2Q-2009 results start to pour in. 269 million handsets were shipped in 2Q-2009. Samsung (19.4%) and LG (11.1%) did particularly well. LG notched up a 2.2% increase in percentage points, Samsung, 1.45%. Nokia staged a remarkable swing in fortunes to achieve a 1.67% percentage point increase to 38.3%. Sony-Ericsson experienced a 0.56% percent point reduction in its market-share while Motorola and RIM also saw contractions.

### ST-Ericsson reports second quarter 2009 results

ST-Ericsson, the joint venture between STMicroelectronics and Ericsson, has reported financial results for the second quarter 2009. No big surprise – the numbers aren't stellar. Net sales for the quarter were \$666 million, which is promoted as an 18.5% sequential increase on Q1, but in fact it was a 31% drop on the venture's Q2 2008 numbers. The net result was an adjusted operating loss of \$165 million.

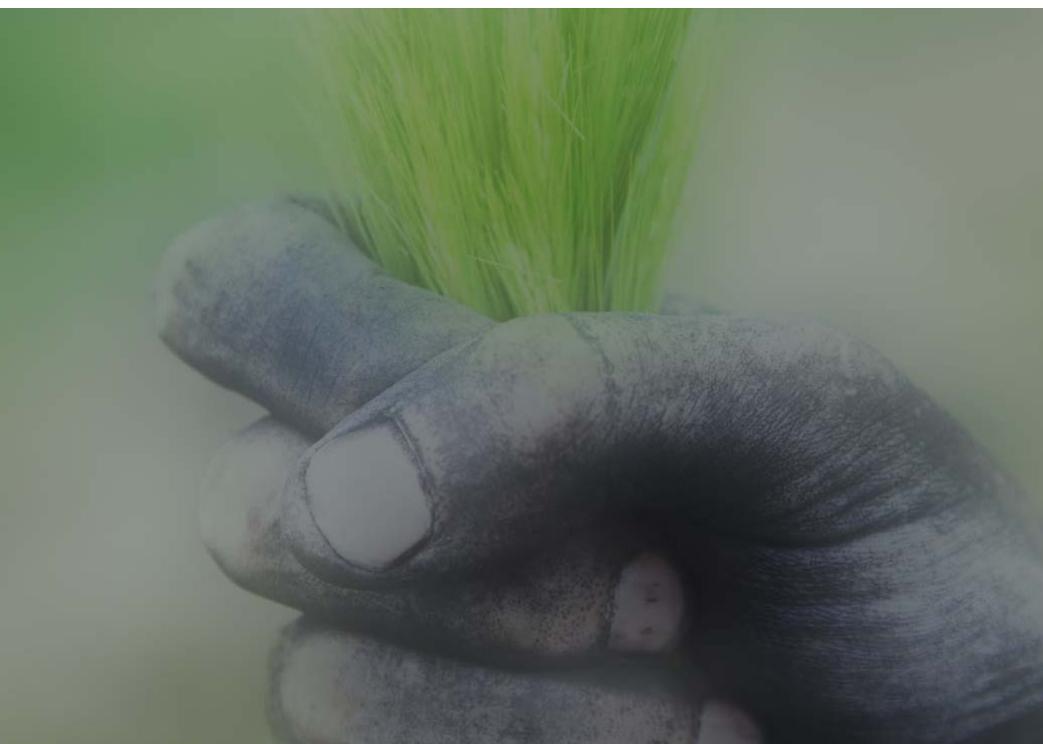
### Is Apple really that litigious?

Here at Incisor we've had direct evidence of the lengths Apple will go to to protect its secrets. It's a long story ....

Now we hear that an employee at a factory that makes iPhones in China killed himself in July by jumping out of his apartment window after a prototype went missing. The 25 year-old worked in product communications at Foxconn Technology, a Taiwanese firm that makes Apple products. The Southern Metropolis Daily newspaper said the man – responsible for sending iPhone prototypes to Apple – noticed he was missing one of the 16 units he was holding on to. He reported the missing phone and his apartment was searched by Foxconn employees. Apple apparently offered its condolences.

### Telehealth technologies in sync with healthcare reform

With public attention in the United States focused on ways to reform the world's most expensive healthcare system, a new study from ABI Research examines "wireless telehealth": the use of sensors that monitor a person's physical condition or surroundings and transmit that data back to remote medical practitioners using cellular connections. Some 15 million such systems are forecast to be in use – mainly in North America – by early in 2012.



# Follow us on LinkedIn, Facebook and Twitter

Vince Holton represents Incisor on a number of Internet networking sites. Many interesting discussion take place, and this feature will allow Incisor to keep its readers in touch with diverse - and different - viewpoints from experts all across the world.

From this point forwards, you can read a selection of these views in Incisor, and you can follow the discussions as they happen on the various sites. And why not join in!

Currently, Incisor is represented at these sites:



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Oh, and this one, of course

## ON THE FORUMS:

### FROM THE INCISOR MANAGED LINKEDIN WPAN WORLD GROUP

Posted by Vince Holton, Incisor:

**Do you think the 2.4/5GHz spectrum has the potential to be saturated by video traffic? Why? What are the implications?**

*We hear rumours that even before we start zapping video into the equation, WPAN traffic may have to move from this space (people still bitch about co-existence). So yes, I think that if it was possible for there to be a sudden deluge of video transport happening in the 2.4/5GHz space, then saturation could occur. As a result, you would have many unhappy consumers, and various wireless associations all pointing the finger at each other and saying it is not their fault. And some would then decide to say 'and I told you so'.*

*BUT - is that likely to happen?*

**Reply from Stephen Wood, technology strategist:**

This is a problem that I've been concerned about for a while now. Let me tell you the data points that I have encountered so far:

- 1) OFCOM (UK equivalent of FCC) appears to be looking into the topic. I believe it is too early for them to have any conclusions.
- 2) After checking with the then-President of Wi-Fi, the two of us were unable to identify anybody who was doing quantitative research on the question of the current utilization of the available spectrum. This alone was concerning when a number of industry players are adamant about moving large new applications into the space.
- 3) Anecdotal information that I've encountered indicates that users in suburban areas of the US are now seeing 10+ access points. One University doing some preliminary research was seeing substantially more.
- 4) In an analysis that I did for the ITU, a single

MPEG 2 video stream would generate traffic volume 19X greater than what one LAN sees today. This goes up substantially if the application is for a wireless monitor.

- 5) In a second analysis that I did, it was found that a very small number of wireless monitor applications would be capable of disabling a corporate LAN.

Obviously, this data is less than conclusive, but indicative of a potential problem.

So, to answer your question, I'd say that people will attempt to use 2.4 and 5 GHz for video and that it will cause substantial congestion. I anticipate a lot of reactions when this becomes visible. IT departments may ban video applications in that spectrum. OEMs may be forced by major buyers to find ways to neutralize the problem.

What I envision is that it will cause a major problem. It will cause a variety of aggressive responses which will cause instability throughout the market for groups employing that spectrum such as Bluetooth.

If there is an upside here, the greatest interference will be experienced by the folks attempting to introduce new video applications. This fact may limit the problem somewhat.

Sure would be nice if the organizations using the spectrum were being proactive on this topic. Imagine if Bluetooth and WiFi got together and sponsored research on the topic. If it looked like a problem was imminent, maybe they could cooperate on informal spectrum use rules.

### FROM THE LINKEDIN 802.15.4 GROUP

Posted by Vince Holton, Incisor:

**Will all low energy wireless technology gravitate towards energy-harvesting?**

**With the recent announcement that ZigBee is following EnOcean down the energy-harvesting,**

**batteryless technology road for its sensor devices (and it seems there could be an EnOcean/ZigBee punch-up!), what about the other short-range wireless technologies?**

**Reply from Robert Poor, principal at NBT Ventures:**

*Once upon a time, I would have said yes. But for the foreseeable future, I think the vast majority of deployed systems will use locally available power or batteries. Compared to batteries, energy harvesters are still relatively expensive and thus only applicable in a few specific applications.*

*My prediction: only after ten years or after a 20x increase in deployed low-power wireless systems (whichever comes first) will we see a significant uptake in the percentage of systems that use energy harvesting.*

*-----*  
*An aside:*

*EnOcean/ZigBee punch up? From this side of the puddle, it appears that ZigBee has a substantial advantage over EnOcean, for example:*

<http://www.google.com/trends?q=enocan%2C+zigbee&ctab=0&geo=all&date=all&sort=0>

*Yes, I know that EnOcean is designed 'ab initio' to be ultra low power and play nice with energy harvesting. But I believe that ZigBee now has enough momentum that if there's a demand for lower power, that ZigBee will adapt to meet the demand.*

*I base this prediction on the history of Wi-Fi: the original Wi-Fi standard was 2mBits/sec. As the demand for more speed grew -- even though there were already systems with higher bit rates (e.g. Motorola) -- it was Wi-Fi that adapted to meet the demand for speed while the other systems faded into the background.*

# INCISOR W-PANel

**THIS MONTH: ARE THE DAYS OF HIGH-ENERGY WPAN TECHNOLOGIES LIKE BLUETOOTH AND WI-FI COMING TO AN END?**

Incisor expert panel of the most influential spokespeople in the short-range wireless industry speaks on short-range wireless technologies

Introduced by Vince Holton

Welcome to this feature in which the Incisor WPANel speaks on a topic of interest to short-range wireless industry observers.

The members of the Incisor WPANel are the senior executives from the organisations that manage the administration and development of Bluetooth, DECT/CAT-iq, EnOcean, NFC, Wi-Fi, UWB/Wireless USB and ZigBee technologies.

The ongoing WPANel members are Mike Foley, exec director of the Bluetooth SIG, Erich Kamperschroer, chairman of the DECT Forum, Graham Martin, chairman of the EnOcean Alliance, Edgar Figueroa, executive director of the Wi-Fi Alliance and Bob Heile, chairman of the ZigBee Alliance. Each of these is an expert in short-range wireless technology. Due to work pressures, Mr Koichi Tagawa, chairman of the NFC Forum has had to pull out this month. His place on the Incisor WPANel should be filled soon by another executive from the NFC sector.

Last month the WPANel group gave us their views on whether short-range wireless technologies can really change the lives of the average man, woman or child in the street? These can be read in last month's issue.

This month's topic: The move to low energy wireless technologies

I asked the panel to consider is this: are the lights going out on what we may now have

to consider 'high' energy wireless technologies such as classic Bluetooth (and UWB as High Speed Bluetooth) and Wi-Fi? Are even technologies such as ZigBee too power hungry? For probably 6-9 months, all I have been hearing is 'low energy is the future', 'low energy is great', low energy is vital', 'batteries are bad and energy harvesting is good'. The announcement this month by the ZigBee Alliance that it is to introduce energy-harvesting technology has certainly sparked controversy.

Developments of this thinking included:

- How much power consumption is too much? Can anybody quantify it?
- Is there any point in continuing to develop applications that are based on battery-powered wireless sensors? Or should the industry abandon the concept and throw all weight at developing energy harvesting technology to power their devices?
- How far can the concept of energy harvesting go? Could it even be built into devices such as handsets or other CE devices? This would be so that non-cellular wireless technologies such as NFC and Bluetooth low energy, which will be making occasional power requests for applications such as payments, identification etc, →



rather than a continuous power drain such as is needed to maintain a handset to headset connection during a call, can reduce drain on the main battery.

- Could there be a day when power-hungry (in relative terms) technologies such as Wi-Fi and classic Bluetooth are able to operate at what we call low energy levels?
- And, further to the question above? Do they need to? Is all of the furore today over low energy wireless technology misplaced? Are today's batteries perfectly adequate and this wave of development is all about the industry creating the next raft of products that their customers have to buy?

The panel's views are below. If you have views, or suggestions as to how we can develop the WPANel concept, or topics you would like to see covered, email me at [vholt@incisor.tv](mailto:vholt@incisor.tv).

**Vince Holton**  
Publisher, Incisor & IncisorTV

## The Incisor W-PANel responds

### Will short range wireless technology really change our lives?



**Mike Foley**  
Executive director,  
Bluetooth Special  
Interest Group

The wireless industry will continue to evolve and optimize solutions and, in some cases, this evolution will result in lower power consumption for a given task. The misconception often held about solutions is that just one supports all use cases. Nothing is further from the truth. For example, both Wi-Fi and Bluetooth technologies are successful because they were each optimized for specific use cases – internet access and the personal area network (WPAN), respectively. Of course they can do other things, but not as well as the use cases for which they were optimized.

As the Bluetooth SIG looks to expand our offerings, we consider how best to enable intended use cases. The end results are often vastly different depending on the scenario. For example, our members wanted to enable streaming video and move bulk data over Bluetooth connections faster than originally possible. We determined the best solution was to leverage the 802.11 radio already existing in devices. On the other hand, when we considered how to enable sensors and watches, the best solution was to create a new, optimized radio based on the existing

Bluetooth radio. Each of these solutions, high speed and low energy, is highly optimized to efficiently deliver the intended use cases. If we tried to use one solution for all intended use cases, we'd have a sub-optimal solution for all of them. Once people accept there are proper solutions for the various scenarios, the technology debates quickly fade.

Wireless technology requires energy to transmit and receive information. Today, that energy is typically provided by some type of battery or a convertor tied into a main power source. Energy harvesting is emerging as a way to collect energy from the environment and to use these resources to power apparatuses such as communication devices. In and of itself, energy harvesting is orthogonal to wireless technology, but this immateriality is irrelevant when the desire is for a complete system that runs forever without the hassle of plugs or battery changes. One example of such a system would be a status indicator on a door or window that reports if it is open or closed. This sensor could harvest energy via a solar collector and transmit status information via Bluetooth low energy technology to a home security system. The advantage is obvious – install the status detector and forget about it. No need to change the battery every year or so just to ensure that the battery doesn't run out while you're away on vacation. It would simply work. Forever.

As wireless technologies continue to evolve and energy harvesting technology improves, they will further intertwine and enable numerous solutions for entertainment, sports, the home, medical applications... the possibilities are endless. However, just as today's wireless technologies are optimized for particular solutions, so will be energy harvesting technology. Today, I could build a [wind farm](#) in my back yard to power my entire house. However, using the farm to power my mobile phone while on the go is impractical. Solutions are most effective when used for their intended use cases. We need to realize now that energy harvesting technology will be optimized for a given solution and one size will not fit all.



**Erich Kamperschroer**  
Chairman,  
the DECT Forum

DECT is a mature and reliable technology and has been constantly developed and optimized during the past 15 to 20 years with respect to energy reduction and power saving. CAT-iq, the successor standard of DECT for voice communication and light data transmission in IP based networks, will definitely benefit from the long-term engineering improvements of the DECT technology. These energy saving measures have resulted in a 60 % reduction of power consumption of today's up-to-date devices even though the cordless telephones provide 24/7 availability.

With the CAT-iq standard (version 2.1) the industry has defined that the radio of the base station is completely disabled when not in use for an incoming or outgoing call. But this is not yet the last word in terms of Eco-mode and power saving capabilities of the CAT-iq technology. CAT-iq 4.0, designed for home automation functionalities, will enable a new generation of cordless devices, which provide ultra-low energy consumption. This means that the batteries of the devices are equipped with energy for 2 years and more without charging. This is a major progress for the consumer since 24/7 availability is guaranteed with a minimum of power consumption.

In fact the industry has driven the energy optimisation of DECT since the technology has been introduced and has even increased its engineering efforts to achieve ultra-low power consumption with the introduction of the CAT-iq technology.



**Edgar Figueroa**  
Wi-Fi Alliance  
Executive Director

There's little doubt that energy consumption is a serious concern for people around the globe, and finding smarter, more efficient ways to manage it are a critical component of our stewardship of the environment. And from a purely commercial standpoint, as devices continue to include a variety of wireless technologies, managing battery life will be critical to market success.

This concern has sparked innovation in the Wi-Fi ecosystem, to be sure. In our core technology, there is continued effort to continue to move the needle on Wi-Fi power consumption. Advanced protocols such as WMM@ Power Save have already enabled Wi-Fi power consumption to be substantially more efficient than in legacy deployments, and have been instrumental in the technology's uptake in small form-factor, battery-powered devices. Silicon vendors continue to build on standards-based protocols with proprietary improvements to further address power dissipation.

Beyond addressing Wi-Fi's attributes with regard to power consumption, Wi-Fi is becoming part of the solution space in managing energy use around the world. Recently, IEEE 802.11 was added to the US Department of Energy Smart Grid Interoperability Standards Framework. As a proven, security-protected wireless backhaul solution, Wi-Fi will be central to bidirectional connectivity for intelligent utility systems – connecting remote, in-field devices from smart meters to infrastructure equipment (transformers, fault indicators, distribution regulators) to the centralized power grid. Aggregating meter data and controlling flexible power consumption are key initial opportunities, and as we look to the near future, the already-ubiquitous residential



Wi-Fi networks can provide the core connectivity for consumers to optimize their own household energy use.



**Bob Heile**  
Chairman,  
ZigBee Alliance

When it comes to the question of how much power consumption is too much, less is always more in today's world. The mission then becomes one of achieving results while reducing cost. Also, it is not so much about developing solutions based on batteries; it is about enabling choices for cost, efficiency and performance. The ZigBee Alliance has addressed the sensor and control space already through a very power friendly standard. And, it's getting friendlier with our newly announced self-powered ZigBee Green Power feature set. ZigBee Green Power will increase the number and variety of products that can take advantage of energy harvesting opportunities available, expanding choice for users and reducing cost for products using no battery required technology. With a standard like ZigBee you can go as far as you want simply by optimizing for function, rather than force fitting.

Wi-Fi's and Bluetooth's high power consumptions needs were required because of the tasks they were designed to do. ZigBee offers optimized solutions for significant tasks, so by taking a systems level approach, the best performance at lowest consumed energy is achieved. The industry should focus on putting the right standards to work on the right task, and achieve not only the best performance but the best operational efficiency as well. With that focus, it can enable the broadest selection of energy sources and do more than it has before.



**Graham Martin,**  
Chairman,  
EnOcean Alliance

In the current economic climate, saving energy costs and CO2 output has become one of our highest priorities. Billions of wireless sensors will be necessary to achieve these goals, but nobody wants to have to deal with maintaining dozens to thousands of batteries in their surroundings. Batteries fail or are removed, need monitoring, entail tedious and expensive replacement and the toxic waste also requires environmentally unfriendly disposal.

Traditional "low-power" wireless sensor solutions have been developed to be powered by batteries and the communication protocols focussed on multiple wonderful, but relatively energy hungry, features. The result is, for example, that a state-of-the-art low power ZigBee node requires 30 to 100 times

the energy of a state-of-the-art ultra-low-power energy harvesting node, making it completely unsuitable for most batteryless based products. Commercial wireless sensor products based on electro-dynamic energy harvesting have to wake up and complete their communication with around 100 micro-Joules of energy, those based on solar or thermal harvesting will have to be able to live and reliably communicate for many days based on a few 100 milli-Joules available energy. ZigBee has now begun to realise these challenges and are planning to develop a first specification for a batteryless solution over the next months.

ZigBee's new marketing efforts in this field help to strengthen EnOcean's leading position, and provide the confirmation that the EnOcean Standard is in accord with market winning solution requirements. EnOcean has over 15 years experience and multiple patent families in the batteryless wireless field, with the first commercially available products as early as 2003 and over 100,000 successful deployments across the globe. The EnOcean Standard was carefully developed from day one to be focussed on ultra-low energy requirements. The results are the world's lowest power wireless sensor modules that require less than 30 micro-Joules to communicate according to the interoperable Standard and in sleep mode require absolutely zero-power or less than 80nA with timers running.

Energy harvesting wireless sensors based on the EnOcean Standard are here to stay and, in combination with other protocols or backbones such as TCP/IP, GPRS, BACNet, LONWorks and KNX, will continue to be a growing part of industry and consumer standard eco-systems helping us all to save energy and raw-materials whilst increasing our comfort and safety.

Battery driven wireless sensors certainly have reached a huge stumbling block in their strive for mass volume breakthrough and their future success and growth will be limited due to the resistance to battery maintenance in many applications – 90% of all wireless sensor applications according to industry analysts.

## Snippets

### **Nokia's Symbian Professional Services acquired by Accenture**

Nokia and Accenture have entered into an agreement for Accenture to acquire Nokia's Symbian Professional Services unit responsible for Symbian OS customer engineering and customer support.

The unit provides engineering consulting and product development services on a global basis to mobile phone manufacturers, as well as chip manufacturers and mobile operators.

Approximately 165 people will transfer to Accenture as a result of the agreement. The transaction is subject to customary closing conditions and is expected to close by the end of third quarter 2009.

## Wi-Fi / WLAN

### **1Q09 WLAN Market Share Report**

According to market researchers at In-Stat, in 1Q09, worldwide revenue for the WLAN market decreased by 10.6% year-over-year (YoY), down from \$1.17 billion in 1Q08 to \$1.05 billion in 1Q09.

### **Kinnarps embraces 802.11n**

Kinnarps, Europe's third-largest provider of office furniture and interior solutions, has deployed Meru Networks' 802.11n wireless LAN infrastructure throughout its UK headquarters and seven new branch offices nationwide.

Kinnarps switched to Meru from Trapeze in order to eliminate the dropped connections it had experienced with its previous WLAN infrastructure. With Meru's 802.11n WLAN with virtual cell architecture, Kinnarps employees enjoy a seamless connection as they roam the office.

# wi-fi / wlan news



## Wi-Fi Alliance - 802.11n program tests will not change for September update

The Wi-Fi Alliance has announced that it will not change the baseline requirements of its 802.11n certification program, and plans to make only small optional additions to coincide with the finalization of the 802.11n standard later this year.

The updated test program is intended to preserve interoperability with the more than 600 Wi-Fi CERTIFIED 802.11n draft 2.0 products that have been released since June 2007, while adding testing for some optional features that are now included in the standard. The Wi-Fi Alliance told Incisor that this validation of the existing certification program comes as the IEEE 802.11n standard is set for final approval within IEEE this September. Product testing to the updated certification is expected to begin in late September.

"Wi-Fi CERTIFIED 802.11n draft 2.0 products have seen wide acceptance across consumer and enterprise markets. It's clear our decision to deliver a draft program has served the interests of the market and Wi-Fi end users the world over," said Edgar Figueroa, executive director of the Wi-Fi Alliance. "The finalization of the 802.11n standard presents an opportunity for us to reaffirm our certification program and to implement additional testing of optional features while preserving interoperability.

The 11n certification program will add support for interoperability testing of some optional features in the approved 802.11n standard. Because all Wi-Fi CERTIFIED draft 2.0 products meet the core requirements of - and interoperate with - the updated program, they will be eligible to use the approved 802.11n logo without retesting.

## Shipments of 802.11n will surge ahead of 802.11g

With growth rates well over 100% in 2010, shipments of Wi-Fi Chipsets based on the draft n/802.11n spec will surge ahead of those based on 802.11g, reports In-Stat. 802.11n is ahead in nearly every equipment category, but unit volume is being driven by shipment growth in mobile handsets and notebook PCs.

"802.11n chipset revenue will surpass that of 802.11g this year as a result of higher Average Selling Prices (ASPs)," Victoria Fodale, In-Stat analyst told Incisor. "ASPs for draft n/802.11n chipsets are complex, as there are more options that can impact prices. These options include support for the 5GHz spectrum and the number of data streams, which can range from 1 to 4."

Recent research by In-Stat found the following:

- Total Wi-Fi chipset revenue will pass \$4 billion by 2012.
- Set-top boxes currently have the largest adoption of Wi-Fi in non-portable consumer electronics applications. By 2013, shipments of Wi-Fi-enabled TVs, however, will exceed shipments of Wi-Fi-enabled set-top boxes.
- Although there have been draft n/802.11n shipments in most markets for some time, we will see the first shipments of draft n/802.11n-enabled portable CE equipment in 2009. These shipments will be dominated by personal media players. Digital still/video cameras will make up the majority of the remaining of draft n/802.11n-enabled portable CE equipment shipments in 2009.
- In 2008, Wi-Fi chipsets in mobile handsets grew by more than 51%. By 2010, In-Stat anticipates that this category will consume in excess of 20% of total Wi-Fi chipset shipments.

This research is part of In-Stat's Wireless LAN (WLAN) service, which examines new

applications for WLAN chips and devices in the business, home, and public sectors. The service covers emerging technology trends, as well as extension technologies like wireless mesh networking and wireless security.

In-Stat isn't brave enough to speculate as to when 'draft n/802.11n' will become anything more than that - a draft spec, which it has been since mid-2007. The Wi-Fi Alliance is sticking with the story that the spec will be finalized by September this year. Here at Incisor we are sitting here patiently waiting for the news of final IEEE approval (see separate story).

## Ruckus unveils outdoor Wi-Fi with dynamic beamforming

Ruckus Wireless has announced outdoor dual-band 802.11n and single-band 802.11g Wi-Fi access points with what Ruckus calls dynamic beamforming. This is intended to overcome problems that have hindered outdoor Wi-Fi deployments, including interference, unanticipated physical obstructions such as foliage, network management complexity and cost.

Pioneered by Ruckus Wireless, dynamic beamforming automatically directs transmissions to the best performing signal path on a per packet basis using real time feedback mechanisms inherent in the 802.11 protocol. Ruckus claims that the ability to adapt to changes in the RF environment on-the-fly results in three- to four-fold improvement in range/performance while providing wire-like reliability.

In an outdoor Wi-Fi mesh, dynamic beamforming APs on both ends of every mesh link are claimed to eliminate performance variability on the mesh backbone, and to deliver enhanced hot zone user experience by erasing dead spots, ensuring reliable connections and providing stable performance across the service area. Dynamic beamforming apparently also improves indoor signal penetration.

# wi-fi / wlan news



## Revenue from Wi-Fi-enabled Healthcare Products to Reach Nearly \$5 Billion

The healthcare industry has always been an early adopter of Wi-Fi, and a new study from ABI Research forecasts that revenue from sales of Wi-Fi-enabled healthcare products worldwide (not even including Wi-Fi-equipped medical equipment) will total \$4.9 billion in 2014. This represents an increase of nearly 70% over today's figure.

With \$20 billion allocated in the US Stimulus Bill for the digitizing of medical records, and committees of the US Congress starting to address proposals for comprehensive reform of a medical industry that accounts for about one sixth of the US economy, attention is focused as never before on the opportunities for wireless communications in healthcare.

"It's a pretty big business," notes ABI Research vice president Stan Schatt. "The strong uptake of Wi-Fi in the health industry is underpinned by its need for improved asset management, staff mobility, transfer of digitized records, and standardized administration of medications. In addition, government security requirements including HIPAA often mean replacing older wireless equipment with modern versions."

Among the benefits of increased Wi-Fi penetration are reductions in operating costs, which is also a theme stressed by the Obama administration in its drive for healthcare reform.

However, healthcare Wi-Fi is no one-stop-shop. "No one vendor has all the necessary pieces to make a complete system for a major medical institution," says Schatt. "It is truly a Tower of Babel." So there is a premium on partnerships and systems integration. Generally it's the wireless LAN equipment channel partner that integrates all these things and makes them work together. The manufacturers have to develop technology partnerships too, and share information so that devices can be optimized for their systems.



## "One size fits all" won't work in global SMB Wi-Fi markets

Staying with ABI Research for a while, the research company says that the number of small-medium businesses in the world is expected to reach 330 million in 2014. Outside North America these smaller enterprises (98% of which employ fewer than 100 people) account for more than 90% of all businesses. Many of these firms are candidates for Wi-Fi networking; but, says from ABI, vendors addressing these markets must take regional conditions and tastes into account.

"When it comes to opportunities in wireless LAN equipment markets, these international SMBs represent the greenest of remaining green fields," commented Stan Schatt. "The winning vendors will be those that develop equipment that meets the particular needs of those companies, at acceptable price points. Small businesses demand products that are designed specifically for them. You can't just repackage enterprise products."

In Europe, the best SMB opportunities for WLAN equipment vendors are services companies with 20-99 employees. Eastern Europe is particularly attractive: Russia and Poland have very high PC penetration but their wired infrastructure is not as developed as in Western Europe.

The most intriguing SMB WLAN equipment opportunity in the Asia-Pacific region, says ABI, is India. In particular, there is a predominance of very small manufacturing companies that are green field targets for WLANs as their only network, since Ethernet cabling is not widespread.

In Latin America, where ABI Research believes the Wi-Fi penetration rate is still only around 25% in mid-sized businesses, the opportunity is found not just in the services sector, but in industrial settings as well.

## INCISOR TV Video presentations

When it comes to assessing what is really going on in the market, there is no substitute for seeing products in action and hearing 100% accurate information from the people at the sharp end. Incisor TV provides that insight.

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**Bluetooth SIG – Best of CES 2009**

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**WiMedia special - UWB - a high performance solution / part 1**

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**WiMedia - The future for UWB**

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**A guide to Bluetooth Version 2.1 + EDR**

**10 years of Bluetooth / Best Bluetooth of CES 2008**

**CES 2008 – Profile of Parrot**

**Introducing Incisor**

**2007 Wireless Symposium**

**Bluetooth / Wibree launch event (full version)**

**Incisor TV overview: the Bluetooth SIG / Wibree Forum merge**

**Best Bluetooth of CES 2007**

**Incisor profile: Icron Technologies and Extreme USB**

**Wireless USB special - Introducing Wireless USB**

**Wireless USB special - Wireless USB in use**

**Wireless USB Special - Regulatory, approvals and interoperability**

**Wireless USB special - The future for Wireless USB and UWB**

**Wireless USB special - Wireless USB at CES 2007**

**Vince Holton introduces the High Speed Bluetooth Special Issue**

**Anders Edlund of the Bluetooth SIG - Bluetooth and UWB combined**

**Robin Heydon, CSR - Bluetooth & UWB - The semiconductor company perspective**

**Motorola's Steve Deutscher examines High Speed Bluetooth mobile concepts**

**Motorola video - Jordan's morning**

# uwb / wireless usb news



## 20 million wireless networked TVs to ship in 2011, but UWB not part of the deal?

Fed up of the rat's nest of cables behind your TV? Salvation could be at hand. As part of the continuing trend towards networked home entertainment, television sets will increasingly include wired or wireless connections to online content. That is according to a new study from ABI Research, which forecasts that in 2011, some 20 million TVs offering wireless connectivity will be shipped worldwide. This segment is expected to show linear growth through the study's forecast horizon of 2014.

Network connectivity does already exist in high-end models, and networked TVs are already quite widespread in Japan. According to industry analyst Michael Inouye, "North America, Western Europe, and select Asian countries are seen as the next growth markets, and the 2009 holiday season and 2010 will be the watershed periods when vendors will see whether networked TV should trickle down to mainstream models and really take off there."

Ethernet will handle the wired type of connection in most cases, but will wireless technology prevail? If it does, the most likely candidate is Wi-Fi, although it's true that 802.11b and 802.11g may suffer some latency and interference problems. ABI suggests that 802.11n Wi-Fi, though, should provide a fully capable connection, and its growing adoption will improve support for networked TVs.

"Many current TV models are nearly capable of being networked, at least for basic functions," says Inouye. "Basic networking often only entails additional memory, Ethernet support at the chip level (and active port), and software – the hardware component being relatively inexpensive."

What will consumers get with a networked TV? A wide variety of online content: news, weather, sport, material from Internet video sites, music, casual gaming, and social networking.

However, a critical factor for the success of this new kind of entertainment is the position of the owners of that content. "At the end of the day, if

the content holders don't let their content go to this platform in a timely manner, it's just not going to get anywhere," Inouye notes.

You will note that ABI makes no mention of UWB, once considered the daddy of wireless connectivity for TVs and home entertainment devices. Incisor poked the UWB companies a while back to let the world know if they were still active. Staccato Communications stepped up to the plate, but the UWB players have gone quiet again. Maybe Wi-Fi really has betamax'd UWB out of this market?

Anybody want to speak up for UWB?

## Atлона releases wireless USB to HDMI or VGA adapter

We comment above that the UWB companies are very quiet again. Well, one company is doing its bit to keep UWB and Wireless USB in the public eye, and by launching a real product that consumers can buy.

Atлона Technologies has released the HDAiR, a wireless USB to HDMI or VGA converter. Both XP and Vista compatible, this will allow users to connect any USB enabled computer or laptop wirelessly, to any HDTV or projector via VGA or HDMI. The unit wirelessly transmits high resolution signals from a small USB adaptor connected to a computer, to a receiver unit placed next to the display. In line with the Wireless USB spec, the HDAiR is designed to transmit high-resolution content up to 30ft.

Atлона's product uses chipsets developed by UWB semiconductor company Wisair to transmit USB protocol over Ultra wide band (UWB) frequencies. Atлона Product Manager, Michael Khain told Incisor that Atлона and Wisair have many more products in the works. "These various new products featuring "Ultra Speed by Wisair" will all be fully compatible with each other, allowing users to connect to various devices such as printers, displays, audio receivers, human input devices, and more. With the AT-HDAiR, you can extend any computer wirelessly from the display at lengths up to 30ft and resolutions up to 720p or 1440x1200.

Khain's colleague at Atлона, Marketing Director Christopher Bundy added, "We believe this product is a great place to start. We plan to build on the idea, giving users as many connection options as possible."

The AT-HDAiR is available now with an US MSRP of \$199.00

Now, if only a few more vendors could jump on this bandwagon, Wireless USB could get the push it needs.

## Wireless HD video technologies test the waters

Wireless high definition (HD) technologies are the next frontier in consumer electronic (CE) connectivity, according to In-Stat –replacing the nest of wires in the living room with high-bandwidth wireless technologies capable of transmitting HD video streams.

In-Stat suggests that the primary candidate technologies include: Wireless Home Digital Interface (WHDI), WirelessHD, 802.11n, and ultrawideband (UWB). WHDI and WirelessHD are new, uncompressed HD video transmission technologies, each of which is primarily promoted by start-up chip companies. Though each has potential, In-Stat believes that both face significant market obstacles. 802.11n has the advantage of being a Wi-Fi technology, with a large installed base, but has limited bandwidth, necessitating the use of expensive codec technologies to transmit HD. UWB also uses codecs, and is facing difficulties in market adoption, with a number of chip companies shutting their doors over the past year.

In-Stat's report on Wireless HD video tracks the annual penetration through 2013 of all four technologies into 17 different applications within the following product segments: CE, PCs, PC peripherals, mobile phones, and industrial/medical applications. It also includes history and analysis of each technology, annual chip average selling price forecasts of each technology, and profiles of major chip players in the market

# low energy wireless news



## Intelligent home lighting control system uses Z-Wave

Wouldn't it be convenient to control all the lighting in your home with the touch of a single button, while saving energy at the same time? Wintop, which is a manufacturer of electrical installation materials, thinks so, and wants to make it possible using Z-Wave wireless technology.

The company has launched its SwitchDIY product series, which provides intelligent home control of lighting systems and communicates via Z-Wave chips. This allows for management of residential and commercial lighting systems via remote control, switches or the Internet.

Based on the principle of "Easy Control & Easy Installation," Wintop has developed a solution to provide management of lighting in apartments, homes and businesses. The Basic SwitchDIY Kit consists of a remote control unit, a dimmer, a plug-in adapter and a 'build-in' module.

The remote control unit allows for centralized control of up to 45 devices or appliances, and has been developed for use in mesh-networks. An LCD screen displays the status of all the appliances being controlled, while an integrated operating wheel enables switching between the individual control units. The Braille push buttons

could have an easy scene control, allowing you to switch on or off all the devices with only one button, even in the dark.

The corresponding Z-Wave based wireless plug-in adapter can be installed without cables. This means that desk, floor and table lamps, for example, can be integrated into a home control network. The build-in modules are suited for use in new or existing home networks and can be installed under a light switch or socket, as well as in the ceiling lighting if required.

The dimmers in the Wintop SwitchDIY series mean that users can dim, activate or de-activate all the light sources in a building via remote control. The integrated Z-Wave chip makes it possible to integrate all these devices into a home control network, and also allows management of the system via PCs, PDAs, remote control units, cellphones and the Internet. The system's wireless connection also means that the SwitchDIY modules can communicate in home networks with Z-Wave appliances provided by other manufacturers.

## Toppan Forms and Stollmann collaborate over NFC in Japan

Toppan Forms and Stollmann have announced a business collaboration in product development

and joint marketing of NFC (Near Field Communication) related software products. Toppan will be a sales agent in Japan for Stollmann's NFCStack+ and is looking to push NFC at mobile phone applications.

Stollmann will supply the NFCStack+, while Toppan will provide technical services such as customization, porting to the platform or other technical support to Japanese customers. Toppan expects that this is a significant push forward for international interoperability of Japanese NFC solutions.

The NFCStack+ is a full NFC Protocol Stack solution for NFC Forum compliant devices such as mobile phones, PCs or other electronic equipment. When used with Toppan Forms modules, it enables communication with all NFC Forum and ISO NFC standards, including the FeliCa standard in Japan and the NXP's MIFARE standards.

Now that the NFCStack+ product is part of its NFC product line up, Toppan told Incisor that it can provide full solutions - hardware, software, middleware, system design and servicing - and is setting out to be a total solution provider of NFC technologies in the Japanese market.

Toppan Forms demonstrated the NFCStack+ at the Wireless Japan that took place in Tokyo during of July.

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# events



DATE	EVENT	LOCATION	NOTES	LINK
Sept 1 - 3 2009	4G Wireless Evolution Conference	Los Angeles, California, USA	-	<a href="http://www.wi-fi.org/events_overview.php?id=227">http://www.wi-fi.org/events_overview.php?id=227</a>
Sept 2 - 3 2009	Wireless China	Beijing, China	-	<a href="http://www.wirelesschina-summit.com/">http://www.wirelesschina-summit.com/</a>
Sept 13 - 16 2009	Personal, Indoor and Mobile Radio Communications Symposium 2009 (PIMRC'09)	Tokyo, Japan	The theme of the PIMRC'09 is "Giga bit Wireless for Real Personal, Indoor and Mobile Radio Communications (PIMRC)"	<a href="http://www.pimrc2009.org/">http://www.pimrc2009.org/</a>
Oct 5 - 9 2009	Bluetooth SIG UnPlugFest 34	Stuttgart, Germany	-	<a href="https://www.bluetooth.org/Events/sig_events.htm#DevelopersConf">https://www.bluetooth.org/Events/sig_events.htm#DevelopersConf</a>
Oct 7 - 9 2009	CTIA Wireless I.T. & Entertainment 2009	San Diego Convention - Centre, San Diego, California, USA	-	<a href="http://www.ctiawireless.com">www.ctiawireless.com</a>
Oct 23 - 29 2009	CAT-iq Developers Conference	Sofia Antipolis, France	-	<a href="http://www.cat-iq.org/">http://www.cat-iq.org/</a>

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