We started publishing RTT Technology Topics ten years ago this month.

The topics reflect areas of research undertaken by RTT and or with our colleagues at The Shosteck Group and **The Mobile World.**

Producing the topics monthly forces an internal discipline to document and analyze trends in the industry and to observe how the industry responds to external events.

In this months technology topic we revisit some of the 119 topics archived on the web site in a search for some 'useful truths' - underlying trends that are useful in the forecasting process.

Over the past ten years the telecoms industry has had to respond to a series of natural disasters, Katrina, The Asian Tsunami, the Chinese Earthquake, and unnatural disasters including 9/11.

These events disappear from the daily news but have a long term impact on the allocation of engineering resources. 9/11 for example has prompted a shift to homeland security and defence related spending. Katrina has prompted an increased interest in first responder infrastructure investment both in terrestrial radio and the satellite MSS sector.

We cannot forecast external events but we can forecast demographic change and its impact on our industry.

For example the past ten years have been characterized by the increasing dominance by volume and value of China and India. Today Europe represents 24% of the world cellular market by handset volume. This will halve by 2012. Today the US represents 14% of the world market. This will halve by 2012. (Source The Mobile World). This will have a profound gravitational effect on the allocation of radio engineering and R and D resource.

The allocation of radio engineering and R and D resource will determine which radio technologies will succeed and which will fail.

Storage, memory and information bandwidth as a recurring theme

Radio technology and radio engineering are essential to our industry but other 'value domains' have developed over the past ten years.

For example a recurring narrative of the technology topics has been the steady and rapid increase in storage and memory bandwidth value. Future trends in these areas

were more or less correctly identified in **'3G Memory'** (January 2000) and **'3G Content Capture' (April 2000)**.

Storage and memory bandwidth are closely aligned to information value, a topic explored in **'Storage Persistency'** (September 2002).

Information value may of course increase or decrease over time. Information has contemporary value, relevant to a present context. Information may then become either more or less relevant over time (historical value).

'Storage Persistency' discussed the possible impact of the present exponential increase in information bandwidth on future information value and speculates as to whether digital storage will ever be as robust as other storage media (paper, parchment and stone).

Personality value - the wireless ego system

Another recurring theme of the technology topics has been 'personality value'- individuals that have had a profound impact on technology, engineering, market or business value in the industry either in the short to medium term (contemporary or near contemporary) or longer term (historical value) - the wireless ego system.

The impact can be positive or negative. This is unsurprising. 'Ego' can be positive (self confidence, motivation, persistency) or negative (arrogance, stubbornness, vanity).

The Galvin family at Motorola are one example of contemporary (positive) personality value. Motorola was in effect a family business up until Chris Galvin's (forced) resignation in 2003. The Jacobs family at Qualcomm are another present example. Other examples in related industries include Bill Gates, Steve Jobs, Michael Dell, Rupert Murdoch (another dynasty in the making) and Bill Ford, presently persuading large Americans to buy small European cars.

All of the above can be characterised as industrialists - people with specialist detailed technical knowledge of their chosen industry. Note that negative personality value tends to be realised when 'experts' are parachuted in from other industries, a 'useful truth' for Wall Street to observe.

Historical personality value
But our personal personality favourites include many other people who have had a profound and lasting impact on our industry, many of these are non contemporary (historic).

In order of appearance the cast includes

Captain PP Eckersley - the BBC's first chief engineer who in 1925 turned on the world's first high power low frequency transmitter in Daventry (in the middle of England), the beginning of seventy years of radio and TV broadcast innovation.

['Wideband Wireless' October 2004](#)

Joseph Fourier who narrowly escaped the guillotine in the French revolution to provide us with most of the maths needed to implement OFDM radio systems. Prior art almost always exists. Unfortunately, or fortunately for patent attorneys it is often not well recorded.

['Maths in Mobile Phones (1)' September 2005](#)

Jacques Hadamard, Hans Rademacher and Joseph Walsh who individually provided us with most of the maths needed to implement CDMA radio systems. Prior art almost always exists. Unfortunately, or fortunately for patent attorneys it is often not well recorded.

Jacques Hadamard   Hans Rademacher   Joseph Walsh

['Maths in Mobile Phones (2)' October 2005](#)

Agner Erlang, Harry Nyquist and Claude Shannon who individually provided us with most of the maths needed to design **efficient** telecommunications systems. Prior art almost always exists. Unfortunately, or fortunately for patent attorneys it is often not well recorded.

Agner Erlang

Harry Nyquist

Claude Shannon

[**'The Bit Rate Race' January 2006**](#)

Alexander von Humboldt, Alfred Wallace and Charles Darwin, (the bearded botanists) who individually provided us with most of the maths needed to design **adaptive** telecommunications systems. Prior art almost always exists. Unfortunately, or fortunately for patent attorneys it is often not well recorded.

Alexander von Humboldt

Alfred Wallace
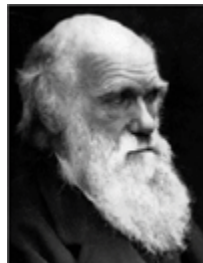
Charles Darwin

[**'Competitive Networks' February 2006**](#)

Dr Ludwig Zamenhof, as an example of the need for a language that would translate accurately and efficiently across technology, engineering, market and business disciplines.

[**'Esperanto for Engineers' March 2006**](#)

Other personal favourites include Aristotle and his work on Metaphysics- the foundation for modern information management [**'Mobile Metadata' April 2006**](#) and why Plato has relevance to the regulatory community [**'The consequential cost of light touch regulation' July 2008**](#)

Curiously all of the above are men. I am not sure why this is. Answers on a post card to……

The Eureka Moment

And this months 'personality of the month' is also a man - a round of applause please for Mr Archimedes.

Archimedes is in the news because an ancient instrument rescued from a sunken wreck off the coast of Crete one hundred years ago has been discovered to be able to predict solar eclipses and was probably used to set the dates for the four yearly Olympic Games. (Who says the ancient Greeks do not have contemporary relevance). Archimedes was probably the designer. He had probably just had a bath.

Archimedes had the talent of taking technology (from the Greek 'techne' meaning crafted or made) and applying engineering (from the Latin 'ingenium' also the origin of 'ingenuity') to make the technology do something useful.

In the defence of Syracuse he assembled ropes and pulleys (technology) to make 'engines' to fire rocks and dead animals at the Phoenicians (who tried to sail into the harbour). Anecdotally he also used mirrors to dazzle the sailors- an early example of optical warfare. Setting fire to the sails is now generally regarded as apocryphal.

Which brings us to another recurring narrative theme. Technology is useless unless it has engineering applied to it. Bran Ferren, the computer scientist, hit the nail on the head (figuratively speaking) by defining technology as 'stuff that doesn't work yet'.

Even the most promising technology will fail if insufficient engineering effort is applied. The 'useful truth' is that engineering makes products relevant and useful to people, engineering gives technology a purpose.

People products - products with personality - the era of the 'emo phone'?

Products with personality tend to be the 'product' either of a single designer or a closely integrated design team. The I pod and I phone are modern examples but historical examples include

The Leica A Compact 35mm camera (introduced in 1925)

Digital cameras and their impact on camera phone design March 2005

The Regency Transistor radio - a 1954 transistor radio that triggered the form factor

race that resulted in the ' world's smallest radio' launched by Sony in March 1957.

[(Broadcast over cellular June 2005)](#)

A visit to The Science Museum this summer provides some idea of how personal product design may evolve over the **next** fifty years.

The **[current exhibition](#)** features 'Emotibots', robots that have human like emotions that can trigger emotional responses in people. Two examples are the **['Pleo'](#)** made by Ugobe and the **[iC Hexapod](#)** made by MicroMagic Systems. Could the next step be the 'emotiphone'?

Summary
In summary, ten years in telecom is not long enough to track product or market trends -foundries have to be planned fifteen to twenty years ahead, spectrum has to be acquired on twenty year leases, new computer languages can take 20 to 30 years to evolve and mature.

Fortuitously RTT is 25 years old this year. Some modest effort and several trips into the attic will generally yield technology and engineering data that starts from the very earliest days of the cellular industry.

The Shosteck Group and The Mobile World or at least the founders of The Mobile World have been around just as long measuring and analysing market and business metrics. We think this longevity is good for us and our customers - the equivalent to the depth of field achieved by that Leica A camera.

About RTT Technology Topics

RTT Technology Topics reflect areas of research that we are presently working on.

We aim to introduce new terminology and new ideas to clarify present and future technology and business issues.

Do pass these Technology Topics on to your colleagues, encourage them to join our [Push List](#) and respond with comments.

Contact RTT

RTT, the Shosteck Group and The Mobile World are presently working on a number of research and forecasting projects in the cellular, two way radio, satellite and broadcasting industry.

If you would like more information on this work then please contact

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