

Some new RF developments

4G network

Ofcom's chief executive, Ed Richards, announced in November 2010 that the frequencies that will be made available for the roll out of 4G (800 MHz and 2.6 GHz) will be auctioned off in the first half of 2012, the service becoming available from 2013. 800 MHz, which has been freed up by the switchover to digital TV allows RF signals to travel over greater distances, making rural access easier. The higher capacity 2.6 GHz will be more useful to meet the need for services from the higher population demands in towns and cities.

4G or Long Term Evolution (LTE) @ 900MHz is being trialled in 4 places in London and in Slough, by O₂. It is anticipated that the whole of London will be covered by 2015.

The US broadcasting regulator has announced that it is to make unused television airwaves available for new 'super WiFi' technology. It hopes the move will turn swathes of the country into giant WiFi hotspots. The airwaves became vacant in 2009 when the US moved to an all-digital television broadcast system.

Technology firms are eager to begin using the airwaves, in part because signals in that spectrum can travel several miles, penetrate walls and allow large transfers of data.

Animal tagging

Flipper bands (radio tags), used to identify and monitor King penguins, seem to be threatening their survival. A 10-year study has found that penguins with the metal tag had 39% fewer chicks and 16% lower survival rates than those without.

Antiretroviral treatment in Kenya

HIV-infected patients who received SMS support had a significantly improved adherence to their therapy and rates of viral suppression compared with those who were not sent messages. It was felt (Lester [2010](#)) that "*mobile phones might be effective tools to improve patient outcome in resource limited settings.*"

References

Lester RT et al 2010 - *Effects of a mobile phone short message service on antiretroviral treatment adherence in Kenya (WelTel Kenya1): a randomised trial* Lancet 376(9755):1838-45

Bluetooth

Motorists who hide their laptops and satnavs in the boot or glovebox are being hi by thieves using hi-tech bluetooth systems to detect them.

Criminals are targetting parked cars with the equipment which sends out a short range radio frequency to seek out other compatible systems close to it. Once it picks up a signal the thieves know a car has valuables inside it which are not visible through the windows.

Mobile phones and laptops have bluetooth technology already fitted and active when they are bought and video games consoles can also be found with the device.

To prevent your own equipment giving itself away you must turn off the bluetooth technology in your own device.

Contactless paying

Contactless cards will be with us in a big way by the time the Olympics is upon us. These enable us to pay for less costly items without having to key in pin numbers or find cash; ideal for the overwhelming number of sports tourists who will be flocking to the metropolis in summer. They use short range wireless technology; the reader at the till picking up a signal from your card when it's very close. Exposure low for shoppers, though high for the person administering the transaction. ES people will find themselves at a disadvantage as even low fields may be too high for them to cope with. The system is being taken up rapidly by banks and shops as the time draws near.

Pacemaker

In August 2009, the Daily Mail reported that a woman had received the first wireless pacemaker, with a wireless home monitoring system that transmits critical information to her doctor via the internet. Dr Steven Greenberg, the director of St. Francis' Arrhythmia and Pacemaker Center said the server and the remote monitor communicate at least once a day to download all the relevant information and alert the doctor and patient if there is anything unusual.

Street lighting

RF-driven plasma lighting are planned to replace ordinary street lights. The bulbs are powered by direct RF radiation, which ignites the argon gas and metal halide mixture constituents. The lights are very efficient: 1W of RF power is converted to 130-140lm of light, with a colour rendition close to sunlight. It lasts for about 50,000 hours, twice as long as LEDs (Electronics Weekly 2-8 March 2011).



It is more energy efficient, but will expose us to more RF, even at very low levels, and to the equivalent of sunlight at night-time, when the levels of melatonin in the people exposed will be reduced, possibly affecting their immune systems adversely.

The equipment on each of the columns will communicate via mobile phone technology to a central computer. The computer will monitor equipment performance and energy use and can help to automatically identify faults. In addition, the lights can be dimmed or even turned off. The exact dimming will differ dependent on a number of factors such as class of road (A

road/residential) or location. For example, full lighting will be maintained later into the morning in locations such as town centres, which have establishments with late opening hours.

It is unclear how often the equipment will communicate to the computer. We would have expected only a few communications per day. Maybe it does depend on where they are situated as some RF-sensitive individuals find them problematical, which implies more frequent signalling. Maybe, like a mobile phone, they log on every 5 minutes or so. This seems completely unnecessary (but possibly cheaper using an existing monitoring package?), unless they are also being used for some covert surveillance purposes. Maybe they also contain mobile-phone camera technology and send back regular pictures of who is in the street. That would be a very 'sensible' extra use of the technology they are installing and would cost very little extra.

Apparently in Leyland, there is a post with a CCTV camera on a large roundabout that is transmitting at around 2.4 GHz directly to the police station, according to the council.

WiFi Direct

WiFi direct allows devices like phones and laptops to connect to one another without joining a traditional network. It will automatically scan for local existing hotspots and any wifi-enabled devices, such as cameras, phones and computers. The WiFi Alliance says the specification will search for both consumer electronics and office applications, enabling devices to connect from across a home or workplace.

The wireless home

In August 2008, Mr Rattner of Intel envisaged a scenario where a laptop's battery could be recharged when the machine gets within several feet of an antenna which could be embedded in tables, work surfaces, picture frames and even behind walls.

WiFi signals that connect laptops and other gadgets to the net are filling up, prompting Virgin to offer customers a personal mobile internet signal (Guardian December 2011). The cable operator wants to offer customers a personal mobile phone signal, using transceivers the size of a paperback book, because the wireless network relied on by personal computers, and increasingly, iPads, smartphones and laptops, is predicted to become overloaded. Household appliances such as fridges, washing machines, boilers, etc. are expected to get their own internet connection in the next few years so that they can be operated remotely.

The WiFi capacity problem has affected luxury hotels such as the Hilton, the Ritz and the Dorchester with guests complaining about the slow internet speeds. They are charging for the high speed service.

Virgin wants to install femtocells which will have a range of up to 100 metres. They can be plugged in to living rooms, studies, or in offices to provide coverage over a wide area at higher power. The signals will clearly travel to other buildings and people nearby. Public places such as restaurants, exhibition centres and railway stations may also want to use the technology.

Mobile phones, a medical aid?

Scientists from Johns Hopkins University in Maryland, USA, say that using a mobile phone with OsiriX, a special imaging software, shows promise for accurately diagnosing acute appendicitis from remote locations. They believe it may also be useful in diagnosing other conditions such as bleeding in the brain, or even stroke, which require a quick diagnosis.

The National Hospital for Neurology and Neurosurgery will use text messaging to remind patients to take their medication and can alert carers if they do not respond to a text saying they have taken the tablets (January 2010 BBC). Patients who received SMS support had significantly improved antiretroviral therapy adherence and rates of viral suppression compared with the control individuals. Lester ([2010](#)) and colleagues concluded that mobile phones might be effective tools to improve patient outcome in resource-limited settings.

It was reported that mobile technology offering *in vivo* skills coaching may be a useful tool for reducing urges to use substances and engage in other maladaptive behaviour by directly teaching and coaching in alternative, adaptive coping behaviour (Rizvi [2011](#)).

Professor Ramesh Raskar of the Massachusetts Institute of Technology Media Labs says that mobile phones come into their own in developing countries where there is a shortage of lab equipment, but an ever increasing number of mobile phones and connections. He is working on a device called the Near Eye Tool for Refractive Assessment (Netra), a cheap clip-on gadget, which can be used to diagnose eye conditions such as nearsightedness and farsightedness.

At the University of California, Professor Aydogan Ozcan is working on a mobile replacement for the microscope. He is building the Cellophone, a handset modification that allows it to detect microbes and bacteria in fluid samples. He is currently refining the technology to detect the parasite responsible for malaria.

Smoking

Have you thought of quitting smoking using your mobile phone? Scientists at Columbia University's Teachers College are working on a game to help people kick the habit by breathing into their mobile phone. Entitled 'A Game Intervention for Nicotine Smokers' it involves breathing into a microphone and is accompanied by sounds, colours, images and challenges to mimic the stimulant and relaxing effects of smoking. Eventually it is anticipated that this will replace the smoking altogether. Cancer swap, anybody?

The research is part of \$1.85 million in grants given to nine leading research teams on how digital games might improve health. It is sponsored by the Robert Wood Johnson Foundation.

Space radar

In November 2011, the BBC reported that a series of satellites could eventually be launched, enabling any place on Earth to be imaged inside 24 hours. The radar money is part of a £200m boost for science announced by the chancellor in his Autumn statement. George Osborne's investment will be matched by industry. The new NovaSar-S will produce what are termed medium-resolution images, meaning details on the ground larger than 6m across would be discernible. Nova Sar-S would have a number of viewing modes that could enable it to perform a wide range of roles, from flood monitoring and land cover management to disaster mapping and maritime enforcement - notably ship tracking and oil spill detection.

Student iPhones

More than 500 fourth and fifth year medical students at the University of Leeds are being issued with iPhones which can access online text books (BBC September 2010). The phones will also be used to keep in contact with students training in hospitals. It will be a way of recording notes on the ward and keeping in touch with tutors.

If the phones are lost or stolen any information on them can be wiped remotely.

In 2009, the University of Central Lancashire in Preston introduced an application for new students, with maps, information about services and local transport. The university invested a £1m in laptops and online access for students who cannot afford their own computers.

Students are increasingly likely to be studying part-time – or to have term-time jobs and a mobile phone is considered to be a convenient way for the university to keep in touch with busy people in many different locations.

It has been estimated that there will be 100,000 applications available by the end of the year, with 1.8 billion having been downloaded so far.

Wii for Health

Patients with Parkinson's found a significant improvement in rigidity, fine motor skills and energy levels after playing Wii Sports for an hour a day, 3 times a week for 4 weeks. Their depression levels also decreased (BBC October 2010). There has also been an increase in injuries suffered by people taking part in, or watching, the interactive games.

Other new uses

In the Lake District mobile phone users will be able to book and pay for parking in advance of their outings. They can also receive texts to remind them when parking is about to run out. Similar schemes are run in some cities and boroughs, such as York and London.

In October 2010, lightweight augmented reality glasses that overlay the world with digital content made an appearance in Japan. The headset uses augmented reality software on an attached smartphone. Tokyo-based technology analyst, Steven Nagata, said *"The promise of a walking, heads up display that would be able to provide important and relevant information about your environment with minimal interaction is the holy grail of mobile technology."*

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