Engineering the future of communications - 2013

“How can the UK champion the global potential of smart superfast systems?”
The IET

The Institution of Engineering and Technology (IET) is a global organisation, with over 150,000 members representing a vast range of engineering and technology fields. Our primary aims are to provide a global knowledge network promoting the exchange of ideas and enhance the positive role of science, engineering and technology between business, academia, governments and professional bodies; and to address challenges that face society in the future.

The IET is registered as a Charity in England & Wales (no 211014) and Scotland (no SC038698).

For more information please visit http://www.theiet.org

The IET Communications Policy Panel

The IET Communications Policy Panel is tasked by the Institution of Engineering and Technology with proactively identifying policy issues applicable to the communications sector and providing guidance to the IET Board of Trustees, members, Government and the public. It’s members are Chief Technologists and their equivalents from across industry, academia and public sector organisations.

The panel conducts most of its business electronically but meets with selected guests a few times a year at the IET in Savoy Place to review key topics. Some of these discussions form the basis for the annual meeting.

For more information please visit http://www.theiet.org/policy/panels/
‘Smart, responsive communications’

Demand Attentive Networks (DAN)

This is the fifth meeting in a series of successful annual briefings to discuss policy matters involving communications and the information economy.

The purpose of this event is not only to provide an occasion for stimulating conversation over a pleasant lunch but to let you hear from top experts in the engineering profession about likely future developments in communications and to give you the opportunity to participate in a discussion of the likely consequences.

The relentless growth in the use of mobile communications has had many benefits but presents unforeseen challenges. One of the challenges has been the explosive growth in data that is being both generated and accessed by mobile handsets. This is occurring on a global scale with the traditional carriers struggling to carry the data volumes without having to invest on a prohibitively large scale. This challenge is only going to worsen unless a more radical joined up approach is taken across the industry and the regulatory bodies.

In order to address challenge this year’s event is focusing on a new concept DAN, whereby the potential exists for the UK to take a global lead in building the next generation high performance network infrastructure in an affordable manner that satisfies user demand.

Lord Broers Kt, FRS, FREng
‘Smart, responsive communications’

Demand Attentive Networks (DAN)

In our report Broadband for All, the House of Lords Select Committee on Communications argued the case for a pragmatic approach to the physical configuration of the last mile of the network to ensure connectivity in a variety of very different circumstances. The IET report Demand Attentive Networks moves the argument on a full step arguing for a sensitive flexible and adaptable network that will respond to the changing requirements of its users.

Lord Inglewood ARICS DL
Chairman’s introduction

User-oriented broadband communications
(Demand Attentive Networks - DAN)

How can the UK champion the global potential of smart superfast systems?

This year, in the fifth of our annual updates on the future and impact of communications technology we are focusing on a major new IET initiative that we think changes the rules for future convergent broadband, optical fibre-core-wireless edge networks.

Fundamentally, DAN is about networks that anticipate and respond rapidly to the user’s needs. But DAN is not about chasing bandwidth - it is about delivering the benefits which those who do chase bandwidth are after, but without chasing bandwidth, affordably and probably more quickly.

We believe the UK with its dynamic usage and regulatory environment has a chance to lead this global advance. To do so will require regulators and industry to work together, with government leadership and facilitation.

To set off discussion we have short presentations by panel experts:

- Will Stewart - introduction
- Gavin Young - a fibre-wireless future.
- Stephen Temple - the new rules for networks...bandwidth must follow the customer

This will be followed by a Q&A and discussion session in which you are all invited to participate - you are all users of communications!

Prof Will Stewart FREng CEng MIET FInstP
It is generally acknowledged that universal super-fast broadband would benefit the UK’s economy and help close the gap between urban and rural economies and between northern and southern economies. Ideally the UK would have a universal fibre to the premise infrastructure with extensive high speed wireless resources at the edges of the network. This would mean that all broadband users would be able to wirelessly access internet and other resources at speeds of 1 Gbps from their smartphones, tablets, TVs and other appliances. Service providers and App developers would find new and creative ways to bring novel services to businesses and domestic customers. But the commercial business cases for investment in universal coverage do not work and the public subsidy required to make it happen is variously estimated at between £10 billion and £30 billion for the fibre networks alone.

The Institution of Engineering & Technology (IET) studied the underlying issue, and recognising that public investment of this size is unaffordable in the foreseeable future, took a different approach. Their key underlying principle is that it is not necessary to have such high speed capacity available everywhere at all times; it is enough if the device or appliance which is using the connectivity finds that it is not constrained in its demands by the network infrastructure in place. This can be achieved by a combination of technical standards, network architecture and smart regulation which work together to organise the demand for bandwidth in real time.

The enclosed paper on “Demand-Attentive Networks” reflects on this point; that future networks should be attentive to the demand for bandwidth being placed upon them and provide sufficient resources to meet the demand at the time. There are several implications of this principle, which are explored in the paper. Firstly the networks have to be positioned to supply bandwidth wherever the demand arises. This can be enabled or prevented by simple public policy decisions. Some of these are described in the attached paper and not all of these concern the making available of more spectrum, although that will always remain important. Secondly the networks have to be designed to enable resources to be shared between networks as demand moves. This implies specific regulatory approaches. The integration of fibre and wireless networks, not all...
of which would be provided by traditional mobile operators, will be critical. Thirdly user devices and Apps developers should assume availability of unrestricted bandwidth, but must design their devices to work in this environment and only demand what they really need at the time. A smartphone mustn’t “cry wolf” and grab the priority from other users if it doesn’t really need it.

In order to focus the debate between network providers, manufacturers, regulators and policy makers, the IET has defined a number of “Working Assumptions” which are set out in a second paper. This could be seen as a to-do list for anyone wishing to implement Demand-Attentive Networks, but it is also more than that. The IET has tried to determine the top ten or so areas that need attention and invites comments and suggestions of other priority areas. Ultimately the IET is seeking to drive agreement, amongst all of those with an interest, as to what the top ten areas for action are.

There have been several Government initiatives intended to increase the reach and speed of UK’s broadband networks. The Coalition Government has made large sums of money available to increase the rollout of rural broadband, which taken together with commercial investments this will result in a wireline broadband infrastructure which delivers 24 Mbps to a majority of households. At every step along the way to an eventual fibre-to-the-premise-&-wireless network the Demand-Attentive Network approach has the potential to deliver a significantly higher performance and economic impact (whilst incorporating 5G mobile and small cell/wifi access) but at a fraction of the cost and without the need for large public subsidy. Currently there is no country in the world which is taking anything like this approach to the delivery of future communications networks. The UK has the opportunity to seize the initiative, generating prodigious economic value for the UK and at the same time enabling the proliferation of creative and novel technology companies.

Copies of Demand Attentive Networks can be downloaded in pdf format from the IET website:

- [www.theiet.org/dan](http://www.theiet.org/dan)

If you require additional hard copies please contact the IET Policy Department:

- policy@theiet.org
- 01438 765690