

# INCISOR™

NEWS FROM THE BLUETOOTH™ AND SHORT RANGE RF ENVIRONMENT

ISSUE 78

## IN INCISOR THIS MONTH

Welcome to the largest ever issue of Incisor magazine.

Our extended editorial reflects a number of very positive developments. First, Incisor has two new cover sponsors. We would like to take this opportunity to welcome Frontline Test Equipment, whose products are used by wireless developers across the world to ensure conformance, interoperability and quality of user experience, and Staccato Communications, one of the companies at the forefront of developments in Ultrawideband, and a founder company of the MBOA Alliance.

These two companies will help Incisor deliver quality information over the coming months, coupled with their unique insight concerning industry developments. Journalists aren't allowed into many industry events, and so we thoroughly appreciate our sponsor's ability to recount and comment upon events, developments and announcements in the wireless world.

And the other main reason for the increased size of this month's issue? That would be our Ultrawideband special focus. Whether by good luck or judgement (!), Incisor's review took place at a watershed point for UWB. With a dramatic increase in activity, and a focal point of the Consumer Electronics Show in Las Vegas, this was the perfect time to see where this exciting, high bandwidth and low power technology was going. We hope you enjoy this feature.

Next month, Incisor looks at the world of ZigBee, where the organising Alliance has recently announced that its spec has been finalised. If you are a ZigBee company, we should be talking!

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### Features:

- Bluetooth industry news ..... 2-5
- BlueCore host software gains powerful new profiles:  
*Carsten Anderson, CSR* ..... 6
- Introducing Frontline Test Equipment  
*New sponsor profile* ..... 7-8
- Driving the ultra low power RF market  
*Coronis Systems* ..... 9-10

### Ultrawideband focus ..... 12-29

- Seeking the path to UWB enlightenment  
*Incisor review* ..... 12-16
- Introducing Staccato Communications  
*New sponsor profile* ..... 17
- Can UWB achieve regulatory approval outside the USA?  
*Examining the UK regulator's report* ..... 19-21
- Sony embraces UWB - *Incisor interviews Head of Sony's European Technology standards office* ..... 22-23
- UWB - As fear turns to greed  
*Mark Bowles, Staccato Communications* ..... 24

### Wireless industry news

- ZigBee, NFC, RFID, WLAN/WiFi* ..... 32-34

### Interactive directory of wireless companies ..... 35

### Wireless industry calendar of events ..... 36

## Staccato, Intel, Philips demo Wireless USB

Staccato Communications worked with Intel and Philips to create a Wireless Universal Serial Bus (WUSB) demonstration for the Wireless USB Promoter Group booth in the MBOA Ultrawideband TechZone at CES. For the demonstration, Staccato enabled the demonstration with its radio development platform based upon its single-chip all-CMOS MBOA architecture. Philips provided the MBOA MAC and Wireless USB hardware, and Intel supplied its Wireless USB host-wire-adapter software.

USB is generally accepted to have been a hugely well accepted standard for high-speed data transfer – more than one billion ports with an additional 3.5 billion interfaces forecast to ship by 2006. The defacto standard for personal connectivity of PCs, USB is migrating into consumer electronics and mobile devices. The fast growing camera phone segment is quickly adopting USB to facilitate downloading photographs as well as connecting to PCs. But USB has always needed a cable – not cool in this day and age. Wireless USB is the next evolution of the USB 2.0 specification, and offers wireless transfer of speeds up to 480Mbps and is fully backward compatible with the existing installed base.

"This advanced demonstration shows that open standards and industry cooperation work. By combining Staccato's proficiency in all-CMOS wireless solutions with Intel's knowledge and commitment in USB and Philips' expertise in wireless USB hardware, consumers can see that



MBOA TechZone well populated at CES

the technology is real and know that products are on the way," said Paul Marino, VP and General Manager, Connectivity, Philips Semiconductors. "Philips has a long history of leadership in USB, and this demonstration will help to show the evolution from the wired to the wireless standard, which will bring greater simplicity and mobility to end users."

"By teaming with Philips, a recognized leader in USB devices, Staccato is able to show the results of its achievements in architecting single-chip, all-CMOS solutions," said Dr. Roberto Aiello, CEO and President, Staccato Communications. "We are promoting high levels of integrated solutions, modules that benefit from all-CMOS architectures, namely by enabling high-volume, low-cost product offerings."

USB is ubiquitous. It is hard to see how wireless USB, with underlying UWB technology, and the weight of companies like Intel, Philips, Staccato and other partners behind it, can fail to become equally widely used.

See inside this issue for Incisor's special focus section on  
**Ultra Wideband**

# CSR's BlueCore4 EDR end-product now shipping in volume

CSR is shipping in volume its BlueCore4-external Bluetooth solution, saying that this is the only Bluetooth solution currently qualified and available for enhanced data rate (EDR). CSR has also announced that the EDR solution has already been selected by Dell. The Dell Wireless 350 Bluetooth Internal Card is offered as an integrated option on the Dell Family notebooks.

Bluetooth EDR is ideal for PC applications in that it supports multiple Bluetooth connections. PCs will increasingly be asked to support multiple Bluetooth links as users type on a Bluetooth keyboard and move a Bluetooth mouse while listening to music on a set of Bluetooth stereo headphones and synchronising contact details with their phone or using the phone as a modem to connect to an email or internet service.

EDR offers a maximum data transfer rate of 3 Megabits per second (Mbps) - compared to the



High data rate Bluetooth silicon now available from CSR

current 1Mbps for standard rate Bluetooth. This increase in transfer rate also means that, for a given amount of data, the EDR radio will be active up to 3 times less than a standard v2.0 radio, hence reducing power consumption, which greatly benefits battery-dependent mobile devices such as laptop computers.

CSR's BlueCore4-external hardware and firmware was qualified in November for v2.0 + EDR including

all of the optional EDR features.

CSR believes it is 6 months ahead of the competition in being able to supply EDR silicon to customers, suggesting that whilst other silicon vendors have recently been reported to have EDR silicon, the fact is that, as of today, only CSR has Bluetooth silicon fully qualified by the BQB (Bluetooth Qualification Board - a prerequisite before Bluetooth silicon can be supplied) to v2.0 + EDR, and CSR is also the only company to be supplying EDR silicon in volume to its customers.

Glenn Collinson, co-founder and Sales Director, CSR, commented, "We expect that customers will migrate rapidly to Bluetooth v2.0+EDR spec to allow end customers to benefit from the multiple Bluetooth links and higher data rates. This migration will mirror other similar trends such as the move from USB1.0 to USB2.0".

# Spectre signs Taiyo Yuden to enhance Bluetooth value

Modular communications specialist Spectre has signed a distribution agreement with Taiyo Yuden, adding the company's range of Bluetooth modules to its portfolio.

Spectre is focused on enabling communications for non-communications specialists, over ranges from a few feet to several miles. Spectre supports solutions based on established standards including GPRS, GSM, 3G, GPS, Bluetooth, ZigBee, ultra-wide band, TCP/IP, as well as selected appropriate proprietary solutions.

"Taiyo Yuden's philosophy is very close to our own

at Spectre, with a strong product line based on industry standards and modularity delivering maximum value," said Doug Gilmour, marketing director, Spectre Communications. "Adding Taiyo Yuden to our line card strengthens our position as the UK's most dynamic advocate of flexible, high-capability wireless communications."

Taiyo Yuden's module line-up offers a range of options, giving designers the flexibility to use high or low integration architecture for their Bluetooth solution, depending on their requirements in terms of system cost, size and performance. Options include

discrete or integrated antennas, USB or UART interface and CDMA interface, plus software and firmware options including the serial communications profile SPP integrated on-chip. Full development support includes evaluation boards and software evaluation kits.

Taiyo Yuden plans new additions including longer-range Bluetooth Class 1 modules and support for the Intel WCS Phase-II Coexistence specification, which allows both Bluetooth and IEEE802.11b/g Wireless LAN technology to operate simultaneously on the same platform.

# Cetecom tester validated

Cetecom's BITE Protocol Tester v1.1 & v1.2 has recently been validated by the Bluetooth SIG for the following parts of Bluetooth Specification Version 1.1: Baseband, Link Manager, Generic Access Profile, Service Discovery Profile, Serial Port Profile and RFCOMM.

Cetecom claims that the BITE Protocol Tester is the first conformance tester to implement the official V1.2 TTCN test vectors specified by the Bluetooth SIG supporting Adaptive Frequency Hopping (AFH), Fast Connection, Extended SCO link, revised QoS and more. CETECOM has also applied for the validation of

the BITE Protocol Tester v1.1 & v1.2 in the scope of Bluetooth Specification Version 1.2: Parts B (Baseband) and C (Link Manager).

The BITE RF Tester and the BITE Protocol Tester will be updated to support Bluetooth EDR (Enhanced Data Rate) during the first half of 2005.

# Wireless beer from OneZeroOne and Carling

**This was one press release guaranteed to grab the attention of most technology journalists, and your Incisor scribes were no exception. After all, it's not often that a hack sees the words 'win a pint of Carling lager' and 'wireless technology pilot campaign' in the same press release.**

So what is this all about? Quite simple, really. OneZeroOne, which is the media technology arm of media giant Poster Publicity, is working with beer company Carling to launch a six-month wireless technology pilot campaign in the city of Bristol, England. This was launched on the 29th November.

The campaign comprises of three elements:

1. Setting up Bluetooth-enabled touch screen kiosks throughout Bristol which will give people free internet access as well as information on where to go and what to do in the city of Bristol from pubs, restaurants, hotels and shops to cultural sites, theatres and libraries etc.
2. A dedicated Carling channel on the kiosks offering people the chance to enter competitions to win tickets to Carling live music gigs in Bristol and London or to win a pint of Carling at a local pub as well as giving details of up and coming gigs at Carling music venues and the best places to get a great pint.
3. What is claimed to be the biggest ever wireless 'cloud' to date in the UK (built by Cityspace),

which will enable people to access the web wherever they happen to be in Bristol without having to find a physical internet connection point. Consumers with Bluetooth enabled on their mobile phones in the area will also be able to opt-in to receive Carling offers and Carlinglive music footage as the campaign progresses.

Chris O'Donnell, head of OneZeroOne, said: "This is the future of consumer interaction with brands. We're really focussed on 'destination planning' whereby we set up the kiosks in locations where people have completed their journey, such as shopping centres, pubs, city centres or rail stations. Here they are in a different mind-frame from when they are in the home or travelling from A to B, and are open to different kinds of messages. This is a huge pilot campaign and a great example of the future of out-of-home advertising. We will replicate

the Bristol experience in major cities across the country once we have completed our learning experience."

Nicola Young, head of Relationship Marketing at Carling, said: "We are really excited about the future opportunities a project like this can deliver. With more companies investigating the potential of new technologies to engage consumers, the Bristol pilot will enable us to experiment with a range of these devices as well as enable us to get more instant feedback from our consumers."

Incisor has commented in the past that this type of 'push' marketing – while quite probably a huge future application for wireless – is regarded by many as invasive and intrusive. These two companies do at least seem to have a reasonable chance of success based upon the fact that their target audience normally has no problem considering booze-related opportunities.



*Bristolian students wandering aimlessly, hoping to be Blue-jacked by alcohol purveyors*

## More Bluetooth direct marketing

**Dublin-based Rococo Software and Prague's Midletsoft Corporation have built a Bluetooth wireless technology solution that helps retailers interact with customers.**

Using Rococo's Impronto, a Bluetooth software development tool, Midletsoft has expanded the reach of its Jellingspot Data Server, a location-based point server platform. Jellingspot Data Server allows shoppers within a 100-meter radius of server locations to freely access information about a store, its goods and services via mobile phones and PDAs. Customers can obtain both static and dynamic electronic-based content, including text, pictures, music, video and more, directly to their mobile devices.

"Our Jellingspot Data Server gives the retail industry the ability to offer 'on demand' information that is current, free, and always available to help customers make more informed purchasing decisions on the spot," said David Stennett, CEO of Midletsoft. "Rococo's Impronto has been instrumental in helping us bring our software to the market."

"When we began building Bluetooth infrastructure for software developers, Midletsoft's Jellingspot was the kind of development project we had in mind," said Karl McCabe, CTO at Rococo Software. "Impronto helps Bluetooth developers create revolutionary applications that change the way people interact

with mobile devices and with each other. In this case, Rococo's Impronto software provides Midletsoft's Jellingspot Data Server with a Bluetooth technology solution upon which Midletsoft has built its compelling platform."

Analyst firm Frost & Sullivan predicts that by 2005 some 37 billion advertisements and alerts will be sent to mobile devices in Europe, and that 65% of users will be prepared to receive ads in this way. These messages are expected to be worth \$7.4 billion in revenues.

## Infineon launches EDR Bluetooth

**Joining the ranks of Enhanced Data Rate (EDR) Bluetooth silicon providers, Infineon Technologies has announced the availability of its BlueMoon UniCellular. It supports the Version 2.0 Bluetooth standard, as well as the new Enhanced Data Rate (EDR) functionality.**

"Market experts anticipate that Bluetooth will soon be a standard interface in mobile phones such as IrDA is today. By 2007, we expect about every second mobile phone to be equipped with Bluetooth functionality," said Dominik Bilo, chief marketing officer of the Secure Mobile Solutions

business group at Infineon Technologies AG. "Based on our extensive platform expertise, broad product portfolio and in-house system know-how, we support our customers in reducing complexity and reducing their time-to-market."

Both the reduction of the package size to 5mm x 5mm and the decrease of the number of external components from at least nine to just six results in a Bluetooth chip that covers 40 square millimetres of board space, which Infineon claims is half the size of solutions available on the market today. In addition,

Infineon's Bluetooth transceiver provides a receiver sensitivity of -90 dBm (decibel milliwatts) even in Enhanced Data Rate mode. It surpasses by a factor of ten the required receiver sensitivity specified by the Bluetooth Standard, guaranteeing a high-quality, long-range communication link. Based on Infineon's 130nm CMOS process technology, the chip has a power consumption that is about 35 percent lower than in the previous generation of Bluetooth solutions.

Sample quantities are available today. Full production is expected to start mid 2005.

## Nokia Digital Pen and IBM eServer improve efficiencies at DHL

**Nokia is collaborating with IBM and Fruits, a system integrator from Denmark, to develop a custom built mobility solution for DHL Solutions. The trio's aim is to streamline deliveries to retail customers, accelerate invoicing, and move the company towards a paperless back office. In addition, the solution provides delivery information to customers via a Web interface. The solution is based on a technology provided by a Swedish company Anoto Group, which will be familiar to long-term Incisor readers as a developer of digital pen and paper solutions that use Bluetooth technology.**

"Our customers have an immediate need to know when a delivery has been completed," said Kurt Nielsen, DHL Solutions Europe North/UK. "The Nokia/IBM solution ensures that as soon as a recipient signs for a delivery, the customer can access that information via the Web site. That is the kind of efficiency that sets DHL Solutions apart from the competition."

DHL drivers are equipped with a Nokia Digital Pen that the delivery recipient uses to sign off on a shipment. The Nokia Digital Pen connects wirelessly via a Nokia mobile business device to an IBM eServer in the DHL head office where the data will immediately be available to customers via a Web site. In areas where there is no wireless service, the solution uses automated



data forwarding, whereby the Nokia Digital Pen acts like a portable desktop, storing delivery information and customer signatures. As soon as the driver reaches another wireless coverage area, the data is automatically sent ahead.

"Other companies use portable minicomputers to perform the same tasks - only the units can cost up to €5000 and are easily damaged. The Nokia Digital Pen costs less than €250, requires no training and is rugged," said Jukka Hieta, head of global pen sales at Nokia. "This is a great example of how a small change can have a big impact."

The joint Nokia/IBM solution has apparently transformed interaction between DHL drivers and delivery recipients, accelerating the transfer of information to near-real time. During a

delivery, the recipient can check the shipment to ensure that the right items in the right amounts have been delivered. The recipient then uses the digital pen, which acts like a normal ballpoint pen, to sign a digital page of the consignment note to accept the delivery. The pen's electronics ensure that every turn and movement is registered electronically. The driver checks a box next to the signature, automatically sending the information wirelessly to the head office via a Bluetooth-enabled Nokia mobile phone.

# Mobile phones and driving legislation one year on - is it working?

The 1st December 2004 marked the one-year anniversary of the introduction of in-car mobile legislation in the UK, and although all drivers are now fully aware of the legislation, it has emerged that many are still regularly flouting the law. A survey conducted by TNS Global on behalf of hands free solutions provider Jabra (the mobile brand of GN Netcom), found that as many as 14% of drivers in Great Britain, which accounts for five million people, readily admit to still using their hand-held mobile phones while driving.

#### Key Findings:

- 100% of drivers questioned were aware of the legislation
- 14% of drivers admitted to driving while using a handheld mobile phone
- Men are more likely to ignore the legislation (17% admitted to doing so, compared to 10% of women drivers)
- Only 0.25% of drivers surveyed had been fined or warned by the police for ignoring the legislation since its introduction
- 10% of drivers surveyed would take the law more seriously and either buy a hands-free device or stop using their phones while driving if the government was to introduce harsher penalties
- 93% of respondents believe that the mobile phone legislation is important in terms of improving road safety
- 59% said they would report other drivers for flouting the law if there was a system in place to do so

Introduced in December 2003, the current legislation states that drivers caught using their phone behind the wheel face a minimum fine of £30 or conviction of up to £1000 if taken to court.

The results of Jabra's survey suggest that the legislation penalties are not severe enough to make all drivers stop using their mobile phones while driving. It is also clear that the risk of getting caught is perceived as being very low, with only 0.25% of questioned drivers having been fined or warned by the police for this



*This is the way you are supposed to do it - by law*

offence in the last year.

This doesn't mean that our police force isn't trying to do its job. On the day that Incisor was reviewing Jabra's report, the BBC news service reported that a British woman had been fined by a UK magistrate for holding an apple while turning a corner in her car. The policeman responsible for apprehending this hardened criminal admitted that he stopped the woman because he 'thought she was using a mobile phone'. This didn't stop her being prosecuted, her lawyer branding this as 'ridiculous'. As far as Incisor knows, it isn't illegal in the UK to hold an apple while driving. Hats off to the vigilance of our police force!

Back to the report. When told about the government's plans to increase the penalties to an on the spot fine of £100 and possible points if taken to court, 10% of all drivers (which accounts for the majority of drivers still admitting to ignoring the ban currently) said this would encourage them to alter their behaviour

and either buy a hands-free device or stop using the phone in the car altogether.

The majority of the population fully supports the legislation. 93% of people surveyed feel the legislation is important in terms of improving road safety: 30% of those believe it is 'absolutely critical'. The majority of drivers surveyed (59%) felt so strongly about the legislation that they would go as far as reporting other drivers for flouting the law if there was a system in place to do so.

The research found that men favoured Bluetooth headsets, with 14% of male drivers surveyed having bought them already. 7% of women have also chosen a Bluetooth solution.

Ben Bushell, Country Manager, Jabra UK and Ireland commented: 'While our research shows that the majority of people are supportive of the mobile driving legislation, there is still a large proportion that admits to, and probably many more who don't admit to, completely ignoring the ban.' Jabra is doing its bit to help, and has recently reduced the price of its best selling Bluetooth headsets to make them more accessible for all consumers.

For what it is worth, Incisor applauds Jabra's move, and that of our legislators. When it is as simple and inexpensive as it is to equip yourself with a Bluetooth hands-free solution, there's no excuse for endangering your own life and more importantly the lives of other road users.



# BlueCore host software gains powerful new profiles

Carsten Andersen, CSR

CSR's BlueCore Host Software (BCHS) is optimised for use with BlueCore silicon, enabling OEMs to implement some of the most cost-effective, lowest power consumption Bluetooth communication systems on the market. The software has the significant advantage that it contains most of the Bluetooth intelligence – including profiles, security, connection manager and application layers – and provides the source code for all upper layers of the Bluetooth protocol stack, down to the Host Controller Interface (HCI) level. A lower cost version, where the core stack (RFCOMM, SDP and L2CAP) is running on the BlueCore chip and requires less of the host's resources but with some performance trade-off, is also available. Both versions feature the same simple Application Programming Interface (API) which enables users to construct optimised Bluetooth solutions without demanding in-depth knowledge of the technology.

CSR has a policy of progressively expanding the functionality of BCHS, enabling designers to incorporate Bluetooth technology across an ever more diverse range of products and applications. Six new profiles have been added to the library in the last six months – bringing the current total to 22 – and the software continuously undergoes rigorous testing to ensure that it is fully compatible with all BlueCore chip models. This includes the new BlueCore4 chip that offers enhanced data rate (EDR) capabilities to facilitate a maximum data transfer rate of 3Mbps – three times faster than Bluetooth v1.2's standard rate – and is likely to lead to a raft of new applications involving high speed transfer of relatively large files. In line with this, CSR has recently added the Basic Imaging Profile (BIP) and Basic Printing Profile (BPP) to the BCHS profile library. The BIP uses the Generic Object Exchange Profile (GOEP) to

allow a Bluetooth-equipped device such as a digital camera or mobile phone to send one or more high-resolution image files to another Bluetooth device, such as a computer. The BPP enables a Bluetooth device such as a mobile phone or PDA to send emails, text messages or formatted documents to a printer.

In the last six months CSR has also added features like a Linux kernel space port as standard, as well as support for USB and Bluetooth v1.2 functions, such as the adaptive frequency hopping (AFH) that has been introduced to prevent interference with wireless LANs operating in the same part of the radio spectrum.

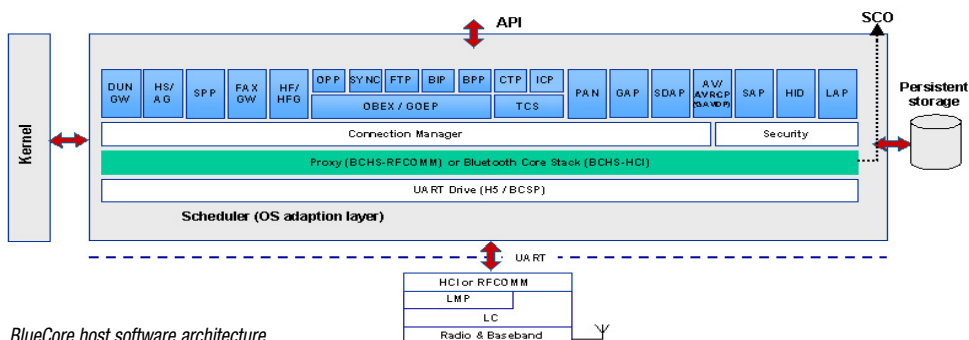
A new SIM Access Profile (SAP) had been added to further accelerate the take-up of Bluetooth in the automotive sector. People are now beginning to use Bluetooth car phones to comply with legislation that precludes use of handheld phones in vehicles, and find it advantageous to be able to exchange SIM cards between their in-car and mobile phones. The SAP facilitates remote access and control of a SIM card, and CSR's implementation includes both the client and server parts of the usage model, making it suitable for manufacturers addressing either the fixed or mobile end of the Bluetooth link. Furthermore, BCHS v10.0 provides an enhanced audio gateway, which now offers headset side control – making it ideal for in-vehicle communication applications.

On the home entertainment front, CSR has added a host-side Human Interface Device (HID) Profile and has implemented the advanced audio streaming model (A2DP) for its Audio Video (AV) profile. The host-side HID is primarily intended for computers and gaming consoles – enabling them to be controlled via a Bluetooth-enabled peripheral such as a joystick, mouse or keyboard – but it also has applications in other areas, such as retrieving information from handheld bar code scanners or remote sensors. Although the enhanced AV profile does not currently support video distribution (scheduled for Q1 2005), it does handle both 'source' and 'sink' roles, enabling an audio stream to be established or suspended by devices such as mobile phones, computers, audio adaptors, headphones and speakers. The application containing the enhanced AV profile also contains a AV Remote Control Profile (AVRCP), which allows a control link to be established between the sink and source devices.

When teamed with CSR's latest BlueCore4 single-chip silicon, BCHS provides users with a fully qualified Bluetooth radio system that provides leading-edge performance in terms of power management efficiency and high speed data throughput capabilities.

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Sponsored contribution



BlueCore host software architecture

# Incisor welcomes new sponsor:



## The leader in portable, affordable, PC-based datacom test equipment

**There are many wireless standards. Short-range technologies, such as Bluetooth, UWB, ZigBee etc, through WLAN and up to the longer range such as GSM. With many in between. These wireless standards and the industries that service them are regulated and controlled by standards bodies and national and international agencies across the globe. The end result of this? One heck of a lot of testing going on.**

Over the years that the wireless industry has existed, an industry has grown up around wireless device manufacturers' need to make sure their products are working properly and comply with all regulations. Many seem to regard the associated costs as nothing better than a necessary evil. Others see it as a way of making sure they deliver the best products to their customers, who enjoy a good out of box experience as a result, and think well of the product manufacturer and its preciously protected brand.

Not all companies in the test industry set out to be part of it. Once such company is Frontline Test Equipment, which is headquartered in Charlottesville, Virginia, USA. Frontline has sold over 30,000 data communication analysers since 1988 and is the world's number one provider of PC-based packet sniffers, network sniffing tools, and protocol analysers for special-purpose data communication networks. But if it didn't set out to do this, how did it happen? Incisor spoke to Eric Kaplan, founder and president of Frontline.

'I had founded a software consulting company here in Charlottesville in 1985,' explained Kaplan, 'We were carrying out general software engineering and development of embedded systems. We morphed into a test equipment company in the late 80's, when we needed a serial analyser. One of our guys said, "Lets build it ourselves" and so we did. It worked well, and this project was partly behind our decision to transition from a software consulting company into a product manufacturing company.'

The path to success was not always straight, though. "We designed a serial analyser in a pod, and

took the design to a bigger company in the test equipment industry,' said Kaplan. 'They liked it, and acquired the company. However, within six months that company was itself bought by another company which didn't subscribe to my idea of having a division within the company focused on creating and selling reasonably priced test equipment. Despite the fact that I had relocated the business and my family to Chicago, there wasn't much choice but to extricate the core of the business and move it back to Charlottesville.'

The business that was recreated in Charlottesville had its work cut out to be viable again, needing to re-focus amid the disruption – fiscal, people and business-related. One factor that helped was the market's ongoing appreciation of the 'analyser in a pod' design. Imitation being the most sincere form of flattery, Kaplan must have felt pretty well liked at the time as many of Frontline's competitors had copied the design.

This backbone of Frontline's product line continued to provide good revenues, and helped the company to return to profitability. Everyone knows, though, that you cannot rest on your laurels. 'About 7-8 years ago we kicked off a blue-skies design session, speculating on where we wanted the products and company to go. Out of this came a number of decisions. We moved across from DOS to the Windows environment, and continued to add features to our analysers' said Kaplan.

Frontline was building a foundation of a very strong and extensible architecture for its protocol analyser platform. Yet, once again, fate dealt Frontline a bad hand. This was the point in the early, post-Millennium years when the ITC industry started to slide into recession. 'The bubble was bursting, and we saw many test equipment manufacturers' sales slip by 50% or more' said Kaplan. Despite this, Frontline not only survived but grew slightly through this tough period.

The key to Frontline's growth was that it had entered the wireless world. A call from Broadcom's Bluetooth team, which said that it had been using

Frontline serial analysers, and now wanted a special Bluetooth version, and another call along the same lines from Bluetooth trail-blazer Silicon Wave was enough to show Kaplan that Frontline needed to be in wireless test equipment.

'We had had a very positive industry reaction to our serial HCI Bluetooth analyser, and it was fortunate that when our customers wanted a more affordable air sniffer our product architecture was applicable to it,' explained Kaplan, 'We initiated the work we needed to do to get us started.'

That may have been enough to cement Frontline's entry into the wireless market, but another move by Kaplan accelerated the process. 'At the Bluetooth UnPlugFest 6 I approached Bluetooth market leader CSR's technical officer James Collier, and explained our air sniffer proposal. James liked the idea and agreed that CSR and Frontline would cooperate on the project,' said Kaplan. 'He wanted affordable test tools for his own team. Air sniffers at this time were very expensive, and James could see that not only was this a barrier to CSR, but it was holding back the whole industry. Therefore, CSR standardised on Frontline for sniffers. This had great testimonial value for us, and was the starting point of a very valuable and productive partnership.'

This, then, was a hiatus point for the test equipment industry. Frontline's aggressively priced analysers prompted its competitors to add features to their products, or lower prices in order to compete. Or both, as Kaplan explains, 'At this time, Mobiwave – one of the most competitive vendors - was selling its product for just below \$10,000. We were below that and had many more features. CATC – one of the biggest – was forced to drop price and add value. Tektronix, Yokogawa, and Arca soon gave up. The funny thing is that at one point we were persuaded to increase our price a little in response to feedback telling us that customers considered that as our products were so cheap, they must be no good!'

Kaplan's company did not rely on aggressive pricing alone. Three functions of the Frontline tester stood out. First, a debugging paradigm invented by

Frontline enabled HCI and air testing to be carried out simultaneously, enabling microprocessor to Bluetooth and Bluetooth to Bluetooth communication to be monitored. Second, Frontline's real-time monitoring and decoding of message packets.

The third - and perhaps most significant - was that CSR allowed Frontline to re-flash CSR's BlueCore Bluetooth chip enabling the creation of a Frontline air-sniffing probe. This meant dramatic increases in convenience and portability for development engineers needing to test in many different places - their own labs, customer sites or UnPlugFests for example. Now it was possible for an engineer to carry out testing without needing to lug around normal test equipment, using instead a simple dongle or BlueCore development kit, by far the most widely adapted Bluetooth silicon in the industry.

Bringing the Bluetooth product story up to date, the current state of the Frontline Bluetooth art is its FTS4BT, a protocol analyzer that can sniff Bluetooth data six ways: (1) through the air; (2 & 3) by tapping the serial or USB HCI interface between a Bluetooth Host CPU and a Bluetooth Host Controller; (4 & 5) by spying on the serial or USB HCI connection between a PC and a Bluetooth device; and (6) "Virtually", via the Live Import feature, which permits any application to feed data into the analyzer.

At this stage, with Frontline in a position whereby its test systems are applicable across serial, Ethernet, Bluetooth, USB, and even some specialized communication buses for industrial automation, it is ZigBee and IEEE 802.15.4 that is Frontline's newest technology focus area. A different market, according to Kaplan. 'ZigBee development kits are very inexpensive,' he explained 'We have worked with semiconductor companies such as Freescale to see that the Frontline sniffer, called FTS4ZB, is included in their ZigBee development kits. Freescale has been

shipping FTS4ZB in their kit since December. This has been seen to be a good move for Freescale and the ZigBee community, as well as for Frontline.'

Nothing ever stands still, though, and some test equipment companies and test houses became nervous towards the end of 2004 as a result of the Bluetooth Special Interest Group (BSIG) hinting that it was to change the way conformity and interoperability testing would take place, which - it was suspected - would reduce the amount of testing to be done and therefore hit test companies' revenues. It hasn't panned out this way for Frontline, Kaplan pointed out. 'While wireless standards continue to develop, more testing will always result. Both Bluetooth and ZigBee have lots of new profiles, particularly ZigBee which is expected to have many custom profiles above the ZigBee stack. The Frontline tool makes it simple to support these custom profiles. In the ZigBee space new silicon companies are appearing all the time. By the end of this year I believe there will be 10-12 ZigBee development kits and I hope that FTS4ZB is in most of them.'

So, a good volume of ongoing work then, and despite the industry's BSIG-related worries, Frontline has also benefited from one particular Bluetooth testing development. As part of its end of year roadmap announcements, the BSIG announced that it was developing its own in-house development and test team, and would provide BSIG associate members and above tools that will simplify conformance and interoperability testing and reduce the need to engage external test houses. Frontline proposed to the BSIG that it would be inevitable that these tools would need support. The BSIG agreed and Frontline was engaged to fulfil this role.

What, then, of the future for Frontline? After ZigBee, Kaplan intends that Frontline will address the WLAN/Wi-Fi market. 'The Wi-Fi analysers on the market today are generally aimed at the IT industry.

However, Wi-Fi is expanding - into mobile phones for example. We already have a lot of phone companies and network operators as customers, and will have a Wi-Fi product by the end of 2005. We are proud that we have created a core platform that is common across our range of products, which means that a customer familiar with our Bluetooth analyser will be comfortable across the range of Frontline analysers.'

Frontline is a company that is soundly and successfully established as a manufacturer of highly respected test equipment, but hasn't stopped looking at other opportunities. Frontline looks to build upon its expertise in the embedded space and also to continue to provide test tools to the industrial communications industry for applications such as debugging network systems for control of oil and gas pipelines. 'We need to retain our knowledge of the wired analysis business' said Kaplan, who seems to have a permanently open weather eye for new business opportunities.

For a company that didn't set out to be a test equipment company, Frontline Test Equipment has done very well. Incisor looks forward to working with this company over the coming months.

Sponsored contribution

## Next month's issue of Incisor will include a review of the market for ZigBee technology

If your company operates in the 802.15.4 sector, and wishes to be represented, contact Vince Holton now - Email [vholt@click.co.uk](mailto:vholt@click.co.uk)

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**INCISOR™**

# Coronis Systems drives ultra low power RF market changes

**Put yourself in this situation. You are the Chief Technology Officer of a national water supply company. You have thousands of households taking their water from you and paying for usage via a water meter inside their houses. Sending operatives around to every household to take meter readings is a practice that is inefficient, and therefore costly, and you just know that there is a better and less old-fashioned way of doing it.**

Wireless technology is very obviously the way to go. But which wireless technology? You are aware that Bluetooth has been adopted by many companies building metering equipment, but Bluetooth's limited range means that you still need to send an operator to every household, and are effectively back at square one.

No, you need some sort of automated system, one that periodically reports meter readings, and which has sufficient range to be able to operate as part of a large network, communicating with one access point, which in turn is connected somehow to your company servers via the Internet or a GSM link.

Oh, and you need your device to be able to operate for very long periods of time – up to 10 years - on commonly available batteries. Another reason not to choose current Bluetooth technology.

So, what wireless technology options do you have that provide long-range capabilities and ultra low power consumption? You have heard of the IEEE's 802.15.4, ZigBee, and even something called Bluetooth Lite. All are pitched at the ultra low power (ULP), long range market. Yet none seems to be available today, or has an established standard. Where does that leave you? Back at square one?

Not according to Coronis Systems, a fabless semiconductor company based in Montpellier, France. For two years Coronis has been selling products that exactly fit the bill based around its Wavenis technology. More than 250,000 devices have been installed by Coronis partners such as EDF, France Telecom, Schneider Electric, Vivendi Environnement, various European water companies and also with Asian and North American companies. Firm customer orders for

more than 500,000 products for the next 18 months are already in place.

Marketing director Christophe Dugas explained the background to his company's success story. "The four founders of the company came from the world of automated



*Christophe Dugas, Marketing Director, Coronis Systems*

meter reading (AMR), with one of them having been Chief Technology Officer of Itron, a US company that leads this market. This background, and their involvement in the AMR industry's adoption of wireless gave them all of the experience they needed of the technology and pricing challenges."

The obvious thing to do would have been to create a metering equipment company. Coronis' founders instead chose to focus on the wireless element, thereby developing an enabling solution that could be sold to many companies, rather than servicing only their own company's product portfolio, or even the AMR market.

"We did not want to limit ourselves to just one application or industry," said Dugas. "Wavenis is targeting the Wireless Sensor Network (WSN) market, and any application where small amounts of data need to be communicated over extended distances, or when devices are hard to reach, and are consuming very small amounts of power." In addition to AMR then, Coronis is also addressing home automation, lighting, security, alarms and industrial applications with Wavenis – any application that sends small amounts of data on a regular basis, no matter how infrequent.

Coronis did not set out to reinvent the wheel, with a completely new and proprietary standard. Seeing the common sense of aligning with an existing standard, Coronis developed Wavenis as a technology whose alignment to Bluetooth is straightforward. Coronis provides the full wireless function - the hardware and the protocol stack which incorporates all the modes



required for operation of a wireless network. In addition, Wavenis has been designed to feature Bluetooth extension capabilities to open the standardization way for such an ULP wireless solution.

The headline numbers are that Wavenis devices can communicate at data rates of 20kbps over distances of 200 metres within buildings, up to 1km in clear air, and operate at an average 10  $\mu$ A, meaning up to 10 years battery life using AA batteries.

There is an important point that needs to be considered. When you are keeping a sensor network operating for several years, synchronization cannot be achieved over the total life period. In the case of such a synch network, if synch is lost, devices try to retrieve the synch and therefore enter high current consuming mode which is not compatible with long life. So, devices should synch only when they need to do so, and the communication between devices backed down immediately after. Synchronisation is done at predetermined times, which are decided by the application (access time of 1s for metering, down to 0 for lighting). In this way, devices toggle sequentially between receive mode and standby mode for most of their lives.

As the table on page 10 shows, Wavenis operates at 868 MHz in Europe and 915 MHz for the American market, with the capability also to operate at 2.4 GHz in the Industrial, Scientific, and Medical (ISM) band. "We are frequency band agnostic," said Dugas, continuing "Though thanks to better regulation in the two main frequency bands, taking advantage of non-

Features	Wavenis
Average operating current	10 $\mu$ A (1s latency)
Carrier frequency	868MHz, 915MHz, 2400MHz
Line of sight	1km (124dB link budget @ 0dBi antenna)
Indoor	200 m
Typical lifespan of equipment	10 years (AA size battery)
Data rate	20kbps
Output power	up to +14dBm
Frame sensitivity	-110 dBm
Protocol	Wavenis
Modulation	GFSK
MAC	FHSS (50kHz channel BW)

directive antenna, 2.4GHz operation is not used at the present time, but we can adapt to 2.4 GHz if we need to do so.”

Another important factor for companies looking to implement large scale, sensor-based systems is the number of devices that can be supported. Like ZigBee, Wavenis is a mesh networking technology. However, while the ZigBee Alliance states that a maximum number of 255 nodes can be supported, Coronis states that the number of nodes supported by Wavenis is unlimited. “We use concentrators as the link between the nodes and the access point, and each can handle up to 2,000 devices. However, we believe that in practice there will rarely be more than a few hundred nodes in a mesh network.” As part of its development, Coronis developed an unique mesh networking algorithm, which has already gained the admiration of France Telecom’s R&D centre.

If a lot of this sounds like Wavenis is aiming squarely at the ZigBee market, Dugas would agree, but with significant differences. “Coronis knows ZigBee technology, but we think that there are some limitations to the ZigBee spec. The limits of its range - coupled with power consumption - work against it. In order to achieve extended range they plan to have repeaters, which will of course bump up the cost of installing ZigBee networks. There are some other weaknesses. Receiver sensitivity is 95 dBm, close to Bluetooth, and we have some doubts about the physical layer (PHY). One of our key customers – one of the world’s largest providers of electric devices - looked at both ZigBee and Wavenis for lighting systems, and chose to implement Wavenis. That said, ZigBee can be good for meter reading applications in the USA, as their meters are fixed to the outside of the house, so that they are easy-to-reach devices.” commented Dugas.

Earlier in this article we mentioned Coronis’ decision to centre Wavenis technology around Bluetooth. Not a bad idea, based upon the undoubted success and growing acceptance of this flavour of short range RF. But Coronis’ target characteristics – long range and ultra lower power – immediately separates Wavenis from Bluetooth. Or so you would think. It has been widely reported that the Bluetooth SIG (BSIG) would like to expand the appeal of Bluetooth so that it could address the market that ZigBee is going for. So called ‘Bluetooth Lite’ is the answer, and either exists in various labs and is being suppressed, or exists only in the land of the fairies, depending on who you believe.

Dugas is in no doubts over the truth of the situation. “If you looked at the BSIG roadmap unveiled at the recent WiCon event, you can see that there is no intention to take Bluetooth to any higher data rates than the 3Mbps of EDR Bluetooth. The competition landscape for high data rate transfer is overcrowded by many standards and will be probably be serviced by Ultra Wideband, Wi-Fi or maybe something else even more speedy. No, the BSIG is looking at control/command, ULP applications in order to gain market share. In turn, we propose to smartly merge our RF & baseband on the Bluetooth chip that features similar architectures.” Coronis became a member of the BSIG last year, and according to Dugas has been participating in the BSIG road-mapping committee on developments to the spec in this area.

There is a clear advantage, says Dugas, to extending Bluetooth rather than adopting ZigBee. “If you do this, any ‘dual-mode’ Bluetooth-enabled product can become an access point to control Ultra Low Power end points, so that there is no need to implement a costly gateway with ZigBee. As a result, mobile

phones or PDAs can be used as a friendly remote control for alarms and home system control applications.

Some work was required to enable the Bluetooth link. “In order to implement the Bluetooth extension to Wavenis we have ‘relaxed’ some of the more stringent requirements relating to data rates and synchronisation,” explained Dugas. “At the same time, the BSIG is looking to attack the control/command market by optimising certain of Bluetooth’s features. This doesn’t mean that the BSIG will necessarily adopt Coronis’ technology solutions, but we certainly believe that we have been able to influence developments.” Coronis is content to aim at commercial rather than ego-level success, and says that if its technology were adopted as a standard, it would be content to let the Wavenis identity disappear.

Coronis’ success in selling 250,000 units did cause a little disquiet initially in its dealings with the BSIG, which expressed concern that Coronis has been marketing Wavenis as Bluetooth Lite. Coronis was able to convince the BSIG that this wasn’t so, and diplomatic relations were resumed.

So, can Bluetooth, alongside Wavenis, truly attack the ultra low power, long range market? Coronis is absolutely convinced it can. “We have operated an open book policy with the Bluetooth SIG in order to help them do so” commented Dugas. Certainly the track record of the company would suggest that there is more to come. With a staff of 40 people it has seen its revenues grow to 3 million in the year to July ’04, and is on track to see this rise to 6 million this year, and to 15 million the next.

Nor is Coronis prepared to leave too much to chance. It may be a fabless company, but not only did it develop its own core/stack, it also insisted on building the manufacturing test benches used at the subcontractors factories in Europe and China so that its products were built using Coronis tools.

And remember, while ZigBee is still working on its stack and spec, Coronis has been selling products for two years. This revenue flow is helping Coronis grow its business internationally, and the company will expand its position in North American, creating a US subsidiary during 2005.

A company to watch, we believe.



?

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# Seeking the path to UWB enlightenment

## Incisor examines the UWB market, and the challenges faced by this emerging, very high data rate wireless technology

As this article was being written, it was Golden Globes week. The glitterati gathered and the plaudits flew. In this vein, can I ask you to cast your minds back, please, to the period of two or three years from 1998?

Then, too, there was glamour, glitz, parties, celebrities, awards and sell out events all over the world. This was show-biz. Lest you think that you have inadvertently picked up a copy of the National Enquirer or Hello magazine, let me reassure that this is Incisor, and we cover the wireless industry. We were simply casting our minds back to the early days of Bluetooth.

Readers who have been with us from 1998 will know that Bluetooth hit the wireless industry with a force rarely seen before. After a period where the technology bubbled under for 6-12 months, suddenly everyone wanted to know about this thing called Bluetooth. And Bluetooth went on to be a true success. Some companies may have gone by the wayside, but others are now seeing Bluetooth provide solid and growing revenues. What's more, the way the standard was brought to market is widely regarded as having been a role model for the way these things should be done.

But why reminisce? Because it seems that lightning may indeed strike twice. While other wireless standards have appeared since Bluetooth – such as ZigBee, NFC, RFID and various flavours of WLAN, and while all of them stake a valid claim to market presence – none of them has taken the market by the scruff of the neck the way Bluetooth did. Until now, that is. And the new player seems to have been borrowing some methodology from Bluetooth, presumably aiming to achieve the same levels of success. What's more, for observers fired up by the higher data rates offered by Enhanced Data Rate Bluetooth – 3Mbps – this one seems to offer performance beyond our wildest dreams. Half a Gigabit per second, anyone?



And that's just for starters.

The new player is Ultrawideband (UWB), which seems to be in the process of exploding onto the market with a similar – or perhaps even greater – impetus to Bluetooth. Barely more than a year ago Incisor examined UWB as part of a wireless industry review, and at this point it was variously described by those that know in terms such as 'an interesting research project' and 'many years away'.

But, is UWB the next Bluetooth? And while the technology may be radically different, are we looking at a similar impact?

In the year that has past UWB has accelerated off the starting blocks and, if we are to believe the publicity, is now knocking on our door as a here and now technology. If you need to transfer very large amounts of data over short distances, very quickly, and using very little power, the solution is UWB, and that solution is available from a semiconductor company somewhere near you. This is despite the fact that a technological chasm exists within UWB that is preventing a standard being established, and – equally significantly – the technology has only so far received regulatory approval in the US. But more of that elsewhere.

One of the major milestones in the annual electronics calendar is the Consumer

### The MBOA Ultrawideband TechZone at CES

Sixteen of the most influential semiconductor, personal computing and consumer electronics companies and four industry organizations appeared together in the MBOA UWB TechZone in the Innovations Plus area of CES, January 6-9, 2005 in Las Vegas. The purpose of this joint appearance was to educate and excite the CES audience about the possibilities of UWB and to show the broad industry support for MBOA UWB technology. By cooperating, the 170-plus members of the MBOA-SIG aim to ensure that future UWB wireless enabled products, which include Wireless USB, Wireless 1394 and Wireless IP, will seamlessly interoperate and work together in the future while achieving high performing and low cost solutions.

The MBOA Ultrawideband TechZone included eight live demonstrations of the wireless technology including bulk data transfers, quality-of-service based streaming video from various sources using wireless USB and wireless IP approaches.

Exhibiting companies in the TechZone included: Alereon, Commstack, Focus Enhancement Semiconductors, General Atomics Advanced Wireless Group, HP, Intel Corporation, Mitsubishi Electric, Orangeware, Philips Electronics, Staccato Communications, Samsung Electronics, Texas Instruments, Taiyo Yuden R&D of America (TRDA), TDK, WiQuest and Wisair.

The exhibiting specification-building bodies, who are closely working together to ensure interoperability for MB-OFDM ultrawideband products, included: the MultiBand OFDM Alliance (MBOA-SIG), WiMedia Alliance, 1394 Trade Association and the Wireless USB Promoter Group.

Electronics show, which takes place in Las Vegas during the opening days of January each year. Here at Incisor, our email in-boxes started to be inundated by UWB-related press releases, announcements and invitations from early December.



UWB was hot at CES in Las Vegas

Both main camps of UWB supporting companies - the MBOA with Multiband OFDM UWB, and the UWB Forum with Direct Sequence UWB (DS-UWB) - were out in force at CES, as you can see from the panels on this and the previous page. Beyond the MBOA and UWB Forums, there are other flavours of UWB - such as that promoted by Pulse-Link. While Pulse-Link (which is known as something of a maverick) wasn't at CES, it did put out a press release during December claiming that it had achieved the highest data rates ever transmitted and received for UWB wireless communications, demonstrating 667 Mbps of throughput after forward error correction. It must be imagined that this announcement was timed to steal thunder from the MBOA and UWB Forum announcements. Pulse-Link's story is carried in a separate piece in this issue.



Massive volume potential of W-USB market attracts UWB vendors

Both the MBOA and UWB Forum are going for the high data rate cable market as one of the first outlets for UWB, with the MBOA's first significant public push being based around Wireless USB, and the UWB Forum pitching at the 1394 / FireWire sector (though so too is the MBOA). This is likely to be the first way most of us experience UWB, as a USB replacement. Staccato Communications is one of the leading MBOA companies, and VP of Business development Mark Bowles commented: 'The entire ecosystem for Wireless USB is now in place from PHY and MAC specs, to WUSB specs, to test and interoperability procedures, to SW and driver vendors, to a competitive array of vendors.' Undoubtedly, the USB market offers volume potential running into billions of units, so this initial concentration is to be expected.

## So, how close are we to having real UWB product?

The MBOA announced in November that it had completed its physical layer (PHY) 1.0 specifications and was making these available to MBOA-SIG Promoter, Contributor and Adopter members. Undoubtedly, people developing product can do so much more quickly if there is a set of ground rules to work with. Companies such as Staccato are completing integration with the Media Access Controller (MAC) and wireless USB functionality, and the MAC 1.0 spec is due to be delivered in an IP review in 30-60 days. Staccato plans to ship a complete, single-chip wireless USB solution in 2005.

For the DS-UWB camp, only Freescale's Ultra-Wideband solutions are commercially available and FCC approved, according to Franz Fink, senior vice president and general manager of Freescale's wireless business. At CES, Freescale was showing UWB applications across mobile products - a cellphone with UWB, home theatre products and enterprise/office solutions, and predicted that consumer products would be available later this year. Incisor also spoke to Martin Rofheart, director of UWB operations at Freescale, who acknowledged that although for UWB to come to market there were "still a lot of cats to



DS-UWB evangelist Martin Rofheart, Freescale Semiconductor

## UWB Forum at CES

UWB Forum members demonstrated a number of wireless consumer products and prototypes. The "industry first" demonstrations included a DS-UWB-enabled media blaster, wireless home network, set-top box, laptop, HDTV and cell phone, all leveraging DS-UWB commercial chipsets.

The proof-of-concept cell phone demonstrated by UWB Forum members Motorola and Freescale Semiconductor at CES connected wirelessly to a laptop and downloaded MP3 files from the internet or photos taken with the phone. This was apparently the first demonstration of a UWB-enabled prototype cell phone, making the potential for merging cellular wireless with UWB a reality.

Refugee from the Bluetooth SIG Mike McCamon, now executive director of the UWB Forum commented "The past year was significant for DS-UWB, having gained certification from the Federal Communications Commission and the commercial availability of DS-UWB silicon. As UWB continues to gain market momentum, our members remain committed to the standards process with a desire to see the current proposal from the IEEE® adopted soon."

UWB Forum Member Demonstrations included:

- **Coretronic** - UWB-enabled wireless media blaster
- **Global Sun** - UWB modules designed to allow customers to implement a UWB solution using the popular mini-PCI interface
- **Haier** - UWB-enabled HDTVs
- **Freescale Semiconductor** - cellular phone with capabilities to wirelessly transfer MP3 files or digital photos taken with the phone to a laptop
- **Samsung and Intellon** - hybrid wireless home network
- **USI** - turnkey 1394 module solutions for original equipment manufacturers (OEMs) eager to incorporate UWB immediately into their products

herd”, he was confident that DS-UWB-enabled finished products were only months away.

Other members of the UWB market are deeply sceptical of Freescale's claims. Staccato's Bowles commented: 'If you research almost any claim made about UWB from XSI and/or Freescale over the past few years they have turned out to be false. This includes claims about "commercially available" silicon literally dating back to 2000, claims of performance advantages, range advantages, power consumption, time-to-market advantages, claims about competitors, claims about supporting wireless USB, and unfortunately, claims about "impeccable ethics" which they claim as one of their corporate pillars.'

### A milestone is passed, support increases

We can see that the December / January period was a time when many UWB messages were being promoted. And some fairly influential parties were endorsing those messages.

Intel is a strong MBOA supporter and chief executive Craig Barrett said in his CES keynote that Ultrawideband (and other wireless connections such as WiMAX) will be vital to the processors of the future. UWB will eventually be integrated into standard silicon processors, he said, allowing consumers to quickly transfer hundreds of megabytes at a time. Barrett showed off one of Intel's developing projects, a UWB-enabled device from Wisair. Elsewhere, Microsoft announced UWB drivers, and Nokia announced a preference for MBOA UWB because of its out-of-band emissions, saying it had looked closely at the various forms of UWB and determined that MB OFDM provided the best characteristics for coexistence with mobile phones. This was down to better performance, lower OOB emissions, and ability to adapt digitally to different regulatory environments.

Global giants like these companies don't often make statements - and announce software support in Microsoft's case - unless they are prepared to back them up. Maybe lessons have been learned. Can you remember how long it took Microsoft to get its Bluetooth act together? The Bluetooth SIG and its members learned well the value of winning this level of support. Many of those people driving Bluetooth development come from companies that blazed the Bluetooth trail, and so are bringing that experience with them. The UWB Forum now has Mike McCamon as its executive director, when he formally held

that position at the Bluetooth SIG. A good move for the DS-UWB people, but there's always the chance that Mike has backed the wrong horse in what is in reality a two horse race.

CES undoubtedly was a watershed, then, in the UWB marketing campaign. Mike Kelly, VP of marketing for Focus Semiconductor, which has a video technology background, confirmed CES' importance to UWB players. "I am sure I am not alone in having been worried that the political overtones of developments in UWB could be causing potential customers to lose interest. It has been a bit of a soap opera. CES, though, was certainly a very important milestone. It was eerily impressive, seeing major corporations such as HP, Samsung, Texas Instruments and many more co-operating with much smaller companies such as ours, and operating in harmony to deliver the UWB story." At CES Focus set out its stall with targets of delivering wireless video ranging from 880Mbps at 8 meters to 37 mbps at 40+ meters.

### Which side of the divide to fall?

So the providers say they have product (or can demonstrate actual chips anyway - and are promising to ship you product soon) and the industry giants are behind the technology. With just the matter of there being two types of UWB to choose from, and limited regulatory support, where does that leave us? Or rather, where does it leave a consumer electronics company that is convinced by the publicity, has equipment such as home cinema systems, video and still cameras, PCs and mobile devices that all want to share rich media content? Because if they do implement UWB in their consumer products, they may have to quickly go into re-design mode if the market chooses VHS over their Betamax (to use an oft-quoted simile). What's more, they can only currently sell any products they do build in the US market. Which is, admittedly, a large and tech-savvy territory.

We are not going to tackle the technical debate between MBOA and DS-UWB here. Beyond the fact that we are not sufficiently technical to do the subject justice (though we will provide opportunities for those that are in a later issue), Incisor has looked at this before, and there are arguments for either solution. Both MB-OFDM and DS-UWB unquestionably provide working UWB solutions.

Both are vying for the attention of the IEEE in the race to establish an UWB standard, and this will continue. While this article was being

written, another IEEE meeting was held in Monterrey, California, and the issue of which UWB flavour would achieve dominance in establishing the standard was again on the agenda. Incisor has spoken to a number of people that attended this meeting and understands that a state of complete and utter stalemate exists, with no progress having been made since the last meeting. We get the feeling that many of the participants are now getting a little tired and emotional, with plenty of toys being thrown out of prams. If there is ever to be a standard for posturing and sabre-rattling, surely this is the role model for the creation of the spec.

More than one participant has told us that it has been acknowledged that no further progress can be made through talking and further meetings, as vast amounts of time and resource are being wasted.



Staccato's Mark Bowles unconcerned by IEEE stalemate

Mark Bowles summed it up this way: 'The IEEE standards battle over UWB has been overblown in the press. By July 2003 both sides, Freescale and MBOA, realized that the deadlock would not be resolved within the walls of the IEEE but instead needed to be taken to the market for a ruling. The IEEE process became irrelevant at that point because both camps had power to block the other since 75% majority is needed to win. The market has since ruled and MBOA won resoundingly.'

Apparently, the most likely next development is that there will be a technical showdown in the next few months - May has been suggested - where each party is required to demonstrate a fully working hardware solution, with all elements of performance against claims being measured. A pretty clear way of deciding a winner, but will this shoot out at the UWB-OK Corral resolve this matter? Only time will tell.

**MBOA – big numbers, big names**

There is one factor, though, that is undeniable. That is the weight of numbers advantage enjoyed by the MBOA. Read the list of 170 MBOA member companies on its web site ([www.multibandofdm.org](http://www.multibandofdm.org)), and it is hard not to be impressed, especially when that list includes such luminaries as Texas Instruments, Intel, Microsoft, HP, Sony, Hitachi, Nokia, NEC, Philips, Samsung, Toshiba and Seiko Epson and many more big names. These are quality supporters and a lot of them are big time consumer electronics companies. The UWB Forum has issued a press release stating that it now has 100 members. Check out it's listing at [www.uwbforum.org](http://www.uwbforum.org), though, and it is much harder to spot 'names'. Only Freescale, Motorola (kinda predictable), Samsung and RF Microdevices stand out (note though that both of the last two are also MBOA members - it's called fence-sitting, more of which later). Mark Bowles pithily summed up the imbalance in last month's issue of Incisor, "Despite the publicity, the DS-UWB camp is just a couple of companies. The MBOA enjoys the support of 9 out of the top 10 semiconductor companies (the majority of which already have MBOA silicon projects underway), all of the top CE companies, and all of the major PC and PC peripheral players, the top handset vendors in the world (except Motorola), and the organizations of WiMedia, Wireless USB and the 1394 TA. Freescale basically has the support of themselves and maybe Motorola for now".

That's as may be, but despite the fact that the MBOA has more and more powerful members, the UWB Forum maintains that DS-UWB has a time to market advantage. Prior to the dot com crash in 2001 a number of companies were working on developing UWB technology, and of those, only Xtreme Spectrum (and Pulse-Link) survived. Xtreme is a company in which Freescale Semiconductor invested (aka swallowed), and the legacy of Xtreme's prior development has meant that Freescale has been able to hit the market with its DS-UWB solution a little before the MBOA companies. How far ahead? About 6 months by most people's reckoning, but some of the gnarlier, pepper-breathed representatives of the MBOA have been heard questioning the veracity of Freescale's claims.

Is Freescale's silicon readily available? Or not? Incisor was told that a potential customer called Freescale regarding their UWB EVK, and



*FreescaleUWB silicon –they say the camera doesn't lie, but sceptics question - can you buy it?*

received the following reply: *'We do not have any platform available for the general public at this time. Freescale will be introducing a low cost (less than \$1K USD) UWB Evaluation Kit at the end of March 2005. This evaluation kit will allow testing of several radio modes (for performance and interference testing) as well as the ability to perform data transfer and video streaming. It will allow operation at several speeds up to 110 Mbps. It is an evaluation, not development, platform and will not enable MAC protocol development. A full featured development platform will be introduced in the 2H of 2005.'* This, it must be said, is hard to square with Freescale's public claims.

**Give me UWB, and give it to me NOW!**

The general view is that Freescale will win some business simply because it will have UWB product first. And, in what is an unusual situation for the tech industry. We are used to writing about technologies that are looking for applications/markets. Here the tables are turned and there are customers out there that want a wireless standard that does what UWB does, and they want it now. Consumers are today using devices that create, manipulate and distribute rich, digital media – video, photo and other forms of imagery, sound, etc. Products such as camcorders, still cameras, home cinemas, hard disk recorders and set top boxes for TVs, MP3 players, smartphones, PDAs and all sorts of mobile computing devices. At some point they all need to move that content from one place to another. For once its not the case that it will be useful to have a new, very high speed wireless solution soon – these customers have been needing it for months if not years and

the need just keeps growing. Our separate story with Sony confirms all of this.

Incisor's assessment is that it will be possible to buy DS-UWB products in the US at least some time around mid-year, but buyers need to be wary. Depending on the way the market goes, a product that they buy mid-2005, based around DS-UWB, could be obsolete (or at least of limited interoperability and therefore usefulness) within six months.



*Wireless connectivity is high on the wish list of consumers installing home cinema systems*

**An iron grip, or loosely held?**

So let's reassess the situation. There is a technology called UWB that is rushing to market. It only has regulatory approval in the USA (but that will change – see separate story). There is a question mark over exactly what our UWB will look like (MBOA? DS-UWB?), - BUT – there is strong consumer demand and therefore it is unlikely that the governing bodies – from the IEEE to the ITU, the MBOA to the UWB Forum – will be able to stop UWB devices being rushed to market. These devices may be demonstrating not only one of two possible technical backbones, but quite likely a whole bunch of proprietary 'enhancements' here and there to facilitate features specific to some vendor's market sectors. If there is one way in which UWB is absolutely not like Bluetooth at this point in time, it is this. The Bluetooth SIG kept an iron grip on the way the Bluetooth standard was developed. There was no leeway that could have permitted a company to market products and call them Bluetooth-enabled unless that company was a BSIG member, the product complied fully with BSIG guidelines, had been through all required testing and had been certified as compliant. The BSIG meant business, too, and employed good lawyers.

And this is where UWB could benefit from being more like Bluetooth, and many of its members know this. Over the course of preparing this feature, representatives of both MBOA and DS-UWB companies have openly associated UWB with Bluetooth, and have talked

off the record about matters that we cannot currently disclose. Incisor approached the BSI for comment, but at the moment they don't want to talk. Which is fair enough. As we acknowledge above, part of the reason for Bluetooth's success, which is what draws others to want to replicate its modus operandi, is that it (the BSI) did exercise proper control over the way the standard was managed – internally, and in the way information was disclosed to the outside world (OK – it screwed up a bit by suffering the consequences of some over-hyping in the early days – BUT, it learned the lesson).

Staccato's Bowles commented: 'Some have speculated that UWB and Bluetooth are on a collision course but I see it differently. UWB is a PHY technology and an unlicensed spectrum resource that can be leveraged by Wireless USB, Wireless 1394, Wireless DVI, TCP/IP, and Bluetooth alike. The question is really about

standardizing a UWB PHY and MAC that can be leveraged for multiple protocols, in multiple application segments, for multiple regulatory geographies. The MBOA/WiMedia PHY/MAC combination has specifically addressed these questions and it would make a great choice to support next generation Bluetooth.'

All that Incisor will say for now is that there look likely to be interesting developments to come in this area. More of which, soon.

Bluetooth is not the only wireless association with which UWB is connecting. Although this is not official yet, we have it on good authority that we could soon be hearing wedding bells, with the MBOA the handsome groom and WiMedia the blushing bride. And Freescale's Rofheart was making noises about DS-UWB's close entwinement with the 1394 trade association.

So, concluding this UWB magnum opus, is UWB going to happen? And is it the new

Bluetooth? The answer to the former is undoubtedly yes. Though, if this was reliant on the various parties promoting UWB solutions to be co-operating to create one stable, clear-cut standard which was the basis for the development of easy to use products that demonstrated pan-industry interoperability, then we would raise an eyebrow and say – maybe, but when? However, there is currently too much market pull. Vendors will have to build something to satisfy the demand for a very high data rate, low power wireless solution.

And the latter – is UWB the new Bluetooth? That one is much harder to answer. Incisor feels that this is a truly fascinating element of this whole discussion, with important developments to come. We look forward to covering this in more detail in future issues.

## Wireless Snippets

# Wireless Snippets

## WLAN/WiFi

### PENNSYLVANIAN GOVERNORS TRY TO STOP THE WORLD

The "pithy phrase of the month" prize goes to Dana Blankenhorn, business journalist and founder of Interactive Age Daily, who commented on the recent Pennsylvania law banning municipal WiFi: "Verizon thinks it can stop the future. No. They can stop it in Pennsylvania, but they can't stop the future."

### FATPORT AND REMOTEPIPES LINK OVER WI-FI INTERNET ACCESS

FatPort, an Ignition Point company, and RemotePipes, Inc., a provider of global wireless Internet access solutions, has signed a distribution and roaming agreement to enable RemotePipes and their channel partner's customers to connect to the Internet and corporate networks via the extensive FatPort Wireless Internet Access network.

RemotePipes and FatPort have completed the integration of the FatPort network of Wi-Fi hotspots into the RemotePipes IP Roamer branded global Internet access network, which consists of over 25,000 global dial-up and Wi-Fi access points in 150 countries.

RemotePipes was forecasting that the IP Roamer network would span over 35,000 dialup and WiFi zones and hotspots by the end of 2004 and well over 50,000 locations and hot spots by 2005.

### BANDSPEED ANNOUNCES WLAN PATENT

Bandspeed has been awarded a patent on improved wireless crosstalk cancellation and interference suppression technology. The patent describes new techniques which can improve 802.11n signal reliability and clarity, and it is applicable in MIMO (multiple-in, multiple-out) systems.

"The patent describes methods to perform source separation, which can be used to enhance standard source separation (MIMO) techniques that separate frequency overlapped streams by also exploiting diversity in time," said Stan Skafidas, co-founder and CTO, Bandspeed.

### WORLDWIDE WLAN UNITS CONTINUE TO GROW IN 3Q04

In 3Q04, Wi-Fi unit shipments increased 12% from 2Q04. 10.99 million units shipped in 3Q04 compared to 9.82 million units in 2Q04

according to market research company In-Stat/MDR.

Strong growth segments included 802.11g NICs and APs. The 802.11g standard is the faster successor to the popular 802.11b. An 802.11g access point will support both 802.11b and 802.11g clients. Similarly, a portable computer with an 802.11g NIC can access existing 802.11b access points as well as newer 802.11g access points. NIC unit shipments for 802.11g increased 32% from 2.83 million units in 2Q04 to 3.75 million units in 3Q04. AP unit shipments for 802.11g increased 30% to 3.55 million in 3Q04 from 2.74 million in 2Q04.

The multimode NIC market saw healthy growth as well. Multimode NICs are capable of operating at 2.4GHz or 5GHz. Unit shipments for multimode NICs increased 17% from 2Q04. Revenue for multimode NICs increased 14%.

# Incisor welcomes new sponsor:



## Developers of single chip, all-CMOS UWB solutions

Incisor magazine is enormously pleased to welcome on board a new main sponsor from the world of Ultrawideband (UWB). This wireless technology is currently enjoying a dramatic expansion in activity.

As reported elsewhere in this issue, Intel chief executive Craig Barrett singled out UWB as a key wireless technology in his keynote speech at CES. Operating at 480 Mbps, UWB will eventually be integrated into standard silicon processors, allowing consumers to quickly transfer hundreds of megabytes at a time.

Incisor's new sponsor Staccato Communications is a key player in the UWB industry. The company is a Wireless USB and ultrawideband (UWB) RF technology pioneer based in San Diego, Calif. The fabless semiconductor company serves the consumer electronics, personal computing and mobile phone industries with single-chip, all-CMOS wireless solutions and places a strong emphasis on wireless USB applications.



Robert Aiello, founder and CTO of Staccato Communications

Staccato was founded in 2002 by Roberto Aiello and other UWB and RF CMOS veterans to pursue a fabless semiconductor business model. Staccato has since built the first all-CMOS MultiBand OFDM silicon prototype that is within the guidelines of current regulatory requirements and demonstrates the viability of low



cost all-CMOS high-performance radios for Wireless USB and other MBOA applications.

Staccato is currently working with its partners and customers in the consumer electronic, personal computing and mobile phone industries to provide solutions for Wireless USB and 1394 applications. Staccato is implementing its all-CMOS silicon to achieve the market requirements for low-cost solutions. Both the PHY (physical layer) and MAC (medium access control) architectures have been designed according to MBOA specifications with the needs of Wireless USB and 1394 in mind. Staccato envisions true single-chip, all-CMOS radio modules for low-risk implementation.

Staccato has forged strategic industry alliances with partners including Abocom, Coretronic, Fujitsu, Intel, Samsung, TDK, and NEC Electronics to accelerate time-to-market of UWB-enabled products and is financed with \$27.5M from tier 1 venture capital firms. Staccato's leadership role in the industry and standards forums provides the company with a clear understanding of product requirements.

The company is leading industry development of the first Wireless USB all-CMOS silicon and integrating its silicon into miniature modules to enable fast time-to-market and minimal design-in risk.

Members of the company's executive team have promoted all aspects of bringing ultrawideband into the mainstream including years of work seeking regulatory approval with the FCC, and are currently active in promoting industry standards through the Wireless USB Promoter Group (Key Contributors), 1394 Trade Association (board member), MultiBand OFDM Alliance SIG (founders and steering committee), WiMedia Alliance (contributor members), IEEE 802.15.3a (founding participants and past technical editor), and IEEE 802.15.4a (founding leadership and vice chairman).

As 2005 develops, it will become apparent that UWB is an enormously important wireless sector. Incisor sponsor Staccato Communications is a leader, and one of the companies driving the standard forward. Here at Incisor publisher Click I.T., we can promise that the Incisor / Staccato partnership will bring news of dramatic developments in the coming months, and will help our readers be apprised of all of the latest UWB developments.

For further information:

Web: [www.staccatocommunications.com](http://www.staccatocommunications.com)

Email: Business enquiries - [business@staccatocommunications.com](mailto:business@staccatocommunications.com)

Email: General - [info@staccatocommunications.com](mailto:info@staccatocommunications.com)

## Staccato attracts Rick Kornfeld as CEO and Marty Colombatto as chairman

Staccato announced at the end of December that Rick Kornfeld has joined its executive management team as president, CEO and board member, effective immediately. Mr. Kornfeld earned distinction for many innovations in the field of wireless voice and data

communications. Most recently he was vice president and general manager of Texas Instruments' Wireless Centre responsible for TI's wireless chipset business. Additionally, Staccato announced that Marty Colombatto, former vice-president and general manager of Broadcom's

Networking Business Unit, has also recently joined Staccato's board of directors as chairman.

Dr. Roberto Aiello is transitioning into a full-time CTO role while retaining most of his current duties at Staccato.

# 1394 Trade Association moves on Protocol Adaptation Layer for MBOA MAC

**The 1394 Trade Association is set to move forward on the development of a new protocol adaptation layer (PAL) that will support the Multiband OFDM medium access controller (MAC) scheduled to debut in 2005. The 1394 Trade Association is a worldwide organization dedicated to the enhancement and proliferation of the IEEE 1394 multimedia standard which defines a high speed serial bus. This bus is also named FireWire by Apple or i.Link by Sony.**

Work will begin in January under the leadership of the trade association's Wireless Working Group, chaired by Peter Johansson. Designed as a standard convergence layer between the MAC and applications developed for wired 1394, the PAL will build upon the 1394 infrastructure, including data formats, connection management schemes and time synchronization procedures, to ensure top-quality wireless FireWire service. "The FireWire infrastructure is extensive and well-proven, and it will provide the MBOA MAC with the middleware

essential for unsurpassed wireless quality of service," Johansson said.

Adaptation of the 1394 infrastructure to the planned MBOA MAC enables the reuse of middleware for streaming audio/video and other multimedia applications. The PAL permits IEEE 1394 devices and protocols to be used in a wireless environment at speeds up to 480 megabits per second, while allowing compatibility with existing wired 1394 devices. "Wireless 1394" consumer electronics products will interoperate with each other and can work with FireWire products via "wireless 1394.1" bridges, which are supported by the wireless 1394 PAL. Wireless 1394.1 bridges are based on IEEE Std 1394.1-2004 and incorporate a wired 1394 node and a wireless node. The bridge routes both "best effort" and streaming multimedia data between the wired and wireless domains.

The PAL will be the third to appear on the Wireless Working Group's agenda. The first, a PAL tailored to the IEEE 802.15.3 MAC, was completed

last spring and is currently under revision to align it with IEEE P802.15.3b. In the fall, the 1394 Trade Association announced its planned collaboration with the MultiBand OFDM Alliance to coordinate the development of UWB and wireless 1394 specifications, including the development of a wireless 1394 PAL that supports the MBOA MAC.

The Wireless Working Group also participates in the WiMedia Alliance's MAC Convergence Architecture (WiMCA) project, with its focus on developing common policies for UWB devices so multiple applications and users can share UWB resources.

As a footnote, the Wireless USB Promoter Group, which was formed in February 2004 to define the first standard for high speed wireless personal connectivity, reached a membership milestone in this month by gaining more than 85 member companies since soliciting contributors to the Wireless USB (WUSB) specification definition in November 2004.

## Alereon intros 480Mbps UWB eval kit

**Alereon, which is seen to be one of the leading fabless semiconductor company developing wireless solutions for the UWB and Wireless USB (W-USB), has announced availability of the AL4000-EVK Evaluation Kit, which is an UWB hardware and software environment for developing and testing UWB applications. The kit is based on the Alereon AL4000 series UWB chipset which operates at speeds from 55Mbps to 480Mbps; Alereon claims that this is nearly 5 times faster than any other UWB personal area network (PAN) chipset.**

The MBOA compatible AL4000-EVK combines Alereon's AL43000-EVB MAC and AL4400-EVB PHY evaluation boards with a PC motherboard in an 8" enclosure. The kit also incorporates multiple USB, IEEE 1394 (Firewire), Ethernet, video, audio and serial ports and includes a DVD drive, thereby



*CES provided launch pad for Alereon EVK*

creating a complete platform for prototyping or developing PC or consumer electronic-based applications. Initial systems will come with Microsoft's XP operating system, with both

Windriver's VxWorks and Linux installations available.

Alereon's AL4300-EVB MAC evaluation board is at the heart of the new test platform. The PCI-based MAC provides an option slot for an MBOA compatible PHY module based on Alereon's transceiver and 0.13micron mixed-signal CMOS baseband processor.

"We are very pleased with the rapid progress of our technology development, including the world's first demonstration of UWB connections at 480 Mbps.," said Eric Broockman, chief executive officer of Alereon. "The introduction of the AL4000-EVK is yet another important milestone in the company's growth, as partners and customers increasingly look to Alereon for leading MBOA-compliant UWB solutions."

# Can UWB achieve regulatory approval outside of the USA?

## Incisor examines the UK regulator's findings with analysis from Janette Dobson, Mason Communications

All discussions regarding UWB's value are tempered by the fact that this is a wireless technology with roots deeply-embedded in military and government agency serious applications – radar systems for missiles and so forth, airspace control systems etc. As such, its not as straightforward to obtain regulatory approval if you want to create a standard to use UWB for everyday applications.

The FCC set the marker when it approved UWB for use in the USA in 2002. Somewhat surprising this, as the US authorities are not known for taking the lead in such matters.

The regulatory situation outside of the USA was the subject of many of Incisor's discussions with UWB company representatives. Europe is an enormously important market, and here many eyes were looking to the UK regulator Ofcom, which was due to report its initial findings at the end of 2004. Ofcom had commissioned independent consultants Mason Communications and DotEcon to report on the overall value – or otherwise – of allowing UWB to gain regulatory approval in the UK. An extract from the concluding section of this report is contained in the panel overleaf.

Ofcom's summary statement was published on the 19th of January, and is published in full below in order that we can't be accused of misinterpretation. We have highlighted the key statements. Incisor subsequently contacted Mason Communications to help interpret the Ofcom announcement, and their / our comments follow:

### Ofcom proposals for Ultra Wideband high-speed wireless services

Ofcom today published its proposed policy in respect of the use of Ultra Wideband (UWB) devices in the UK, which Ofcom plans to adopt

as part of ongoing discussions within Europe on a harmonised approach to UWB. *Independent analysis has pointed to potential benefits for UK businesses and consumers were UWB devices to be allowed.*

Ofcom is seeking views on whether such devices should be allowed, and also which technical restrictions would mitigate the risk of interference to other wireless services. Ofcom has set out proposals for such technical restrictions, and is also undertaking further analysis to determine the likely impact of any introduction of UWB technology on specific existing and future services.

Ofcom is required, under Section 3 of the Communications Act 2003, to secure the optimal use of the spectrum and secure the availability throughout the UK of a wide range of services. Section 4 of the 2003 Act requires Ofcom to promote competition and contribute to the development of the European internal market. Under Section 154 of the 2003 Act, Ofcom must also have regard to economic and other benefits that may arise from the use of wireless telegraphy.

### Background

UWB devices transmit signals simultaneously over a wide range of frequencies and are therefore capable of a far higher data transfer rate than devices using similar wireless technologies.

UWB devices could, for example:

- Deliver wireless connections between DVD players, displays and speakers;
- Provide a high speed wireless link between digital cameras and computers; and
- Link PCs, printers and storage devices in a local area network.

UWB is already allowed in the UK under licence to allow engineers to probe runways and other surfaces for faults, help firefighters detect people through walls and for other specialist industry uses.

*Ofcom's initial view, on which it is seeking opinion, is that to allow UWB on a licence-exempt basis, and subject to appropriate technical restrictions, would align well with its statutory duties. An independent economic study, prepared by Mason Communications and DotEcon and also published today by Ofcom, has estimated that significant economic benefits are likely to result from UWB use for the UK economy.*

### Minimisation of interference

*Identification and exploration of measures to avoid harmful interference, particularly to services such as 3G mobile, wireless broadband and radio astronomy, are a key priority for Ofcom. Ofcom recognises that the potential for interference, and the likely level of any such interference, needs to be weighed carefully against the potential benefits of introducing UWB.*

*The Mason / DotEcon study proposes a technical 'mask' - a set of requirements that all UWB devices would have to adhere to - which Ofcom suggests would significantly reduce the risk of interference to most spectrum users. Ofcom is also commissioning further research into specific areas as indicated in the consultation document.*

### UWB in the US

In February 2002 the US Federal Communications Commission (FCC) authorised the commercial deployment of UWB equipment in the US. *It is possible that UWB equipment*

licensed for use in the US may not be appropriate for use in the UK. Ofcom therefore wishes to finalise its approach to UWB as quickly as possible in order to give clarity to stakeholders in both countries.

#### Next steps

In April 2005, the European Commission will consider initial work on identifying a harmonised approach to UWB adoption across Europe. Ofcom intends to use this consultation to gather opinion on its proposed approach so that it can input into subsequent European harmonisation work with the aim of reaching a pan-European position that is well aligned with the interests of the UK.

The closing date for responses is 24 March 2005. The consultation document and the Mason / DotEcon study can be found at [www.ofcom.org.uk](http://www.ofcom.org.uk)

#### Incisor comment:

As the statement above mentions, Mason Communications was employed by Ofcom to do the background research necessary to make any decisions. We talked with Janette Dobson, senior consultant at Mason, and one of the people responsible for producing the UWB report.

The key statement that Ofcom made was that at this stage it looked likely that approving UWB would bring net benefits to the UK market, from

consumer level right up to overall financial balances. As soon as this statement had been released (before, in fact, as some people had managed to obtain pre-announcement feedback), UWB companies were heralding Ofcom's positive view as clearing the way to mass global regulatory approval.

Typically for such statements, though, the Ofcom announcement doesn't tell us much more than that basic observation that UWB could be OK. Dobson agreed. 'Its quite 'green', and appears to ask a lot of questions' she said, adding 'Ofcom is cautious as it has to be aware of how its decisions will affect or be affected by those of the EU Commission.'

Perhaps naively, we suggested that it would be a long time before we had a final decision from Ofcom. After all, hadn't it taken years to get to this stage? Dobson disagreed 'I firmly believe that Ofcom is committed to bringing this to a conclusion sooner rather than later. Definitely before the end of 2005, and maybe as soon as the middle of the year.'

Incisor still has questions over how a technology can gain regulatory approval when there is so much disparity in the ranks over the definition of the standard and its technical background, and sought Dobson's views. 'I believe that at least for a period of time, there will be different versions of UWB coming to market, perhaps matched to different applications,' she commented, continuing

'Probably Pulse-Link will stay away from consumer electronics, sticking instead to niche markets like military, transport and health. When you consider the MBOA and DS-UWB debate, it may be the case that both prevail, and some of their products will not interoperate. The DS companies could become successful in home entertainment systems, and the MBOA in the PC space.'

Was Dobson a fence-sitter, or did she believe that one of the two main UWB offerings would dominate? 'I believe that the MBOA will come out the winner, due to the key support of companies like Intel, and the sheer number of companies behind MB-OFDM UWB.'

So there we are. Ofcom seems to be clearing the way to approve UWB in the UK, and hopefully Europe. That's enough for many of the UWB marketeers!

The story that follows provides more details from Mason Communications' report for Ofcom, and Mason's own recommendations.

## Mason Communications recommends draft ETSI standard

**Mason Communications' report was commissioned by Ofcom to provide an independent analysis of the costs and benefits which are likely to be associated with the deployment of UWB technology in the United Kingdom, in order to assist Ofcom in its development of policy in this area.**

Mason Communications wished to clarify that the assumptions, conclusions and recommendations expressed in the report were entirely those of Mason and DotEcon and should not be attributed to Ofcom.

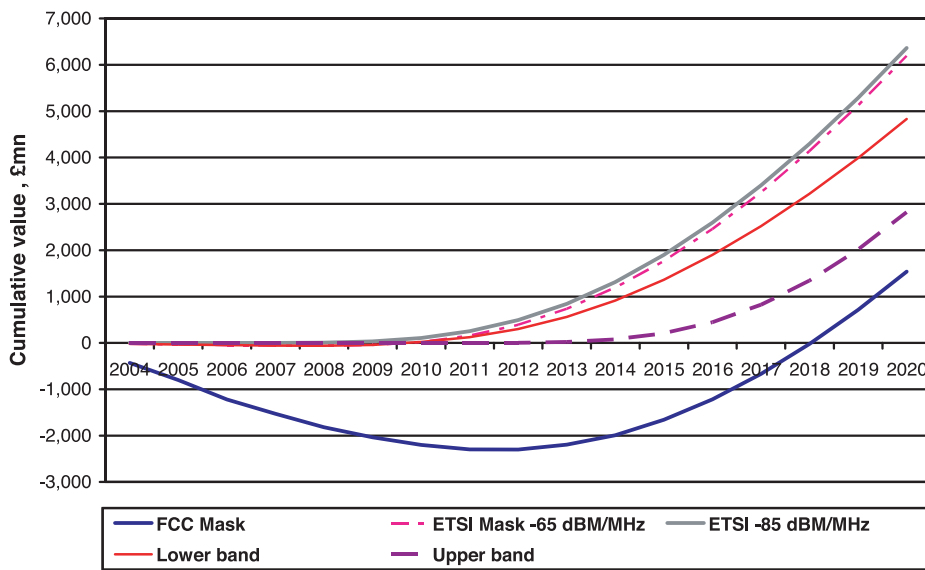
With the usual risks associated with extracting conclusions from a long (218 page)

report, and without having space to include all the qualifying statements and assumptions, Incisor can report that Mason Communications made the following concluding statement:

"The objective of our study has been to quantify the potential value of UWB PAN applications to the United Kingdom, based on assessment of net benefits versus potential interference costs to existing radio users. Our conclusion is that UWB PAN applications have the potential to make a very valuable contribution to the UK economy, generating billions of pounds in value over the next 15 years (cost calculations relate only to UMTS interference, which, as discussed in this report,

is expected to account for the vast majority of all external costs).

For the period to 2020, net private benefits exceed external costs under all the regulatory scenarios considered by the year 2020 (however, in the case of the FCC mask, a positive net value is not achieved until 2020 and significant external costs are present in the period preceding this). There are large variations in value between the alternative scenarios, as illustrated in Figure 7.1. The value to the United Kingdom is likely to be maximised if chipsets deployed meet the draft ETSI standard or a modified version of this.



"Figure 7.1 graphic extracted from Mason Communications ([www.mason.biz](http://www.mason.biz)) report "Value of UWB Personal Area Networking Services to the United Kingdom - Final Report for Ofcom"

**Recommendations**

Based on these conclusions and taking into account the limitations of this study including the fact that the costs associated with some services have not been quantified, we offer the following recommendations:

1. Ofcom pursues a policy within Europe of promoting the draft ETSI UWB mask for UWB PAN applications, possibly subject to modifications of the roll-off below 3GHz (see point 2 below). This recommendation is based on our understanding from manufacturers that UWB chipsets can meet the tighter limits applying at the edge of the mask relative to the FCC mask.
2. There appears to be scope for tightening the roll off of the ETSI mask below 3 GHz to introduce additional 10- 20dB attenuation in the 2 GHz band without eroding UWB benefits. At a PSD level of -85 dBm/MHz, we have calculated that costs to UMTS operators will be minimal. Therefore, there does not appear to be any compelling reason for applying power restrictions below this level. The case for imposing a limit between -65 and -85 dBm/MHz rests on the assumption that UWB chipsets under development can meet any tighter restrictions, which is subject to further verification with manufacturers. Any constraint that required new chipsets to be

developed for the European market and thus significantly delayed the launch of UWB would have a detrimental impact on value.

3. Both the upper and lower bands should be made available for UWB<sup>1</sup>. Restricting UWB to the lower band would potentially constrain future value for no obvious benefits. Restricting UWB to the upper band only would be value destructive.
4. There is scope for further investigations into the interference effects of UWB on various services, including wireless broadband, UMTS and aeronautical radar. This might lead to additional insights in relation to the detailed regulation of UWB emissions for UWB PAN and other envisaged applications of UWB. Further work could be conducted to quantify the interference costs to Fixed Wireless Access in the 3.4 GHz band when addressing the distributional concerns of UK FWA operators, as our analysis suggests potential detrimental interference occurring to those systems. However, we think it unlikely that this will impact the principle conclusion of this study, which is that Ofcom's policy should be based on the draft ETSI UWB mask, because the level of UWB benefits occurring by 2010 in this scenario are predicted to significantly outweigh costs (the differential being over £60 million at 2010). As highlighted by the scope of work, this study does not

address the potential impact of UWB on future technology investment. It is noted that within some industries considered in this study, notably 3G, there are ongoing developments in technology implying significant future investment in systems using the 3 to 5 GHz portion of the spectrum, including introduction of High Speed Downlink Packet Access (HSDPA) and potential expansion of mobile services into other frequency bands<sup>2</sup>. We note that Ofcom may wish to consider potential future utilisation of the 3 to 5 GHz portion of the radio spectrum in its setting of the UWB regulatory framework.

5. This study focuses on UWB deployment in wireless PAN devices, which by their nature are generally used indoors. It is noted that this limits the potential for interference compared to UWB outdoor use. It is also noted that the nature of wireless PAN devices is that users might 'roam' outside of their normal operating environment (e.g. a laptop user takes the laptop outdoors). We note that the FCC has imposed specific regulation on UWB outdoor use to limit interference to other radio systems (such as prohibition on use of external antennas). We recommend that Ofcom consider the adoption of similar rules governing outdoor use in its overall policy determination on UWB.

1 This recommendation is based on consideration of existing uses of this spectrum; it is outside of the scope of this study to consider whether there are any future uses of spectrum in either the upper or lower bands that might be constrained by UWB deployment.

2 For instance, ERC/DEC/(02) 06 designates the frequency band 2500 – 2690 MHz as an extension band for 3G/IMT-2000 systems, following the decision taken at the World Radio Conference in 2000."

# Sony embraces UWB, forecasts early product availability

**Incisor talks to: Renaud Di Francesco  
Head of European Technology Standards Office, Sony.**

**In our preparation for Incisor's UWB special focus issue, we knew that amongst other angles that we had to cover there was the legislative issue, and the viewpoint of UWB's main customers – major consumer electronics companies.**

**Fortuitous it was, then, when we identified one contact that could provide a perspective on both. That contact is Renaud Di Francesco, who is Head of Sony's European Technology Standards Office.**

After all, Sony is not just any old consumer electronics company, it is one of the leaders in promoting the digital home concept, and has millions of real consumers using Sony video and still cameras, and private and corporate users of its IT products. What's more, Sony is a leading supplier of home cinema systems, and in its Sony Pictures and Sony Music guises it is one of the world's most prolific providers of film and music content. So, it not only sells the products that people watch movies and listen to music on, it creates the media they are watching and listening to, and therefore has a huge vested interest in enabling the most convenient access to this rich content.

Di Francesco started off by explaining the breadth of applications for UWB. "Even before you start considering the consumer market, it is important to recognise that UWB has a lot of value to the IT community," he said. "Today we have Bluetooth and WLAN. UWB-based Wireless USB is here now and will be very big. In the home, UWB will be used to connect video devices – home cinemas and wall-mounted flat panel TVs that currently require complex and invasive installation. Sony is considering displays that will integrate better with home decoration and furnishings, looking more like a picture. Projectors will be much easier to mount on ceilings if wiring is not required between the projector and the home cinema receiver. HD TV is just round the corner and as soon as a new channel like this opens up it fills up very quickly."



Di Francesco went on to explain that for Sony there are many factors that make UWB appealing. The high data rates everyone is aware of, but low power consumption is possibly even more important, according to Di Francesco. "Low power design is centric to everything Sony does today. Sony is the main developer of Lithium Ion battery technology and the number 1 supplier. Battery life is critical across all of the technology sectors we work in and we are constantly looking at ways to reduce power consumption. The low power of UWB makes it attractive for use in small, battery-powered PAN devices, as well as mains powered IT and consumer electronics products."

We asked Di Francesco how Sony was positioning UWB amongst the short-range wireless standards? "We are active in a number of wireless standards. Bluetooth has reached the stage whereby it is a fixture in mobile phones. NFC and RFID are both very important to Sony, as both a consumer electronics company, and as a corporate user of RFID. The latter results from our being a supplier to Wal-Mart, which has mandated that all its suppliers must use RFID" Di Francesco explained. In fact, Wal-Mart has this week announced that it plans to spend \$3bn (£1.8bn) over the next few years on a new inventory tracking technology that uses RFID to keep tabs on merchandise.

NFC is a technology that Sony is working with on a different level, but which links closely to its

interest in UWB. Di Francesco described how NFC would work with UWB – and other technologies. "We are reaching what we call the third age of the mobile phone, where people will enable secure transactions by 'phone waving' – passing the handset close to another device. NFC provides layers under which you can use any wireless network link, once the two parties know each other – meaning that they have established a trusted link. In this way, NFC – a low bit rate, short range wireless technology can facilitate a secure connection over which large volumes of data can then be communicated in a short period of time." One example of how this could be used was where a customer with an NFC/UWB-enabled smartphone could buy a movie – from a music video to a full-length film – from an advertising poster. OK, it would have to be a 'smartposter', but nonetheless by setting up a secure payment over an NFC link, the customer would then be able to download the movie over the much faster UWB connections. Neat, eh? Sony has entered into a joint venture with Japanese network operator NTT DoCoMo to develop this technology.



*Sony believes smartphones will soon be NFC/UWB enabled*

## Incisor interview continued:

That Sony is considering this type of application demonstrates that it is thinking ahead, to the longer-term benefits of adopting UWB. However, Di Francesco also admitted that short-term expediency is a factor. And what does this mean? It means that although Sony is a strong supporter of MBOA UWB, it recently announced that it would carry out UWB demonstrations using DS-UWB silicon at a US event. "Its true that at this point we are keeping both bases covered," said Di Francesco. "Sony is a technology leader, and needs to be able to provide technology solutions when the customers want to buy them. This means that we could first bring DS-UWB products to market in those countries where they have regulatory approval, and switch to MBOA at a later point."

There are two more factors in Sony's technology selection process to select the ultimate UWB victor. The first is quite simple. "Unless a technology works properly and interoperates seamlessly with apparently compatible devices, it will die. Customers will not use it," said Di Francesco, continuing, "This is equally applicable to both MBOA and DS-UWB, so both parties must work to create a solid standard that developers can work to, and must implement rigid and mandatory interoperability test programmes."

The second factor is perhaps the bigger issue – regulatory approval. After acknowledging that the FCC had set the marker by approving UWB use in the USA, Di Francesco considered the challenge for the rest of the world. "Wherever

spectrum is being shared, there will inevitably be incumbents claiming interference. They are trying to protect their own back yard. In the case of UWB this is a very diverse selection, including satellite operators, airports, maritime, amateur radio operators and even astronomers. They are all lobbying to pre-book and protect their spectrum allocation, and will protest that anything new will disturb them. The governing bodies have to try to manage and satisfy everyone's interests."

The matter doesn't need to be as complicated as it is often portrayed, according to Di Francesco, who feels that co-existence is the key, and is perfectly achievable. "Bluetooth showed how it could be done. It is operating adjacent to and even over-lapping other wireless standards, and without interfering with them. Looking further back, DECT has been a huge success, and is very robust to noise and interference. There just needs to be a willingness to make it happen. With UWB the problem should be small as we are taking about short distances."

All of this is undoubtedly true, but for anyone to be able to sell UWB products for use outside of the USA, that regulatory approval is needed. As reported in this issue, during the second week of January, UK regulator Ofcom released details of its initial findings, having carried out research into the benefits or otherwise of allowing UWB use in the UK. While positive, there is a lot more work to be done, not least to integrate UK legislation with that of the rest of

Europe. How far away is approval, we asked Di Francesco, who surely must know as well as anyone? "Sony participates in the Frequency Harmonisation Group and we are therefore familiar with Ofcom and the European agencies' views. For them it is still a case of balancing between the UWB companies' needs and the views of the incumbents. Its possible, for example, that one or more network operator, which has had to pay billions for its 3G licence, may complain that enabling UWB could impact on its ability to recoup its investment – in the existing spectrum and future allocations. That said, I am confident that the regulators will take the end-users interests into account, and find a solution."

That is encouraging, but we still needed to know the availability forecast. After all, for UWB to be more than a topic of conversation, it needs to be enabled in real products. Without giving away any secrets, Renaud Di Francesco (who, with his job as Sony's head of European Technology Standards Office must be regarded as a reliable source) said he was confident that UWB would receive regulatory approval in Europe before the end of 2005, and that Sony would be one of the companies shipping UWB-enabled consumer products in the USA considerably sooner than that.

So now you know.

## Wireless Snippets

## Wireless Snippets

## WLAN/WiFi

**NEXT GEN BROADBAND WIRELESS ACCESS CONCENTRATOR**

HauteSpot Networks unveiled its next generation Wireless Access Concentrator at during December. The new HR-IXP42501 routing device is based on the Intel XScale IXP425 network processor combined with 4 802.11a/b/g long range radio modules, and will enable wireless service providers to design exciting new services and applications with minimal cost and simple provisioning.

**TRAPEZE INSTALLS WI-FI FOR HI-SOCIETY**

Le Rosey, Switzerland's oldest private school, has chosen Trapeze Networks to provide a WLAN across its campus in Rolle. Institut Le Rosey, known as one of the most exclusive private education institutions in the world, plays host to students who come from some of the world's wealthiest families. Ex-pupils include the Duke of Kent, Dodie Fayed and Prince Rainier of Monaco.

The school is also believed to be the only

school in the world to span two seasonal campuses. In spring and autumn, classes are held in the facilities near the village of Rolle between Lausanne and Geneva. For the winter term, the entire student body moves to Gstaad, home to the world's most elite ski resort and where skiing is part of the school's curriculum.



# UWB - As Fear turns to Greed

Mark Bowles – Staccato Communications

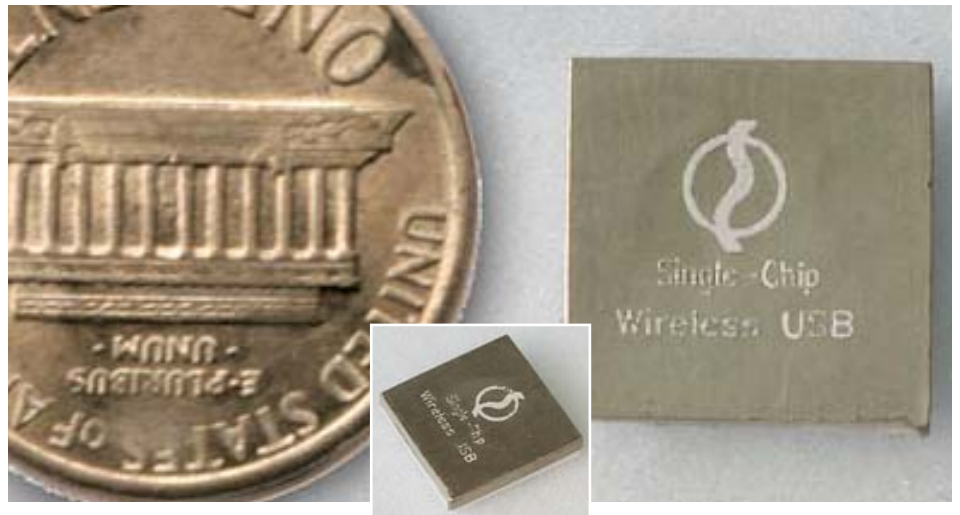
**The third anniversary of the FCC's landmark ruling that allow the unlicensed use of Ultrawideband (UWB) spectrum is just weeks away. And while it falls on St. Valentine's Day not everyone loves the technology. At least not yet.**

The FCC ruling here in the States came three years sooner than in any other country. The skeptics predicted correctly that UWB would face a seemingly endless gauntlet of challenges on its way to commercialization. UWB has met more than the usual resistance experienced by new wireless technologies, and for good reason; it is the first real overlay of unlicensed spectrum directly in the frequency allocations of dozens of other licensed and unlicensed spectrum users.

UWB's most significant opponents are the incumbent spectrum licensees who feel threatened by the imminent deployment of UWB systems. Most of their arguments are based on claims of potentially harmful interference, but probably more often they are concerned about the economic implications to their existing businesses. After all, many of these incumbent spectrum licensees pay enormous sums of money for their small slice of spectrum and these UWB new-kids-on-the-block want access to a huge chunk of spectrum for free! However, as the path that UWB followed in the US is repeated in other countries the fear of UWB – whether it's economic or interference related – fear quickly shifts to greed.

In the three years since the FCC ruling, many of UWB's strongest opponents in the US have become its staunch supporters. Qualcomm and Trimble Navigation both strongly opposed UWB, for instance, but now view it as an important business opportunity. Most have come to realize that UWB, properly regulated and specified, does not cause harmful interference to other wireless services. And more importantly, UWB enables fundamentally new features for most connected devices, whether currently wired or wireless, creating tremendous new economic opportunities.

Operators once viewed U-NII and ISM technologies like WiFi and Bluetooth as threats and now have largely embraced them; the same is



occurring for UWB. In essence, incumbents in the US have come to realize that their primary responsibility is to protect their market position, which means more than simply protecting the particular slice of spectrum where their current systems operate.

The dynamic that happened in the US will repeat itself in other regulatory geographies soon, and at an accelerated rate. The interference debate, once largely relegated to voluminous theoretical technical debates, easily obfuscated by either side and truly understood by a precious few, is quickly being reduced to practical tests of real world devices in real world conditions. 2005 will usher in a new phase of rational and practical regulatory rulings in many parts of the world, leaving much of the theoretical phase behind. If the Ofcom consultations from their recent report are any indication, the rational phase is already taking hold in the UK. The US approach and spectral mask will not likely be perfectly suitable for all geographies but a harmonization process based on realistic conditions is certain to emerge.

Further reason to believe that UWB fear is turning to UWB greed is evident from events at CES 2005 in Las Vegas a few weeks ago:

- Microsoft's Kosar Jaff explained to an audience at IEEE's CCNC conference preceding CES that Microsoft had been "working on a driver for Wireless USB which they planned to release before

the end of the year". A milestone that didn't occur in the history of Bluetooth or WiFi until much later.

- Nokia's Marilyn Green explained to the same CCNC audience Nokia's preference for MBOA UWB based on their own tests for harmful interference and coexistence with other mobile services in the same handset.

- Intel's CEO Craig Barrett dedicated a significant portion of his keynote to the vision of UWB enabled products and Intel's commitment to make it happen.

- CES itself had a significant UWB exhibitor contingent. A UWB MBOA TechZone hosted 16 companies (HP, Intel, TI, Samsung, Philips, Mitsubishi, Taiyo Yuden, TDK, Staccato, and others) and 4 organizations (Wireless USB, WiMedia, MBOA, and 1394TA). There were many vendors with wireless demos and silicon demos spanning a large variety of applications.

UWB is positive for the industry and for the consumer because it truly enables fundamentally new features that in turn can make all of our gadgets more useful and more valuable. The more valuable they are to consumers, the more consumers will want to use them, upgrade them, and maybe even pay a small premium for them for a short time. And incumbents stand to benefit the most if they embrace the exciting future that ultrawideband offers us all. As the US Industrialist Henry J. Kaiser once said "Trouble is only opportunity dressed in work clothes".

# Mitsubishi Electric demos W-UWB

**Another global electronics giant aligned itself with MBOA UWB at CES when Mitsubishi Electric unveiled a demonstration of wireless ultrawideband technology for home theatre. Jointly developed by corporate R&D labs in the US and Japan, Mitsubishi Electric's demonstration is based on the emerging standard from the MultiBand OFDM Alliance (MBOA).**

The demonstration system showed how ultrawideband (UWB) technology can eliminate wires and simplify installation of high-end home theatre systems. It included a single transmitter unit that sends two independent high-definition television signals wirelessly to two high-end display products: a plasma HDTV and a high-end

projector, both from Mitsubishi Electric.

"Mitsubishi Electric has a long history of leadership in the development and promotion of digital communications standards through international organizations like MPEG, IEEE, and ITU," commented Dr. Hiroshi Koezuka, General Manager of the Information Technology R&D Centre for Mitsubishi Electric in Japan. "As one of the original Contributors to the MBOA SIG, we believe standardization of UWB technology will help insure broad adoption in the marketplace."

While the demonstration system focused on UWB applied to home theatre, Mitsubishi Electric anticipates other applications, including in-car communications, wireless USB, and inter-board communications. Dr. Koezuka added,

"UWB technology has the potential to impact many of the businesses Mitsubishi Electric is in, including consumer electronics, communications, industrial automation, transportation and building equipment. That is why our Corporate R&D group is an active contributor to UWB standardization."

Commenting on the home theatre application, Dr. Kent Wittenburg, VP and Technology Lab Director at Mitsubishi Electric Research Laboratories in the US, added, "Our R&D investment in this area, including efforts in digital communications, advanced user interfaces, and our contributions to the MBOA standard, helps to ensure Mitsubishi Electric's leadership in home theatre for years to come."

# Wipro's MBOA MAC IP for release

**Wipro Technologies, the global IT services division of Wipro Limited, has announced the availability of MBOA MAC IP by Q2 2005. Wipro provides IT solutions and services, including systems integration, information systems outsourcing, package implementation, software application development and maintenance, and research and development services to corporations globally. In the Indian market, Wipro is a leader in providing IT solutions and services for the corporate**

**segment in India offering system integration, network integration, software solutions and IT services.**

MBOA MAC enjoys the support of many industry players from the Consumer Electronics and PC industry and from industry bodies such as WiMedia, USB IF and 1394 TA. Wipro's customisable MBOA MAC can be integrated into devices such as Set Top Boxes, Digital TVs etc.

Wipro has developed expertise in the standards-based silicon intellectual property

domain, and had developed several IPs that span technologies including WLAN, IEEE 1394 (hardware and software IPs), USB and Ethernet.

"We have a full portfolio of IEEE 802.11 IPs and the MBOA MAC IP further complements our Wireless IP portfolio. We will release the MBOA MAC IP to our customers soon. We are also fully committed to develop solutions around these IPs like Multimedia Distribution over Wireless, Wireless USB, Digital TV solutions etc" said A Vasudevan, Vice President, VLSI, Wipro Technologies.

## Wireless Snippets

# Wireless Snippets

## Bluetooth

### CSR ADDS TECHMARK AWARD TO 2004 ACCOLADES

CSR has been awarded the 2004 techMARK Achievement of the Year Award, which recognises the top performing companies in the quoted technology industry. The award was collected by Richard Ord, Vice President of CSR's Bluetooth Business Unit, at techMARK's awards dinner in December. The techMARK Awards Dinner is sponsored by PricewaterhouseCoopers and the London Stock Exchange.

## RFID

### PAXAR SOLUTION FOR METRO CORP

RFID specialist Paxar has launched a new solution, the NVE-2-EPC Starter Kit to enable suppliers of the German Metro Corporation (Metro) effective RFID pallet labelling. Metro AG is demanding that many of its suppliers label their pallets with RFID technology. The Paxar unit is entirely mobile and can be incorporated in existing process chains precisely where RFID labels are needed.

A radio scanner reads the serial shipping container code and transmits it over a distance of up to 30 meters to the base station in the cart. The software then generates an EPC number and a new label with visible information that the 9855 RFID printer prints. At the same time, the printer also writes onto a Philips-U-Code EPC 1.19 RFID chip in the label.

# UWB – what is your flavour of choice?

## Is it MBOA? Is it DS-UWB? Or is it Pulse-Link?

**So you believe that UWB comes in one of two versions - either the MBOA's MB-OFDM or the UWB Forum's DS-UWB. Think again. In addition to all sorts of what companies operating under the UWB umbrella call 'enhancements' to the technology and we call proprietary changes, there is another version which is significantly different.**

Mentioned in our main article as a maverick, Carlsbad, California-based Pulse-Link is ploughing its own UWB furrow. Incisor spoke to chief operating officer Bruce Watkins. We had spent considerable time researching Pulse-Link, trying to find out what it is offering, and how its technology differs. Look at the Pulse-Link web site and read its press releases and it is impossible to ascertain what type of UWB it is using. According to Watkins this is entirely deliberate. What we did find out is that Pulse-Link is as interested in UWB over wired links as it is wireless.

The company is promoting its ability to use UWB to transfer data at high data rates. Pulse-Link's UWB over-wire technology for coax cable provides up to 1.2 Gigabits downstream and up to 480 Megabits upstream of additional bandwidth, at low cost, on differing CATV architectures. Pulse-Link says it is the first company in the world to demonstrate UWB over wired media. During our interview, Watkins suggested that it's actual over-the-air data rate is at present 1.3 Gigabits per second, with the data throughput presently at 667Mbps, adding that over the next thirty to sixty days, optimisation will bring the throughput to Gigabit data rates.

Instead of divulging Pulse-Link's technical disposition, Watkins preferred instead to explain that his company's work with UWB had links going way back to the 1960's, when Henning Harmuss, who worked with Pulse-Link CTO

John Santhoff, was one of two people – the other being Dr Gerald Ross – who first started describing UWB. Santhoff went on to work on UWB while working for the US Air Force. 'So we really know UWB, and know that it will work,' said Watkins. When pushed, Watkins did tell us that Pulse-Link's solution was nearer to DS-UWB than MB-OFDM. 'DS-UWB is more 'traditional' UWB, like us. The main difference is in receiver architecture and forward error correction. Our signal modulation is also different.'

Apparently, one of the explanations for Pulse-Link's left of centre secrecy is that the company still focuses on government security applications for UWB. "If the government security market is an important part of your business, there is an advantage to the rest of the world not knowing how you do things,' said Watkins, continuing 'Even before the MBOA/DS-UWB debate started, there were 25 different proposals put forward to the IEEE to establish the standard. For both of these reasons, we don't reveal our technology, and are not promoting it to the IEEE as a basis for the

standard.' Though he also acknowledged that Pulse-Link was now in dialogue with the IEEE.

It seems that Pulse-Link will continue to concentrate mainly on achieving high data rates over long distances. Watkins was sceptical of some of the claims that are being made. 'For all of the talk of 480mbps demos, most of what was shown at CES this month was achieving 30-100Mbps at best. Achieving high data rates is not as simple as they (the MBOA and DS-UWB protagonists) say, and it will take time' he commented. Pulse-Link publishes the table below which includes its own data rate targets.

Is Pulse-Link an UWB player and a force to be reckoned with? It's hard to say, today. Watkins told Incisor that Pulse-Link would ship developer kits with 1-gigabit capability within 30-60 days. Inevitably, and as with all of these companies, it will be a case of seeing whether Pulse-Link delivers on its promises.

**Raw Data Rates: Line-of-Site**

ditRange (LOS*)	802.11b	802.11a	802.11g	802.15.3a (UWB)	Pulse~LINK
3 Meters	11 Mbps	54 Mbps	54 Mbps	480 Mbps	1 to 1.3 Gbps
10 Meters	11 Mbps	48 Mbps	48 Mbps	120 Mbps	333 Mbps
20 Meters	11 Mbps	24 Mbps	36 Mbps	0	88 Mbps
40 Meters	5.5 Mbps	12 Mbps	18 Mbps	0	14 Mbps
60 Meters	5.5 Mbps	6 Mbps	6 Mbps	0	5 Mbps
80 Meters	2 Mps	0	No Data	0	2 Mbps

# Fujitsu and Staccato Communications partner

**Fujitsu Limited and Staccato Communications, Inc. (profiled in this issue) have announced a partnership under which they will provide all-CMOS, single-chip wireless universal serial bus (USB) and ultra-wideband (UWB) solutions for the global marketplace.**

The partnership's CMOS single-chip wireless USB products are compliant with Multiband OFDM Alliance (MBOA) UWB specifications. Sampling of these chips from Fujitsu and Staccato Communications is scheduled for 2005, moving the companies closer to volume production and commercialisation, targeting the consumer PC, digital home appliance, and mobile phone markets.

"Integration is the key to competitive products. Having chosen Fujitsu's advanced process CMOS technology from the outset, Staccato Communications is leading the industry with single-chip wireless USB solutions," said Joji Murakami, group senior vice president, LSI Group of Fujitsu Limited. "Fujitsu aims to achieve further



*BBC television discusses CES UWB announcements with Staccato's Robert Aiello*

integration of wireless USB functionality into ASIC system-on-chips (SoC), utilizing its design capabilities. By partnering with Staccato Communications, our goal is to provide customers with optimal wireless USB/UWB technology-based solutions."

Fujitsu will offer its SoC/ASSP together with Staccato Communications' UWB products as part

of its next-generation wireless USB/UWB technology-based solutions to its customers, enabling them to develop products with wireless USB capabilities.

"Perhaps one of the best decisions we have made at Staccato was our choice of Fujitsu's process technology," said Roberto Aiello, Staccato's founder and CTO. "For digital-centric designs like wireless USB, Fujitsu's process technologies and a rich set of libraries and IPs have tremendous advantages, and the real benefit is in how well Fujitsu's process technology and libraries are optimized to handle high-speed RF circuit designs embedded along with the digital."

Fujitsu Limited reported consolidated revenues of 4.7 trillion yen (US\$45 billion) for the fiscal year ended March 31, 2004. A fairly substantial company for Staccato to partner with, then, and this must demonstrate a substantial vote of confidence in the Staccato's Multiband OFDM UWB technology.

## New funding for WiQuest UWB development

**WiQuest Communications, which provides wireless communications semiconductor and systems technology, has closed a \$13M round of institutional financing, led by Menlo Ventures and Palomar Ventures. This new capital will be used by WiQuest to hire additional staff, expand wireless research and development activities, and support marketing, interoperability testing, and production release of WiQuest's advanced UWB products.**

WiQuest is building complete solutions for Ultrawideband applications, from mobile handsets and portable gaming to audio/video systems in the digital home, including wireless multi-media, PC connectivity, and simplified, lower cost home theatre installation.

"We were attracted to WiQuest for a number of

reasons, including a strong, proven wireless team, their focus on a highly differentiated, systems-oriented approach for multi-media, mobile, PC, and consumer electronics applications, and an excellent climate of opportunity for their ultrawideband technology" said Pravin Vazirani of Menlo Ventures.

"Our vision for UWB leverages the unprecedented performance opportunity that the FCC and other worldwide bodies are enabling, and will allow consumers to finally 'cut the cord' and enjoy the wireless benefits of freedom and flexibility," said Matthew B. Shoemake, founder, CEO and president of WiQuest.

Founded in September 2003, WiQuest Communications' team is comprised of semiconductor and system design veterans

from companies including Alantro Communications, Nokia, Qualcomm, IBM, Texas Instruments, Gain Technology, Bay Networks, Sun Microsystems and others.

As an early contributing member of the MultiBand OFDM Alliance Special Interest Group (MBOA-SIG), WiQuest engineers have been actively involved in the development of the recently released MBOA-SIG physical layer (PHY) as well as the media access control (MAC) specifications. WiQuest is also a member of the USB Implementer's Forum and is active in its nascent wireless USB efforts.

# Samsung lays out UWB roadmap

**At CES, Samsung's UWB demo scenario showed the ability to control wireless multimedia streaming of high quality, high data rate signals such as HD/SD A/V signals, and how UWB could provide easy connectivity between mobile devices and home appliances.**

Samsung said that its 'ceaseless active participation on MBOA, WiMedia Alliance, WUSB and IEEE activities' had enabled it to draw near to having fully-fledged production of various home-networking products. These will enable wireless video image transmission between a DVD player and a digital TV, wireless connection between set-top boxes, HDTV and home theater system and high-speed

connection between computers and digital camcorders.

Samsung's MBOA compliant UWB Platform is implemented on FPGA with data rates of 25Mbps, 50Mbps and 100Mbps, which it says are downscaled by half of 53.3Mbps, 106.7Mbps and 200Mbps, respectively.

Samsung's development line-up currently includes:

- RF : One chip RFIC with 0.18micron CMOS standard process
- Baseband Modem : Complete FPGA test with MBOA(Ver. 0.7) up to 200Mbps
- MAC : Complete FPGA test with IEEE 802.15.3

This platform can transfer HD quality multimedia streaming of MPEG2- HD video data from a server PC to a client PC while each PC connects to the UWB platform via an Ethernet port to send data.

Samsung expects to have a 130micron process RFIC + ModemIC operating at up to 200 Mbps by Q2 2005, a 130micron process RFIC + ModemIC + WUSB test bed operating at up to 480 Mbps by Q4 2005 and a 90micron process 1chip WUSB solution operating at up to 480 Mbps by Q2 2006.

# Coretronic develops Wireless USB for projectors/display systems

**Known as a leading Taiwanese provider of projection and display solutions, Coretronic will work with Staccato Communications to develop Wireless USB for projectors and related products.**

Coretronic is a worldwide top three DLP projector manufacturer and the leading manufacturer of LCD backlight modules in Taiwan, and claims its DLP projector and LCD backlight module products have a 10 percent global market share respectively in 2003. The

company manufactures four major product lines, namely DLP projectors, LCD monitors/TV, LCD backlight modules, and video products (DLP rear projection display TVs and plasma display panel (PDP) TVs).

Coretronic will use Staccato Communication's recently announced single-chip design for all of the RF and baseband components based on the newly completed MBOA PHY specification.

"Staccato's technology offers a low-cost, all-CMOS implementation, which will help us build

products faster and better," said John Fu, Coretronic A.V.P., Wireless Media Product Design Center,. "We are a major supplier of innovative projection and display solutions, and we plan to move aggressively to bring wireless USB to market in 2005."

# AboCom to build wireless USB adapters and PC Express cards

**Staccato Communications has announced that AboCom, a leading Taiwanese ODM/OEM of wireless mobile products will adopt Staccato's wireless USB silicon products as the basis for wireless USB PC Express cards and other PC adapter products.**

The AboCom products will become available in the second half of 2005 and will initially target the PC and peripheral markets.

"The small form factors and low cost enabled by Staccato's single-chip all-CMOS solutions are critical elements in meeting the requirements for Express Cards and USB adapters," said Wen Tsay, CTO of AboCom. "AboCom is a major supplier of wireless technologies, WiFi and Bluetooth, for the PC marketplace, and we are aggressively bringing Wireless USB to market in 2005."

"Abocom has emerged as one of the most competitive players in this market and our mutual goals are well aligned Abocom will be a key customer and partner for Staccato to enable the Wireless USB market" said Roberto Aiello, CEO of Staccato.

# Wisair underpins UWB applications

Wisair used Ultra-Wide Band (UWB) technology to demonstrate its own and various partners' MBOA-based UWB applications at CES. Leading up to the event, Wisair had showcased a new development kit - the DV9100 - demonstrating wireless USB, wireless video and other UWB applications. The DV9100 is based on Wisair's two-chip solution.

Wisair demonstrated a number of UWB applications at the MBOA pavilion (and the secret squirrel items in a private meeting room!) including WUSB applications for seamless connectivity between a host PC and legacy USB 2.0 devices such as remote hard disk, printer / scanner and high quality PC cameras, wireless video applications streaming High Definition content to high resolution flat displays and wireless media adapters using UWB to connect a home PC with the home entertainment system, and also showed co-existence and immunity to interference with other wireless technologies such as 802.11a and cellular telephones.

Companies demonstrating UWB-enabled



DV9100 development kit

applications at CES based on Wisair technology, and using the DV9100 kit included:

- Asahi Glass Co. (AGC) showed a first prototype of a UWB USB Dongle. The small form fit dongle enables connectivity between PC's and multiple other UWB enabled peripherals.
- ASUS demo'd UWB WUSB connectivity, sharing video, audio and graphic content through the ASUS S-presso entertainment PC

- D-Link was showing UWB connectivity between a wireless media player and an Entertainment System using a D-Link Wireless Media adaptor
- Intel demonstrated a Wireless USB PC host solution enabling UWB based connectivity to PC peripherals and other consumer electronic devices.
- NEC Electronics' wireless USB Device Wire Adapter (DWA) prototype was combined with Wisair's UWB module as part of Intel WUSB demonstration.
- TI demonstrated Wireless USB application based on its own Wireless USB controller and the Wisair DV9100 development kit

Wisair itself demonstrated an HP All-in-One solution on which Hewlett Packard and Wisair had collaborated and agreed to demonstrate at CES, and also said that two large Japanese consumer electronic brands were using Wisair technology to demonstrate Wireless Video streaming application

## Staccato demos industry first complete single chip all-CMOS MBOA UWB chip

During December, Staccato announced that it had demonstrated to select customers the first version of its single-chip design for all major components of the RF and baseband specified by the newly completed MBOA PHY specification.

This single-chip design is the latest in a series of all-CMOS test chips built by Staccato over the past 18 months but is the first to include all major components specified by the newly finalized MBOA specification.

The chips have demonstrated the ability to transmit at the highest specified data rate of up to 480 Mbps. The all-CMOS implementation clears the path for low-cost, highly integrated silicon solutions for wireless USB and other UWB

applications by taking advantage of mainstream generic CMOS foundry processes.

"In terms of what it means for consumers, this achievement is significant," said Joyce Putscher, director and WPAN principal analyst for In-Stat/MDR. "Those familiar with the history of the Bluetooth and Wi-Fi markets can bear witness to the fact that all-CMOS solutions enable these technologies to be integrated into end products more quickly due to their significant price advantage. This can translate to early market share capture."

"We are pleased by the results we have seen in the series of MBOA UWB test chips we have built so far," said Roberto Aiello, president and CEO, Staccato Communications. "We are now

comfortable moving to production samples of the single-chip PHY for our customers as the next step and then quickly integrating the MAC and wireless USB functionality for a complete single-chip wireless USB chip in 2005."

Staccato's single-chip PHY products are expected to sample in early 2005 with ramping production later in the year. Complete single-chip wireless USB silicon will sample in late 2005. Staccato will make both products available with complementary development kits to its key customers.

# ZigBee Alliance finalizes specification

Incisor today covers a wide range of short-range RF technologies. The industries that are based around them are driven by companies and groups of companies forming special interest groups, forums and alliances. Its possible to generalise about them – some are extremely professional and tightly run, some more 'loosely bound'. Some are 'noisy' and some are quiet. The ZigBee Alliance is one of the latter – a 'quiet' organisation which just seems to get on with the job in hand.

During December the Zigbee Alliance announced that it had ratified the first ZigBee specification. In a follow up phone call, Alliance chairman Bob Heile told Incisor that this on-time delivery of the specification is the culmination of two years of worldwide development and interoperability testing by the more than 100 member companies of the ZigBee Alliance. 'Back in summer 2003 we sat down and mapped out a detailed programme that created a milestone – finalising the spec by the end of 2004. We are all very pleased to have hit that target' said Heile. Isn't this unusual, as many other wireless specs seem to suffer many complications along the way? Not the ZigBee Alliance, according to Heile: "We stayed pretty focussed, and didn't allow ourselves to get bogged down. There are six working groups and 12-20 companies represented in each working group, but if there are ever issues, we have a board of directors which makes decisions and resolves disputes.'

For those members that have already announced ZigBee-ready technology, Heile said that the



Bob Heile, chairman, ZigBee Alliance

ratification of the specification enables them to quickly enhance their products and begin testing to obtain ZigBee-compliant certification. All Alliance members have complete and exclusive access to the final specification and will continue to participate in ongoing interoperability testing to verify that their products are ZigBee compliant.

Now that the ZigBee specification has been ratified, the Alliance will continue to validate the specification through expanded interoperability and scalability tests and future enhancements. The Alliance plans to actively promote the use of ZigBee-enabled technology in real-world applications to foster new, creative applications for the market, as well as to facilitate the broad market adoption of the ZigBee

standard around the world. 'We want to create innovation in the market,' said Heile, continuing 'Some members want to add proprietary features for certain specific applications. The Alliance will monitor this and will adopt the best.'

One thing the Alliance is not doing is getting hung up over the need for the complete spec to be endorsed by the IEEE – a quagmire as others have demonstrated. Heile explained the Alliance's position: 'With 802.15.4 we already have the main part of our spec standardised. The rest will become a de facto standard. We have helped facilitate this by creating in the ZigBee Alliance what is a very standards-based organisation.'

Incisor asked Heile what the next milestones were? 'We're now working to complete the test and conformance methodology, and plan that this should be done by the end of this quarter (Q1 – calendar quarter, that is - 2005). Then, given the number of ZigBee-ready products announced in 2004, we anticipate seeing ZigBee-compliant finished products as soon as Q2 2005.'

See next month's issue for Incisor's ZigBee focus, where we will look at developments in the world of ZigBee technology, will profile some of the leading companies, and look at some of the most interesting applications for this low-power, low cost wireless networking technology. To ensure your company is included, contact Vince Holton now. Email: [vholtan@click.co.uk](mailto:vholtan@click.co.uk)

## Chipcon launches CC2430 ZigBee System-On-Chip solution

Norwegian RF chip company Chipcon AS has revealed launch plans for what it describes as the industry's first true single-chip IEEE 802.15.4 and ZigBee-solution, one year after the launch of Chipcon's CC2420 (claimed to be the industry's first IEEE 802.15.4-compliant and ZigBee-ready RF Transceiver). Chipcon's CC2430 combines the features of the CC2420 with an 8051 MCU, 128kByte of FLASH memory and 8kByte of RAM.

The CC2430 is targeted at a wide range of applications, including building automation, industrial monitoring and control systems, and wireless

sensor networks. The new device will enable OEMs to develop wireless network products using the CC2430 as the only active device in the system. "We have seen a tremendous interest for the CC2420 in the market says John Helge Fjellheim, VP of Worldwide Sales. According to Fjellheim, the CC2430 can also be used as a general 2.4 GHz direct sequence spread spectrum device for a number of proprietary solutions not using IEEE 802.15.4 or ZigBee.

The CC2430 is based on Chipcon's SmartRF 03 technology in 0.18 µm CMOS. It will be available in a 7x7 mm QLP 48 package. Development kits and

samples are targeted to be available in Q2 2005. Chipcon says that in million quantities, the pricing for the device will be USD 4.00 - or lower. "The ZigBee Alliance has set the long-term target for the BOM for a ZigBee solution to be USD 3.00. Being able to offer the CC2430 as the first-generation All-In-One solution for USD 4 - both efficiently shows that the ZigBee Alliance's long-term cost target is within scope as well as showing Chipcon's commitment to make the ZigBee standard successful" summarized Fjellheim.

# Philips joins Taiwan's Proximity Mobile Transaction Service Alliance

**Royal Philips Electronics' Semiconductors division has joined Taiwan's Proximity Mobile Transaction Service Alliance, an initiative of the Committee of Communication Industry Development within the Ministry of Economics Affairs, ROC. The objective of the alliance is to promote contactless communication and mobile e-payment services by integrating the products and services of industry members such as chip/electronics manufacturers, transportation providers, financial institutions and telecom services vendors.**

The alliance will include companies such as Acer, BenQ, Chung-Hwa Telecom, Far EastTone Telecommunication, Taiwan Cellular Corp., Asia Pacific Broadband Wireless Communications Inc., VIBO Telecom Inc., MasterCard International, Visa International and Philips. Taipei Smart Card Co. (TSCC) will be acting as project managers to implement the contactless infrastructure in Taiwan.

Philips supports the alliance based on its activity in Near Field Communication (NFC) technology for contactless transactions, which combines the functions of a contactless reader,

a contactless card and peer-to-peer functionality on a single chip.

Beyond developing a contactless mobile transaction business model, the first practical step will include using NFC-enabled mobile handsets on the public transportation system in Taipei. The project will work on the existing MIFARE-based infrastructure. MIFARE is the industry standard for contactless and dual interface smart card and reader technology operating at 13.56Mhz, which uses the Easy Card issued by TSCC. Simultaneously, the alliance will work to implement an NFC contactless interface in the retail and banking environments.

Many different technologies and fields of expertise need to be integrated to create a complete mobile business service application. Industry-leading firms within the alliance are providing their technologies and expertise, ranging from core NFC technology, semiconductor system and sub-system modules, through the development of NFC-enabled mobile phones and devices. They will also develop mobile telephone service providers' value added services including e-Wallet, mobile payments and point of sale

infrastructure and a software stack supporting a mobile transaction platform together with user interfaces. "As a major provider of mobile transaction applications in Taiwan, Philips is honored to become a member of the alliance. The biggest technology challenge for mobile business transactions is to ensure the integrity and security of data transmission," said Marconi Jiang, general manager for Philips Semiconductors Taiwan. "In the near future, consumers will be able to use public transport, visit a cinema or a concert or go shopping just by using an NFC-enabled mobile phone or PDA. This is the ultimate convenience for the connected consumer."

# European RFID Centre supported by Cisco

**Networking giant Cisco Systems will join the European RFID Centre to collaborate with European businesses in developing their RFID strategies. The RFID Centre, which officially opened on January 25th 2005, provides a showcase of RFID applications for European business delivering value through live demonstrations, educational services, networking events, and impartial advice.**



The RFID Centre is based in Bracknell, England, close to Heathrow airport. The Centre is backed by a range of technology partners

including Microsoft, Intel and Cable & Wireless and has government support from the UK's Department of Trade and Industry.

"2004 was hailed as the year of the RFID pilot but many of these to date have been small scale, lacked the complexity of involving multiple stakeholders and have mainly focused on in-store applications. Cisco believes that in order to develop understanding, accurately

measure and create a long-term RFID strategy, it is essential to use a converged IP network which is scalable to accommodate future complexity and volume of traffic, said Kaan Terzioglu, Managing Director, Technology Marketing Organisation, Cisco Systems EMEA. "RFID is the ultimate networked data application and its success and speed of deployment will depend on a scalable intelligent network architecture."

"The RFID Centre is a permanent, independent venue for exhibiting and demonstrating a wide range of RFID related technologies and cross sector applications to help potential users identify opportunities and select solutions" said Ed Cowley, Director of the RFID Centre. "It will

also act as a hub to link together all interested parties from government, academia, industry bodies, business and supplier communities to help spread best practice with regard to successful implementations. It will focus on operational, technical and business issues. We're not a standards body, but we can help by interpreting and explaining to the business community the likely business impact of technical standards."

Cisco will be supplying the wired and wireless network infrastructure to the RFID centre, which RFID applications and devices can run over. The centre will also house six Cisco demonstration pods which will showcase RFID specific uses of the Cisco RFID Ready Network with partners.

New routing solutions with embedded services and applications, such as the Integrated Services Router (ISR), launched in September 2004, will be included as they evolve in the development of the Intelligent Information Network 3-5 year strategy.

## More bandwidth for RFID

**The 46 national communications authorities in Europe have voted to adopt new regulations developed by European Telecommunications Standards Institute (ETSI), which will allow RFID readers to use more power and operate in a wider UHF band. This was hailed as good news for end-users in Europe that are looking to implement new supply chain solutions.**

The new regulations, dubbed ETSI 302-208, will allow European RFID readers operating in the UHF band to perform nearly as well as UHF readers operating under Federal Communication Commission rules in the United States. But some European retailers will not switch to readers operating under the new rules immediately

because they are not sure how long it will take for vendors to begin mass-producing such readers and because of concerns about how fast tags and readers can exchange data under the new regulations.

ETSI 302-208 provides an additional frequency range from 865 to 868 MHz in which RFID readers can operate (currently they operate between 869.4 and 869.65 MHz), increasing the spectrum band from 250 kHz to 3 MHz. The number of channels readers can broadcast on has been increased from one to 15. The new band is divided into three sub-bands. Under the old regulations, UFF readers were restricted to half a watt of effective radiated power (ERP). The new regulations allow them to emit up to 2

watts ERP between 865.6 and 867.6 MHz; 0.5 watts ERP between 867.6 and 868 MHz; and 0.1 watts ERP between 865 and 865.5 MHz

## IEEE aids selection and deployment of WLAN equipment

**Anyone who sets up a wireless local area network (WLAN) faces the challenge of choosing equipment for access points and the client adapters in personal computers, PDAs and other devices. In order to make this task easier, the IEEE has started work on a test and measurement standard for the components in IEEE 802.11 WLANs.**

The standard project, IEEE P802.11.2, "Recommended Practice for the Evaluation of IEEE 802.11 Wireless Performance," will give users the metrics, measurement methods and test conditions they need to evaluate how WLAN equipment functions and performs. The project will be the focus of IEEE 802.11 Task Group t. It will serve many constituencies including

developers of IEEE 802.11-related chipsets, components, systems and software, as well as system installers, information technology managers and testing laboratories.

"I expect this recommended practice to be of high value to the industry given the complexity of IEEE 802.11 protocols and the intrinsic stochastic nature of electromagnetic wave

propagation," says Paul Nikolich, Chair of the IEEE 802 Committee. "It will create the basis for WLAN test plans that accurately characterize and compare IEEE 802.11 WLAN devices for use in the dynamic wireless environment. Our initial focus is likely to be on parameters such as device throughput, roaming time and rate-versus-range."

IEEE P802.11.2 builds on the test foundation established for wired Ethernet networks, but involves many more metrics since it must address interference from other wireless sources and how to test devices in motion. Both interference and mobility make repeatable measurement more difficult.

"The objective of this new standard development project will be to foster the growth of wireless LANs beyond their success in small networks," says Charles Wright of Azimuth Systems and Chair of the IEEE 802.11 Task Group t. "Small office/home office users often see cost as central. Those in the enterprise market also consider network performance and productivity as primary. IEEE P802.11.2 will support large organizations as they adopt



WLANs by helping them predict performance in large deployments without extensive measurement.

"It will give those who deploy wireless networks a uniform set of planning benchmarks

based on device characteristics, network layout and usage parameters. Our overall goal is to improve WLAN reliability and lower costs."

## WiFi for broadband wireless operators

**Cambridge Broadband and Gemtek Systems are working together to enable broadband wireless operators to add carrier-grade WiFi to their service portfolio. The two companies have signed a commercial and technical collaborative agreement to integrate Gemtek Systems' WiFi technology with Cambridge Broadband's industry-leading VectaStar fixed wireless access technology.**

Cambridge Broadband will integrate Gemtek Systems' WiFi technology into VectaStar's subscriber unit, creating a hot-spot-in-a-box with integrated backhaul to allow residential and mobile users to be served cost-effectively. The combination of Gemtek Systems' and Cambridge Broadband's per-user QoS mechanisms is said to facilitate a range of tariffing options for data services and high quality voice-over-WiFi.

Cambridge Broadband's platform is capable of delivering IP, VoIP, Ethernet, and E1 /T1. This multi-service capability is further expanded by



the addition of Gemtek Systems' carrier-grade WiFi access.

Commenting on the signing, Colin Abrey, VP, Business Development at Cambridge Broadband said, "As the telecommunication market is

fiercely competitive today, service differentiation is paramount in attracting new subscribers. With VectaStar's ability to offer ATM or IP, operators can deploy Gemtek Systems' integrated WiFi technology as part of a larger service portfolio".

Delivery of the new WiFi enabled CPEs will commence in the first quarter of 2005 and will be available for existing VectaStar customers or new entrants wishing to offer WiFi services.

# ADP Télécom spreads its wings beyond airport WLAN services

**Today it's not just aircraft that are taking off from airports around the world. Estates management, terminal design and retail operations are just some of the areas that have yielded success and profits for the world's top airport operators.**

But the French company Aéroports de Paris (ADP) has added a more unusual service to its portfolio: telecommunications. The firm, through its wholly owned subsidiary ADP Télécom, has carved out a valuable niche for itself providing telecommunications (and particularly wireless) services - and not just in airports.

The company was originally set up to manage the telecommunications infrastructure across ADP, which runs 14 airports and aerodromes in the Paris region, including the country's biggest air hub, Roissy Charles de Gaulle.

In the last year and a half, however, it has applied the experience gained from introducing Cisco-based Wireless LANs (WLANs) across airport terminals to other areas that Jerome Castaing, ADP Télécom's director of



Development, describes as "large and complex sites with people in transit."

This experience has allowed ADP Télécom to

become a major provider of wireless and telecommunications services to owners of these sites, which include airports, business hotels, conference centers and exhibition spaces. Earlier this year, for example, ADP Télécom won a contract to provide WLAN and other telecommunications services for the Paris Expo-Porte de Versailles, the second-largest convention centre in Europe.

The Paris Expo win also capped a run of deals to manage wireless networks for a range of clients including Alliance Hospitality, which owns the Holiday Inn hotel chain, and the 1,000-room Concorde La Fayette on Paris' Champs-Élysées.

Castaing says the Paris Expo deal was a watershed in really breaking ADP Télécom into non-airport services. These now account for a significant amount of revenues to the business and have led to the creation of a specialist unit within the company.

## Changes to 5GHz 802.11 standard

**One reason for the relatively slow uptake of 5GHz 802.11a Wi-Fi, compared to its 2.4GHz cousin 802.11g, has been the complexity of licensing regulations affecting the 5GHz band - also an issue for WiMAX in the unlicensed spectrum. Two extensions to the 802.11 standard are easing the situation and should boost the adoption of the 'a' variant.**

First, and with the opening of new wireless bands for indoor, outdoor, and mobile use in Japan, the IEEE has approved an amendment to IEEE 802.11 to support the new spectrum and their designated applications. The amendment, IEEE 802.11j, will enable WLAN vendors to offer wireless products that adapt to new frequencies, different channel widths, and operating parameters.

"With existing spectrum used by more and more products, IEEE 802.11j was developed by leading international experts to allow WLAN products to

take advantage of new frequencies and operating modes," said Stuart J. Kerry, Chair of the IEEE 802.11 standards committee. IEEE 802.11j, "Wireless LAN Medium Access Control (MAC) and Physical Layer (PHY) Specifications: 4.9 --5 GHz Operation in Japan," takes advantage of spectrum and technology that has emerged since the original IEEE 802.11 standard was written in 1997. In August 2002, the Japanese Government published new rules to use 4.9 and 5 GHz bands in hot spot (indoor), fixed (outdoor), and nomadic (mobile) modes using Wireless LAN technology. IEEE 802.11j amends IEEE 802.11 to deliver a standard method of supporting these capabilities with new technologies such as the ability to change channel widths and dynamically modify radio capabilities.

"We wrote this amendment to enable IEEE 802.11 to scale to new regulatory requirements and uses envisioned by carriers, manufacturers,

and end users around the world," said Sheung Li, Chair of the IEEE 802.11j Task Group.

The amendment is targeted to the new Japan rules, and allows IEEE 802.11 networks to communicate and move to any new frequency, change the spectrum footprint to improve performance or user capacity, and communicate new rules and operating parameters to support both indoor and outdoor modes. Depending on the manufacturer, IEEE 802.11 products may be upgraded to use IEEE 802.11j features to take advantage of these new capabilities.

Another important Wi-Fi extension, 802.11h, is already in place to comply with European regulations regarding 5GHz and, in particular, to prevent Wi-Fi devices interfering with the incumbent users of the band, military and other radar. This will become mandatory in Europe and the US at the start of next year and a rush of new products is likely to appear soon.

# Incisor directory of wireless industry companies

As time goes on, more and more companies join the wireless industry, becoming part of the global network of companies that are working to take wireless technology to market.

On an ongoing basis, Incisor includes a listing of companies providing products and services within the short range RF sector. Beyond the simple listing, wherever there is an open book icon (📖) alongside the company name, you will be able to obtain more information and contact details for that

company by clicking on the icon. This provides a link to an expanded profile of that company.

Incisor continues to be the only continuously published magazine dedicated to Bluetooth and short range RF technology, and is received at more than 1300 companies across the world, and enjoyed by an estimated readership of 25,000 individuals. To add your company or a profile for your company to this directory listing, email: [directorylisting@click.co.uk](mailto:directorylisting@click.co.uk)



## **Access point/gateway products**

BLIP Systems  
Clipcomm Inc.  
Commil Ltd  
lesswire AG  
**Inventel** 📖  
Pico Communications  
Red-M  
Tadlys  
Wireless Networks Inc.

## **Antennas**

Fractus  
GigaAnt

## **Cellular handsets**

Mitsubishi Electric Telecom Europe  
Motorola  
Nokia  
Panasonic  
Philips  
Sony Ericsson

## **Communications Consulting**

Alpine Communications  
PA Consulting Group

## **Connectivity/Hardware products**

3Com  
Anycom, Inc.  
**Brain Boxes Ltd** 📖  
Ensure Technologies  
Logitech  
MediaSolv.com  
Roving Networks  
Socket Communications  
Tactel AB  
TDK Systems

Troy Group  
Xircom

## **Digital pen and paper technology**

Anoto

## **Hardware and software design/IP**

Adamya Technologies  
ARC Wireless Solutions Inc.  
Atinav Inc.  
CEVA Inc.  
Colligo Networks Inc.  
Cosmic Co Ltd  
DsIT Technologies Ltd

## **Ericsson Technology Licensing Company** 📖

Impulsoft  
IVT Corporation  
LinTech GmbH  
Mecel AB  
MindTree Consulting  
NewLogic Technologies  
Penell A/S  
RTX Telecom  
Stollmann E+V GmbH  
Tality Corporation  
Teleca  
TTPCom Ltd.  
WaveLab Engineering AG

## **Headsets**

GN Netcom  
Plantronics  
SouthWing

## **Industrial products**

Barocoda

BlueGiga Technologies  
ConnectBlue AB

## **Market research & analysis**

ARC Group  
**Baskerville** 📖  
Chorleywood Consulting  
EMC  
IMS Research

## **Mobile Computing products**

Casio  
Fujitsu Siemens Computers  
IBM  
Palm  
Samsung Electronics  
Sony Information Technology Europe  
Toshiba Information Systems

## **OEM solutions**

**SMART Modular Technologies** 📖

## **Silicon/Semiconductors**

Alcatel Microelectronics  
Atmel Corporation  
Brightcom Technologies, Inc.  
Conexant Systems, Inc.

## **Cambridge Silicon Radio (CSR)** 📖

Infineon Technologies  
Intel Corporation  
KC Technology Inc  
National Semiconductor GmbH  
**Philips Semiconductors** 📖  
RF Micro Devices  
SiGe Semiconductor  
Silicon & Software Solutions  
Spirea

STMicroelectronics  
Texas Instruments, Inc.  
XEMICS SA  
Zeevo, Inc.

## **Software solutions & applications**

Atinav Inc.  
Bandspeed  
**Mezoe** 📖  
Microsage Wireless  
Norwood Systems  
Open Interface  
RegiSoft  
Rococo Software  
SofBlue Inc.  
**WIDCOMM** 📖  
Zi Corporation

## **Test Equipment**

Anritsu  
Berkeley Varitronics Systems  
Catalyst Enterprises  
**CETECOM Spain** 📖  
Frontline  
IAR Systems  
Tektronix, Inc.  
Tescom Co Ltd

## **Test houses**

**7 layers** 📖  
**CETECOM Inc.** 📖  
Ericsson  
ETS DR.GENZ GmbH  
**Intertek ETL SEMKO** 📖  
**Radio Frequency Investigation (RFI)** 📖

## Wireless industry calendar of events

DATE	EVENT	LOCATION	NOTES	LINK
February 6 - 10 2005	ISSCC 2005	San Francisco Marriott Hotel, San Francisco, CA	-	<a href="http://www.isscc.org/isscc/">http://www.isscc.org/isscc/</a>
February 13 - 18 2005	Bluetooth UnPlugFest 20	Vancouver, Canada	-	<a href="http://www.bluetooth.org/foundry/sitecontent/document/unplugfest_main">www.bluetooth.org/foundry/sitecontent/document/unplugfest_main</a>
March 14 - 16 2005	CTIA Wireless 2005	Ernest N. Morial Convention Center, New Orleans, USA	Represents all technologies and platforms and tells the complete story of wireless	<a href="http://www.ctiawireless.com/">http://www.ctiawireless.com/</a>
April 11 - 14 2005	Bluetooth SIG All Hands Meeting	Lisbon, Portugal	-	<a href="http://www.bluetooth.org/foundry/sitecontent/document/unplugfest_main">www.bluetooth.org/foundry/sitecontent/document/unplugfest_main</a>
May 24 - 25 2005	Wireless Connectivity World	ExCel, London, UK	-	<a href="http://www.wiconworld.com">www.wiconworld.com</a>
July 11 - 13 2005	m-Business 2005	Sydney, Australia	The Fourth International Conference on Mobile Business (IEEE sponsored)	<a href="http://www.mbusiness2005.org">http://www.mbusiness2005.org</a>

Further wireless industry events will be added to the calendar as soon as they are announced. See notes below regarding editorial submissions.

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