

**Joint Event between the Digital Communications Knowledge Transfer Network
and Cambridge Wireless Future Wide Area Wireless SIG**

25th March 2010

‘Standards and the New Economy’

**Championed by Stirling Essex of CRFS, Graham Maile of Plextek
and Geoff Varrall of RTT Programmes**

Kaetsu Centre, Murray Edwards College, Cambridge, CB3 0DF

AGENDA

10:30 Registration and Refreshments

11:00 Update on Cambridge Wireless Activities and Introduction to FWA/Spectrum and Standards SIG from Stirling Essex of CRFS

**11:10 Welcome message and Keynote Address – on behalf of the DCKTN
Stuart Revell, DCKTN**

Internationally there has been intensive political debate about net neutrality, the right of citizens to have unrestricted access to the internet across multiple networks but what does this mean in practice? There is no such thing as a universal device that can access a universal network and access policy inevitably has to be conditioned by composite cost factors that have to be factored into access pricing. For example, there is an underlying assumption that wireless can deliver broadband connectivity more cost efficiently than other delivery options. It has the apparently obvious advantage of not needing to be buried in the ground. However the industry has managed to introduce substantial additional costs that have needed to be amortized as part of the overall cost of delivery including spectral cost and standardisation cost. Spectral cost is now largely a sunk investment though in practice still needs to be recovered. Standardisation costs could be reduced if we could find a way of improving the standardisation process and potential resource re-use across multiple platforms and standards. How do we do this?

11:30 “The New Wireless Eco-system - Technology and Spectrum Drivers and their Impact on Standardisation Policy and Standardisation Cost”

David Barker, Quintel

Operators across the world are assessing how to deploy and where (spectrally) to deploy LTE access technologies. The USA is now leading the LTE march and the big operators have firmly chosen the US Digital Dividend band 700MHz as LTE’s first home, due to its favourable propagation properties and the tough lessons learnt in attempting to deploy networks solely at high-band frequencies.

In Europe we are observing the same debate; LTE’s first home was always thought of as the 2600MHz band, but the Digital Dividend band in Europe is gaining momentum as a promising initial home for LTE in Europe. In parallel, we are observing that an LTE1800 eco-system may also flourish where there is a sensible balance between available spectrum and achievable footprint coverage.

This prime spectrum-estate at “low band” is proximate to both terrestrial digital TV transmissions and existing GSM900 services. This can open possibilities through network design innovation and aspects of sharing to help Broadcast and Cellular to converge and co-exist and with potentially significant spectral efficiency gains.

Technology convergence and technology innovation are together providing the catalyst for developing additional value from existing and new allocated and auctioned spectrum and from the products (cellular phones and mobile broadband devices) used to access that spectrum.

How will these technology innovations change present industry business models? What impact could/should these technology trends and techniques have on future standardisation policy and are standardisation costs likely to offset the technology driven efficiency benefits and value opportunities potentially achievable in wireless?

12.00 **“Can Wireless Compete against Fibre, Cable and Copper?”**

Ian Vance, Amazing Communications

This session, led by Ian Vance compares the technology, engineering and business economics of fibre, cable and copper, tracking the similarities with wireless in terms of adopting and standardizing higher order modulation methods combined with frequency multiplexing.

Fifty years ago Charles Kao and George Hockham proposed a way of making **optical fibre** at low loss, paving the way for the development of optical telecommunications. Today the world is connected though over half a billion miles of optical cable. Most cellular phone calls travel down optical fibre at some point in their journey.

Both multi mode and single mode fibre have substantial untapped bandwidth potential which will be realized as optical components improve over time and as higher order modulation schemes are adopted. However fibre is expensive to install when compared to competitive access options that have either been fully amortized (copper) or written down (cable). One solution may be to deliver fibre over existing utility poles. Coupled with optical routing and optical storage, this could transform the cost and energy economics of broadband delivery.

In common with fibre, **cable** is benefiting from higher order modulation schemes but these higher order modulation schemes are noise sensitive. This suggests that present cable networks may need substantial additional investment to ensure that sufficient bandwidth is available to support a competitive high definition TV proposition and acceptable down load times for high definition content. This of course strengthens the business case for competitive or preferably complementary fibre investment but also implies a substantial engineering common interest between cable and fibre in final mile access platforms. Can this common interest be extended to wireless?

Higher order modulation schemes over **copper** combined with adaptive channel coding schemes deliver data rates that are presently competitive for internet access but marginal for high definition TV.

VDSL modems add in an OFDM multiplex to deliver some additional bandwidth gain but are severely distance limited. The 100 M/bit high profile service for example needs to be within 350 meters of a fibre node.

As with cable this suggests that present copper networks may need substantial additional investment to ensure that sufficient bandwidth is available to support a competitive high definition TV proposition and acceptable down load times for high definition content.

This strengthens the business case for competitive or preferably complementary fibre investment but also implies a substantial engineering common interest between copper and fibre in final mile access platforms. Can this common interest be extended to wireless? Can standards be standardized across different physical layers to achieve economies of scale? Will this help move us towards a world where the majority not the minority have access to broad band connectivity?

12:30 **Panel Discussion/Q&A Chaired by Graham Maile of Plextek, with morning session presenters.**

13:00 **Buffet Lunch**

14:00 **“Lessons from History - The Ionica Story and its Relevance Today”**

John Haine, Cognovo

Behind the discussion about the place of wireless is an assumption that it is competing with fibre or copper to connect fixed premises to the network. Such an assumption needs to be examined in the context of the unique properties of wireless links; both their advantages and disadvantages, and where possible, lessons need to be learned from previous attempts to make this substitution.

Between 1991 and 1998 Ionica, a Cambridge start-up, developed and deployed a fixed wireless access system operating at 3.4 GHz to provide telephone service to homes and small businesses. Launching in 1996, by 1998 the company had 62,000 customers in Yorkshire, the Midlands and East Anglia. Various technical and commercial problems led to Ionica going into administration in October 1998, and it closed down the following year.

In the process of developing the technology and deploying it, Ionica met and overcome many challenges, and the lessons learned have implications for people thinking of deploying fixed wireless today. However, the fact that the company was deploying a proprietary technology, and ultimately failed, means that much of the knowledge lies only in the minds of those who were involved.

This presentation, based on contributions from people at the heart of developing and deploying the technology and planning the business, will tease out some of these key lessons and assess their relevance to the Digital Britain debate today.

14:30 **“Broadband Global Area Networks”**

Alan Howell , Inmarsat

Fibre and the satellite industry are both 50 years old. Both industries have transformed global connectivity. The silent revolution in space has been based on ever more power efficient satellites that can support mobile, portable and fixed connectivity. Inmarsat's Broadband Global Area Network delivers a mix of voice, standard IP or streamed IP at data rates of between 384 to 492 kbps, delivering step function gains in effectiveness and efficiency into aid, oil, gas, construction, mining government and media applications. Satellites are not competitive to other wireless solutions but play a vital complementary role in global connectivity. In particular the use of IP protocols allows applications to move seamlessly and efficiently between satellite based and terrestrial based wireless wide area and broadband global area networks, providing a standardised way to move and manage voice and data traffic.

15:00 **Refreshment Break**

15:30 **“What about Terrestrial TV?”**

Ollie Haffenden, BBC Research.

Ollie is a subject expert in COFDM technologies, including DVB-T, DRM and DVB-T2 and has played a leading role in standardisation work.

The need to co share spectrum with analogue transmissions has required digital TV to transmit at sub optimum power levels though this constraint lessens as analogue transmissions are switched off.

There are obvious opportunities to increase signal strengths over and above present analogue TV transmissions by increasing the number of DVB transmission sites. Cellular operators are a natural partner in this process.

This opens up the possibility of supporting a wider range of portable and mobile devices including the use of these devices within buildings.

It could of course be argued that in building portable and mobile device applications can also be serviced by a combination of fibre, cable or copper access combined with WiFi or indoor Femtocell solutions.

However it would be economically hard for any alternative delivery options (including cellular and/or possible future combined WiFi/cellular networks) to match the ability of terrestrial TV to deliver a 20 M/bit or 30 M/bit downlink to devices irrespective of where or how they are being used.

Terrestrial TV therefore has a significant role to play in the standard and high definition TV delivery process including the delivery of these services to portable and mobile devices that can access multiple physical layers transparently to achieve economies of scale.

In particular the transition to DVB T2 delivers significant improvements over the present T1 standard both in terms of performance and user features including portable device support.

16:00 **“How do Other Industries do it?”**

Tim Masson, Agilent Technologies

The wireless industry has two models of standardisation, collaborative and adversarial, the de facto approach to standards. How are standards managed in other industries and what lessons can we learn from them?

16:30 **Panel Discussion / Q&A - Chaired by Geoff Varrall, RTT Programmes**

We are very pleased to be joined in this session by Simon Hicks, Head of Technology (Electronic Communications and Content), Information Economy (IE) Directorate, Department for Business, Innovation & Skills.

17:00 **Closing Remarks from DCKTN**

17:10 **Complete Evaluation Form**

17:15 **Networking over Drinks & Nibbles**

18:00 **Event Close**

This agenda is subject to change.

About the DCKTN

The Digital Communications Knowledge Transfer Network has been established by an industry-led group of leading players, with funding from the Technology Strategy Board. We seek to bring competitive advantage to the UK by promoting collaboration and knowledge sharing between the users and providers of Digital Communications, and helping to drive innovation in the sector. For further information please visit: www.dcktn.org.uk

Profiles of our SIG Champions

Stirling Essex of CRFS

CRFS develops and supplies spectral analysis tools for planning, monitoring, and licensing of wireless spectrum, based on innovative, low-cost distributed networks of broadband, real-time RFeye® spectrum monitoring nodes.

Stirling has been involved in wireless systems since the early days of GSM, and was subsequently involved in the development of test systems for CDMA (IS-95), and for 3G (W-CDMA), including responsibility for the development and marketing of 3G Test Mobiles at Ubinetics. He founded Espansivo, a wireless technology consultancy in 2005, and joined CRFS in June 2008. He is a co-champion of the Cambridge Wireless Future Wide Area Wireless SIG and is a member of the Cambridge Wireless Board. For more information visit www.crf.com.

Geoff Varrall of RTT Programmes

Since 1986, RTT has been specialising in providing an international client base with technology assessment and technology related design support programmes. The company's knowledge and experience is principally in mobile terrestrial communications. RTT works closely with members of the Mobile Experts Groups within ETSI (European Telecommunications Standards Institute), and the international academic, scientific and industrial research community.

RTT's research focuses on 3G design and implementation, user equipment design, air interface and network design - areas of particular expertise include RF and IF processing (3G DSP), noise and gain budgets (OFDMA bandwidth gain), device options (RF, IF and baseband), design analysis, protocols and 3G network performance optimisation.

Over the past two years, RTT's research has extended to include the impact of technology convergence across six industries - computers, consumer electronics, IT, wireless, wireline, TV. For more information please visit www.rtonline.com

Graham Maile of Plextek

Plextek is one of Europe's largest independent providers of electronic product design, supply and consultancy. Its specialist business areas include telecommunications, security, automotive, defence and medical. With a team of around 120 and skills in microwave semiconductor design, radio, DSP, digital design, embedded software, design for manufacture, industrial design and production test equipment, the company is able to tackle any wireless project.

Graham Maile, Plextek's director of Strategic Consulting, has 30 years' experience in R&D, management and business start-up roles within the electronics and telecommunications industry. He co-champions the Cambridge Wireless Future Wide Area Wireless SIG and is a director of the Digital Communications KTN and an associate of Corbett Keeling Corporate Finance. For more information please visit www.plextek.com