

2005 BT Technology Timeline

August 2005

Edited by Ian Neild & Ian Pearson

Welcome to the 2005 edition of the BT Technology Timeline

As usual the timeline comes with the same caveats. The authors (Ian Neild and Ian Pearson) and BT (<http://www.bt.com>) are not involved in all of the research described in the timeline. We also do not necessarily approve or condone what we are predicting will happen. We are just saying they are possible, and listing some obvious implications.

The timeline has often been used by various people and companies around the world to start off workshops and brainstorming sessions. Look at each entry and think "is it likely?" You may agree or disagree with the prediction. If you disagree, is the date too soon or too late, is the idea just too ludicrous or does it scare you? Go back 10, 20, 30, 40, 50 or more years and imagine explaining what we do today. Then debate how it will affect you, your life and your business.

Many of the items may seem like science fiction, but as the great scientist Arthur C Clarke said:

"Any sufficiently advanced technology is indistinguishable from magic." - Profiles of The Future, 1961 (Clarke's third law).

The majority of the feedback we receive on the timeline is positive, but we do receive some criticism. But just because you don't agree with us now, don't worry, in 10 years' time you may change your mind. Human technology has moved from the first flight to flying to the moon in around 60 years - which was a remarkable achievement. In the past 60 years we have gone from Colossus - a machine the size of a room used to crack supposedly unbreakable codes during a war - to the PlayStation 3 and Xbox 360 - machines that bring virtual war into a room. These games machines have the processing power of super computers just 10 years ago yet are now used for entertainment.

In the next 60 years we will see nanotechnology and biotechnology making impacts on our life that might seem like magic to us but will be quite normal to our children's children. The world is speeding up as each generation learns from their kids, and through knowledge sharing via the Internet, so who knows what the next 60 years will bring? Our timeline can only cover a small sample of what is coming.

I look at the world in which my one-year-old will grow up, and can't help comparing it to my world, or my parent's or grandparent's worlds. We still do the same basic things in life but in terms of how we do them, we may as well be on different planets as different timelines.

The sources for the timeline include the preceding BT technology timeline, the web, magazines, chats with world experts and from interesting newsletters such as the Harrow report (<http://www.theharrowgroup.com/>) and Peter Cochrane (<http://www.cochrane.org.uk/>).

The future comes to us all at 60 minutes an hour but the timeline allows us to look a bit further up the road and see what could be happening. It is up to you decide what to do about it, or even to ignore it, but we certainly hope you will enjoy thinking about the future and the impact it will have on you in work, life and play.

Ian Neild
ian.neild@bopenworld.com

ARTIFICIAL INTELLIGENCE & ARTIFICIAL LIFE	3
BIOTECHNOLOGY, HEALTH & MEDICAL	4
BUSINESS & EDUCATION	5
DEMOGRAPHICS	6
ENERGY	6
ENVIRONMENT & COUNTRYSIDE..	7
HOME AND OFFICE INFRASTRUCTURE	7
LIFE & LEISURE IN A CYBERSPACE WORLD	8
MACHINE INPUT/OUTPUT	9
MATERIALS & ELECTRONIC DEVICES	9
PROCESSING, MEMORY AND STORAGE	10
ROBOTICS.....	10
SECURITY, MILITARY, LAW	11
SHOPPING & MONEY	12
SPACE	12
TELECOMMUNICATIONS.....	12
TRANSPORT & TRAVEL	13
WEARABLE TECHNOLOGY	13
ADDENDUM: WILD CARDS (THAT COULD HAPPEN ALMOST ANYTIME)	14

2005 BT Technology Timeline

ARTIFICIAL INTELLIGENCE & ARTIFICIAL LIFE

Synthetic voices pop band gets in top 20	2006-2010
Emotionally responsive toys and robots	2006-2010
Odour and flavour sensors comparable to dog	2006-2010
Virus aimed at toys released	2006-2010
Computer agent personal shoppers	2006-2010
Toys with network based intelligence	2006-2010
AI chatbots indistinguishable from people by 95 % of population	2006-2010
First artificial electronic life	2006-2010
First species brought back from extinction	2006-2010
Domestic appliances with personality	2006-2010
AI pop group gets top 10 hit	2006-2010
AI Entity passes GCSE	2008-2012
AI used as classroom assistants	2008-2012
Action man toys engage in war games over networks	2008-2012
Toys with built in tracking technology	2008-2012
People have some virtual friends but don't know which ones	2008-2012
Mood-sensitive home décor	2008-2012
Location devices implanted into pets	2008-2012
First divorce due to virtual affair with computer game character	2008-2012
Addiction to on-line games seen as a national problem	2008-2012
DNA used to assemble electronic circuits	2008-2012
First bacterium assembled from scratch	2008-2012
Many drugs delivered via fruit	2008-2012
AI football manager	2008-2012
AI football teams as TV entertainment	2008-2012
AI Entity passes A Level	2011-2015
AI companies illegally cloned	2011-2015
Highest earning celebrity is synthetic	2011-2015
Dolls with personality chip and full sensory input	2011-2015
25 % of TV celebrities synthetic	2011-2015
Expert systems surpass average human learning and logic abilities	2011-2015
Computer agents start being thought of as colleagues instead of tools	2011-2015
Autonomous AI sales staff become AI stalkers	2011-2015
Smart jelly babies	2011-2015
Smart mammary memory	2011-2015
First multi-celled organism assembled from scratch	2011-2015
Drugs delivered in carbon buckyballs (burst open at destination under laser light)	2011-2015
AI technology imitating thinking processes of the brain	2013-2017
AI teachers get better results than most human teachers	2013-2017
AI starts being noticed as a source of redundancy	2013-2017
AI Entity gains Degree	2013-2017
Computers that write most of their own software	2013-2017
AI students	2013-2017
Most software written by machine	2013-2017
AI Entity gains Masters Degree	2016-2020
Human knowledge exceeded by machine knowledge	2016-2020
Electronic pets outnumber organic pets	2016-2020
Electronic life form given basic rights	2016-2020
Artificial insects and small animals with artificial brains	2016-2020
AI Member of parliament	2016-2020
Smart bacteria, contains electronics and linked to net	2016-2020
AI brings chimpanzee or dolphin up to human level intelligence	2020s
AI Entity gains PhD	2020s
AI Entity awarded Nobel Prize	2020s
Remote control devices built into pets	2020s
Virus wipes out half of the electronic pet population	2020s
AI entities given vote	2020s
Smart yoghurt, colony of smart bacteria linked together, IQ = human	2020s
Brain 'add-ons'	2030s
AI Entity sets up higher level prize	2030s
Learning superseded by transparent interface to smart computer	2030s
Robots physically and mentally superior to humans	2030s
Emulation of bio life form inside the computer using protein emulation	2030s
Living genetically engineered teddy bear	2040s
Primate given brain implant to increase intelligence to human level	2040s
Humanoid robots beat England football team	2050s

BIOTECHNOLOGY, HEALTH & MEDICAL

Electronic prescriptions reduce fraud and improve speed	2006-2010
Quiz shows screen for implant technologies	2006-2010
24/7 blood chemistry monitoring	2006-2010
Laser activated drug capsules	2006-2010
Ultrasound or radio activated capsules	2006-2010
Blood analysis chips	2006-2010
Supermarkets used as major source of medical alerts	2006-2010
Remote control of insects by neural implants	2006-2010
Emotion detection used in businesses to select front line staff	2006-2010
e-Baybies electronic conception	2008-2012
Instant electronic identification of pathogens	2008-2012
Expert systems used extensively in GP surgeries	2008-2012
Hospitals use virtual queuing systems	2008-2012
Neural networks used for patient appointment management	2008-2012
Multimedia patient records	2008-2012
Lifestyle monitoring and insurance linked to medical records	2008-2012
Online surgeries dominate first line medical care	2008-2012
Active skin	2008-2012
Video tattoos	2008-2012
Cyber-drugs (electronically activated drugs)	2008-2012
Automated pain relief for soldiers	2008-2012
Bacteria in toothpaste to attack plaque	2008-2012
e-Baybies, binary conception	2008-2012
Antibacterial coatings on domestic appliances, phones etc, especially in hospitals	2008-2012
Smells embedded in ordinary household objects	2008-2012
Flexible displays used for body monitoring and alerts	2008-2012
Emotional jewellery	2008-2012
Emotion alerts	2008-2012
Rich world badly infected by third world disease	2008-2012
Hand-held scanner to detect tumours using tissue resonance interferometer	2008-2012
Broadcasters become major source of funding for medical research	2008-2012
Smart pill bottles remotely monitor medication taking and use alarms	2008-2012
Drug shortages caused by internet diagnostics	2008-2012
MRSA detection chips on sale in high street	2008-2012
Diabetes cure via stem cell research	2008-2012
Hotels offer some hospital services	2008-2012
Devices roaming within blood vessels under own power	2011-2015
Operations videoed and stored as part of medical record	2011-2015
Use of human's own tissues to grow replacement organs	2011-2015
Direct electronic pleasure production	2011-2015
Orgasm by email	2011-2015
Artificial senses, sensors directly stimulating nerves	2011-2015
Smart membranes for remote control of drug injection	2011-2015
Context sensitive cyber-drugs	2011-2015
Electronic stimulation of brain sensations as recreational substitute for drugs	2011-2015
Some implants seen as status symbols	2011-2015
Custom (GM) foods for particular medical conditions will exist.	2011-2015
Gene-gel stimulation of re-growth of natural teeth on demand	2011-2015
Retina regeneration using foetal retinal cell injection	2011-2015
Tooth regeneration	2011-2015
Domestic bacterial detection devices	2011-2015
Plastic bones	2011-2015
Emotion logging and recording	2011-2015
Emotionally specific drugs	2011-2015
Micro-fluidic chips used for gene sequencing in every GP surgery	2011-2015
Self certification for prescriptions using electronic diagnostics	2011-2015
Visitor sanitising in hospitals	2011-2015
Insects that can be controlled by artificial positioning systems	2011-2015
Outpatients at home - remote tele-medical consultations	2011-2015
Genetic links of all 90% of diseases identified	2013-2017
Individual's genome part of their medical record	2013-2017
Synthetic organs by printing layers of cells	2013-2017
Synthetic viruses	2013-2017
Portable bactericidal devices	2013-2017
Bactericidal saws incorporated onto materials in hospitals	2013-2017
Sensory augmentation using sensory implants, nanoparticles etc	2013-2017
Use of stem cells in brain after strokes or accidents	2013-2017
Gene therapy generates new hair cells in humans	2013-2017
Sensory implants allows direct sensing of cyberspace entities	2013-2017
Robotic cleaners in hospitals	2013-2017
Biometrics and medical tests linked to benefits and disability allowance	2013-2017

Nanotech based organism colonies	2016-2020
Synthetic bacteria	2016-2020
Artificial sensors used in cosmetic upgrade surgery	2016-2020
Smart makeup	2016-2020
Listing of individual's DNA for \$1 (10M key base pairs)	2016-2020
Brief human suspended animation	2020s
Electronic memory enhancement	2020s
Many new forms of plants and animals from genetic engineering	2020s
Nanobots in toothpaste attack plaque	2020s
Fully functioning artificial eyes	2020s
Electronic brain implants	2020s
Genetic, chemical and physiological bases of human behaviour understood	2020s
Intelligence or memory enhancement by external means	2020s
First Bionic Olympics	2020s
e-Baybies, genetic conception	2020s
DNA compression used to create optimal organisms	2020s
Virus crosses over from machine to human	2020s
Synthetic immune system	2020s
Artificial peripheral nerves	2030s
e-Baybies, digital emulation conception	2030s
Sims game using real genetics	2030s
Artificial brain	2040s
Brain in jar	2040s

BUSINESS & EDUCATION

Professional paid-for email	2006-2010
Lifestyle brands dominate	2006-2010
Network based learning causes polarisation in classes - streaming is essential	2006-2010
Global classes used for multicultural immersion	2006-2010
Instant voice mail	2006-2010
Nomadic information companies paying no corporation tax	2006-2010
Business offer individual deals to customers	2006-2010
British retirement age rose to 70	2006-2010
25% of UK workforce teleworking at least 2 days a week	2006-2010
Human free companies	2008-2012
All government services delivered electronically	2008-2012
Universal monitoring of business transactions	2008-2012
"Made in China" seen as a sign of status	2008-2012
Most advertising is personalised to viewer	2008-2012
e-money, e-vouchers, celebrity cash	2008-2012
Smart stickers for the home	2008-2012
Biometrics compulsory for claimants	2008-2012
Electronic communications compulsory for claimants	2008-2012
Email used to communicate with most social service claimants	2008-2012
Inter-business financial transactions all electronic	2008-2012
Virtual companies and virtual co-operatives dominate	2008-2012
Superstar teachers use telepresence to lecture to dispersed classes	2008-2012
Personalised degrees quantised to individual lectures	2008-2012
Purely electronic companies exist - minimal human involvement	2008-2012
Augmented reality key part of high street	2008-2012
Mass internet blockade of business, brand, country	2008-2012
Return to the high street as personal service matters again	2011-2015
Printers good enough to make reasonable quality forged banknotes	2011-2015
Paper money replaced by smart media	2011-2015
Spread of nomadic information companies leads to global taxation	2011-2015
New tax forms, e.g. compulsory servants	2011-2015
Academic learning is argued to be unnecessary in the age of smart machines	2013-2017
Integrated taxation in all transactions	2013-2017
Return to sender viruses, corporate counterattacks	2013-2017
Retirement age raised to 75	2013-2017
Major pensions crisis	2016-2020
More people using telework centres than home working	2016-2020
Telework centres double as community resources	2016-2020
Police force privatised in many nations	2016-2020
Less than 10% of UK workforce in manufacturing	2016-2020
Autonomous production plants make everything, Asia unemployment increases	2016-2020
Pension crisis, collapse of stock market due to share sales to pay pensions	2016-2020
Retirement age linked to medical history	2016-2020
Language teaching decline due to machine translation services	2020s
Learning superseded by transparent interface to smart computers	2030s
95% of people in advanced nation computer literate	2030s

DEMOGRAPHICS

Less than 20% of UK workforce in manufacturing	2006-2010
World population reaches 7 billion	2008-2012
India population hits 1.2 billion	2008-2012
Population growth slows to 1% (1.3% today)	2008-2012
Asia-Pacific overtakes US in internet users	2008-2012
Worldwide deaths due to HIV/AIDS peak at 1.7 million	2008-2012
60% of the world's population living in cities	2011-2015
China GDP overtakes EU GDP	2013-2017
400M people live in mega cities of over 10M inhabitants	2013-2017
50% of world population have internet access and processing capability	2013-2017
Androids form 10% of population	2016-2020
70 million over 65s in USA (20%) with 9 million over 85s	2020s
3Bn people water stressed (<1700 cu m per capita per year)	2020s
First e-Baybies genetically assembled	2020s
Chinese graduates exceed American and European graduates	2020s
3.5 Bn people water stressed (400M in 2001)	2030s
e-Baybies form virtual population of 1 Bn	2030s
First e-Baybies electronically emulated	2030s
World population peaks at 10 billion	2040s

ENERGY

Button sized gas turbine generators for portable device power	2006-2010
Return to nuclear power in UK (decision made)	2006-2010
Power save mode on appliances linked to grid demands	2008-2012
Power rationing enforced due to grid shortage	2008-2012
Home fuel cell based 7kW generator	2008-2012
Solar chimney power station (1.5km tall)	2008-2012
Most portables powered by fuel cells	2008-2012
Multi layer solar cells with efficiency over 50%	2008-2012
Solar reflector satellites bringing sunlight to major Northern cities	2008-2012
Nuclear power plants supply 16% of energy in Russia and Eastern Europe	2008-2012
Worldwide energy consumption 50% greater than 1993	2008-2012
Renewable power in UK at 5 %	2008-2012
Hydrogen production by bacteria	2008-2012
Commercial magma power stations	2011-2015
Hydrogen fuel available on UK forecourts	2011-2015
Active transmission/distribution grid - energy web	2011-2015
Widespread use of carbon fixing/burying	2011-2015
Extremely insulated buildings	2011-2015
Catalytic water decomposition by sunlight	2013-2017
Seabed gas hydrate crystals used as fuel source	2013-2017
Worldwide oil consumption is 100M barrels of oil per day	2013-2017
10% of UK energy produced by renewables	2013-2017
Nuclear power in UK up to 25 %	2016-2020
Oil consumption peaks	2016-2020
Systems based on biochemical storage of solar energy	2020s
Widespread use of micro CHP stations (in 50% of premises)	2020s
Space solar power stations	2030s
Wave energy providing up to 50% of UK requirements	2040s
Use of nuclear fusion as power source	2040s

ENVIRONMENT & COUNTRYSIDE

Complete list of 1.5 million known species available on web	2006-2010
Virtual farming co-operatives	2006-2010
GM crops infect neighbouring fields	2006-2010
Between 15 and 95cm rise in sea level	2006-2010
Extensive remote sensing use in environmental management	2008-2012
Effective prediction of most natural disasters	2008-2012
Out-sourced vegetable plots	2008-2012
Poor countries charge for bio-prospecting	2008-2012
Genetic solutions in one area become environmental problems for other areas	2008-2012
Green groups endorse products	2008-2012
Killer bug resistant to all known antibiotics	2008-2012
Nuclear power generally accepted by green groups	2008-2012
Growth of scientific environmentalism	2008-2012
Landfills in London and surrounding region full	2011-2015
Insect-like robots used for crop pollination	2011-2015
Large areas of countryside used for biomass production	2011-2015
New environmental groups focused on visual environment protection	2011-2015
Ecotourism one of biggest environmental problems	2011-2015
Green groups use defensive patenting of damaging technologies	2011-2015
Waste sludge used to create energy using bacteria in fuel cells	2011-2015
Increased use of GM crops on saline contaminated soils	2013-2017
30% of world's arable land will be salty	2020s
Widespread use of sensors in the countryside	2020s
70% of landfills in USA full	2020s
Carbon dioxide fixation technologies for environment protection	2030s
Artificial precipitation induction & control	2030s
Global environmental management corporations	2040s
50% of world's arable land will be salty	2050s
Ozone hole disappears	2050s

HOME AND OFFICE INFRASTRUCTURE

Chips on food packaging tell when food is at its best	2006-2010
Video tiles	2006-2010
Emotional objects, switches etc around home	2006-2010
Most homes have wireless networks	2006-2010
Spoken caller number identity, with personal numbering	2006-2010
SMS appliances	2006-2010
IM appliances	2006-2010
Electronic notebook with contrast as good as paper	2008-2012
Smart paint available (contains chips)	2008-2012
Digital bathroom mirror	2008-2012
Magazine tablets	2008-2012
Personalised response from household gadgets	2008-2012
Mood sensitive light bulbs	2008-2012
Consumer electronics devices plug straight into home net	2008-2012
Smart responsive environments	2008-2012
Domestic positioning systems	2008-2012
Most homes use web cams for communication	2008-2012
Virtual windows	2008-2012
Dual architecture	2008-2012
Anti-noise technology built into homes	2011-2015
Active wallpaper responds to inhabitants' moods etc	2011-2015
Chips in packaging control cooking	2011-2015
Neighbourhood video surveillance networks	2011-2015
Washing machine aware of contents and selects cycle	2011-2015
Augmented reality offices used in telework centres	2011-2015
Palm-top printing puts buttons on skin	2011-2015
Glasses based displays dominate in the office	2011-2015
Electronic response based on conversational inference	2011-2015
Windows with coatings to re-direct sunlight	2011-2015
Nanotechnology toys	2013-2017
Traditional pubs using technology to enhance illusion of tradition	2013-2017
Kaleidoscopic flowers using electronic inks	2016-2020
Patio display panels and slabs to simulate beach	2020s
Anti noise technology in gardens	2020s
3D home printers	2020s
Nanotechnology plants	2020s

LIFE & LEISURE IN A CYBERSPACE WORLD

Avatar cosmetic surgery	2006-2010
Theatres gain extra revenue by allowing internet attendance	2006-2010
Conferencing technology for remote socialising in public places	2006-2010
1Bn internet users	2006-2010
Automatic video capture of personal events	2006-2010
24/7 audio recording	2006-2010
Remind me devices	2006-2010
Personal surveillance	2006-2010
Social log	2006-2010
Deep indexing creates greater bonds between people (i-Pod play lists etc create insight into another's personality)	2006-2010
Electronically mediated tribes become major social structures	2006-2010
Virtual car races as spectator sports	2006-2010
Personal remote web servers	2006-2010
Chips in footballs, players, etc to enhance data collection	2006-2010
Viewers able to pick any angle or player view	2006-2010
Augmented reality at sports grounds to enhance spectator experience	2006-2010
Major social problem caused by email and texting in secret relationships	2006-2010
Mobile email reduces productivity due to lack of concentration on task-in-hand	2006-2010
Tourist information beacons	2008-2012
Cyberspace make-up	2008-2012
People have cyberspace wardrobe	2008-2012
Frequent use of multiple Net identities causes personality disorders	2008-2012
Cheap miniature cameras cause social backlash	2008-2012
Toy soldiers with video camera eyes enrich play	2008-2012
People reduce tax liability by being partially paid in information products	2008-2012
On line voting in UK	2008-2012
VR overlays on real world	2008-2012
Loneliness in aged population greatly reduced by network communities	2008-2012
National UK decisions influenced by electronic referenda	2008-2012
Worldwide population of over 65s increases by 1 million monthly	2008-2012
Cyber community with 100 million people	2008-2012
1st Extreme Olympics	2008-2012
Personal black boxes record everyday life	2008-2012
Mass customisation of toys	2008-2012
Ability to digitally replace or enhance people in your field of view	2008-2012
Digital x-ray glasses	2008-2012
Xanadu, leisure city in cyberspace	2008-2012
Kitchen rage caused by electronic gadgets	2011-2015
Electronic implant equivalent to Botox	2011-2015
Living area use of virtual reality scenes	2011-2015
Replacement of people leads to anti-technology subculture	2011-2015
Make-up by numbers	2011-2015
Orgasmatron	2011-2015
Most electronic toys hybrids with half on net	2011-2015
Active skin makeup	2013-2017
VR escapism is a major social problem	2013-2017
Dual geo/cyber-nationality recognised internationally	2013-2017
Most towns echoed in cyberspace	2013-2017
Films where viewers can choose who acts in each role	2016-2020
Emotion transmission and conversion (feel love or anger)	2020s
Digital image overlays enhance relationships	2020s
Global voting on some issues	2020s
Network based telepathy	2020s
Creation of The Matrix	2030s
VR extensively used in retirement homes	2030s
Restricted capability home genetic engineering kits	2030s
Experience recording	2030s
Real' toy soldiers using nanotechnology	2030s
Running man' style TV programs using androids	2030s

MACHINE INPUT/OUTPUT

e-ink screen advertising billboards	2006-2010
Personalised adverts on Radio	2006-2010
Head up displays for DVD watching	2006-2010
Smelly television using chips with small reservoirs of chemicals	2006-2010
Simple voice command interface for home appliances	2006-2010
3D 'Minority Report' style air display	2006-2010
Virtual mouse	2006-2010
3d fingertip tracking	2006-2010
Self destructing DVDs used for video hiring	2006-2010
i-Pod style jog-wheel dialling for phones	2006-2010
Holographic animated or video advertisements (few second video clips)	2008-2012
Displays with image quality comparable to paper	2008-2012
Separate volume controls for different people in room	2008-2012
3d air display	2008-2012
Projected augmented reality	2008-2012
Personalised TV & radio	2008-2012
Use of storage based nets	2008-2012
3d personal glasses displays	2008-2012
Full voice interaction with PC	2008-2012
Voice synthesis quality up to human standard	2008-2012
Data loss because of format changes becomes major business problem	2008-2012
Self organising displays	2011-2015
Active contact lens	2011-2015
Augmented reality standard in towns and cities	2011-2015
Dual architectures	2011-2015
Active skin touch sensitive display on forearm or for adornment	2011-2015
Holographic displays for continuous video	2013-2017
Hamster ball with VR for pets	2013-2017
Computer link to biological sensory organs	2013-2017
Holodecks using box room lined completely with polymer screens	2016-2020
Thought recognition as everyday input means	2016-2020
Holographic TV	2020s
Full direct brain link	2020s
Virtual display	2030s

MATERIALS & ELECTRONIC DEVICES

Spherical silicon integrated circuits	2006-2010
Polymers with lower resistance than copper at room temperature	2006-2010
Chips with 1 billion transistors	2006-2010
Use of polymer gels for muscles	2006-2010
Quantum effect interferometer for flux measurement	2006-2010
Use of carbon fullerenes for on chip interconnect	2006-2010
Chemical lab on a chip	2006-2010
Self diagnosis using gene chips for domestic use	2006-2010
Liquid drop lenses for camera phones etc	2006-2010
Piezoelectric motors for moving lenses in phones	2006-2010
Terahertz scanners	2006-2010
Portable terahertz scanners	2006-2010
Self organising adaptive integrated circuits	2008-2012
Use of polymer gels for bioreactors	2008-2012
Molecular sized switches	2008-2012
Intelligent materials with in-built sensors, storage and effectors	2008-2012
Smart skin for intelligent clothing and direct human repair	2008-2012
Self organisation used in most fields of electronics	2008-2012
Use of bacteria to assemble small circuits	2008-2012
Crossbar based logic circuits	2008-2012
Use of polymer gels for information processing	2011-2015
Chips with 10 billion transistors	2011-2015
Materials exhibiting superconductivity at room temperature	2013-2017
Manufacture of long diamond fibres	2013-2017
Smart bacteria	2016-2020
Smart yoghurt	2020s

PROCESSING, MEMORY AND STORAGE

Supercomputer as fast as human brain	2006-2010
Live CD-based OS distributed in newspaper	2006-2010
Optical neuro-computers	2008-2012
Simple quantum computer, 4 Qubits	2008-2012
Computers used for creativity enhancement	2008-2012
MP3 Net downloads dominate over CD distribution	2008-2012
Personal memory sticks replace hard drives for everyday files (HD used as archive)	2008-2012
Most video players based on memory sticks	2008-2012
Public storage provided by local government to support social use of IT	2008-2012
100GB memory sticks (typical 2005 HD capacity)	2008-2012
Ultra-simple computing - just in time OS	2008-2012
Chinix OS Chinese UNIX variant	2008-2012
OS distributed primarily on ROM	2008-2012
DNA storage device	2011-2015
Supercomputers with speed exceeding 1 ExaFLOPS	2011-2015
Use of analogue co-processors in PCs	2011-2015
DNA computer	2011-2015
Windows drops below 50% penetration worldwide	2011-2015
Use of bacteria for processing and storage	2011-2015
Desktop computer as fast as human brain	2013-2017
Bacterial supercomputer	2013-2017
Circuits made with bacteria by own DNA, smart yoghurt	2020s

ROBOTICS

Totally automated factories	2006-2010
Global domestic robot numbers passes 4M	2006-2010
Global industrial robot numbers passes 1M	2006-2010
Fractal shape-changing robots	2008-2012
Insect-like robots used in warfare	2008-2012
Robotic dolls and pets account for 10 % of domestic telecomm traffic	2008-2012
Self monitoring infrastructures using smart materials and sensors.	2008-2012
Micromechanical gnomes	2008-2012
Robots for cleaning, washing fetch and carry in hospital	2008-2012
Robot dance tutors	2011-2015
Nanowalkers, nanoworms, nanofish	2011-2015
Mechanical intelligence using MEMS and NEMS	2011-2015
Android robots used for factory jobs	2011-2015
Fleet of garden robots for plant and lawn care and tidying	2011-2015
Robots for cleaning, washing fetch and carry, in office	2011-2015
Robot pest killers	2011-2015
Housework robots - fetch, carry, clean & tidy, organise etc.	2013-2017
Robots for guiding blind people	2013-2017
Cybernetic use in sports	2013-2017
Robots for cleaning, washing, fetch and carry, in home	2013-2017
Self diagnostic self repairing robots	2016-2020
Actuators resembling human muscles	2016-2020
Insect sized robots banned in gardens due to effects on wildlife	2020s
Robotic delivery for internal mail	2020s
Robotic exercise companion	2020s
More robots than people in developed countries	2020s
Android gladiators	2020s
GM and robotics converge, GM used to make organic robots	2020s
Micro-Mechano fractal construction kit	2030s
i-Robot style robots with polymer muscles and strong AI	2040s

SECURITY, MILITARY, LAW

Edited

Mass internet rallies	2006-2010
Bacteria used in detection of explosives	2006-2010
Blogs in military use as dominant intelligence technique	2006-2010
Major terrorist attack on company or country via internet	2006-2010
Soldiers' weapons fired remotely	2006-2010
Software companies sued for misuse of remotely controlled weapon	2006-2010
War fought over water supply	2006-2010
Logic checkers highlighting contradictory evidence	2006-2010
SMS spam problem undermines mobile content market	2006-2010
Biometric home access	2006-2010
Expenditure on security exceeds expected cost of attacks prevented	2006-2010
Autonomous weapons authorised to fire at own discretion	2008-2012
War where own side kills more of its own than the enemy	2008-2012
War for water	2008-2012
Context sensitive bombs (waits for senior politicians)	2008-2012
Weapons use biometric authentication of user	2008-2012
Bacteria used to break down explosives in mine fields	2008-2012
Terrorist are source of most on-line scams	2008-2012
Communication networks severely disrupted by hackers	2008-2012
Balloons used in terrorist attacks	2008-2012
Radio controlled vehicle attacks on shipping, smart mines	2008-2012
Cracking of public key cryptography within a few seconds using networked zombie machines	2008-2012
Data mining use in trials	2008-2012
Remote override capability on planes	2008-2012
Household access by facial recognition	2008-2012
Jargon translators	2008-2012
Computer advice to jurors on probability issues	2008-2012
Criminal tagging augmented with video and audio sensors	2008-2012
Extensive use of electronics to monitor police behaviour	2008-2012
Automated stenographers	2008-2012
Jigsaw viruses	2008-2012
Spam email volume forces charge based solutions	2008-2012
Phishing destroys confidence in on-line banking, most on-line banks closed	2008-2012
Terahertz video cameras become social nuisance due to privacy invasion	2008-2012
Expert system based home law advisors	2008-2012
Robot casualties reported routinely	2011-2015
Corporate cyberwars	2011-2015
Major utility brought down by hackers	2011-2015
Universal ID cards in UK	2011-2015
Most weapons attack systems rather than injure people	2011-2015
Civil liberties revolt	2011-2015
Anti-tech backlash	2011-2015
2nd internet with guaranteed security for email, with no spam	2011-2015
World War 2 thought of as a film rather than a real event by 30% of Americans	2013-2017
War with zero own side human casualties	2013-2017
Scalable AI as major military threat	2013-2017
Positive clean ID required for access to many places	2013-2017
Terrorist use of GM to pollute crops and damage economy	2013-2017
Most fighters and bombers flown remotely	2013-2017
Plastic stealth tank	2013-2017
Use of network resonance as security threat	2013-2017
Ambient intelligence detection of minor crimes & anti social behaviour	2013-2017
Identity theft forces all transactions to use biometrics	2013-2017
Domestic augmented reality used to give virtual makeovers	2013-2017
Biometric ID required for every phone call	2013-2017
Use of mutant insects for attack purposes	2013-2017
War caused by global warming forcing mass migration from coastal areas	2016-2020
War fought entirely between robot armies	2016-2020
ID cards replaced by biometric scanning	2016-2020
Emotion control chips used to control criminals	2016-2020
Open city prisons for criminals and antisocial people	2016-2020
First war without any casualties from friendly fire	2020s
Robots outnumber soldiers on battlefield	2020s
Smart bacteria used in warfare to alter behaviour of enemy	2020s
Smart bacteria as military threat to mankind	2020s
Attacks based on facilitating natural disasters	2020s
Smart bacteria weapons	2020s
Gated cities for civilised people	2020s
Use of solar wind deflectors to set fire to cities	2030s
Nanotech based virus communicable between machines and people, sent over net	2030s
Asteroid diversion used as weapon	2040s

SHOPPING & MONEY

Local warehousing for local distribution systems	2006-2010
Personal shopping tablets	2006-2010
Movies no longer sold in VHS format	2006-2010
Local e-bay augments car boot sales	2006-2010
Shops start being paid by manufacturers as try-on outlets	2008-2012
Paypal migrates onto high street	2008-2012
In-store positioning systems enable personalised guides	2008-2012
25% of UK shopping is network based	2008-2012
Immersive VR shopping booths	2008-2012
Most books sold on-line	2008-2012
Internal positioning systems in stores	2008-2012
In-store positioning systems with 1cm precision	2008-2012
Paper and coins largely replaced by electronic cash	2011-2015
Most tickets electronic	2011-2015
Personal taxation at point of sale	2011-2015
Automatic dialling from smart business cards	2011-2015
RFID replaces most barcodes	2011-2015
Most music sold online	2011-2015
Augmented reality overlays used in stores	2011-2015
Reverse auctions in personal shopping devices (nearby stores bid to provide items on shopping list)	2013-2017

SPACE

Private space mission to examine asteroid with a view to space mining	2011-2015
Prize claimed for 1st private orbital trip	2011-2015
Hotel in orbit	2013-2017
Scramjets used to launch low-orbit space-planes	2013-2017
Helium 3 mining on moon	2016-2020
Orbital space junk cleared up by sweeper craft	2016-2020
First manned mission to Mars	2020s
Production, storage and use of antimatter	2020s
Space factories for commercial production	2020s
Airships used to carry payloads most of the way to orbit	2020s
Regular manned missions to Mars	2030s
Use of human hibernation in space travel	2030s
Space elevator based on carbon nanotube cable	2030s
Start of construction of manned Mars laboratory	2040s
Moon base the size of small village	2040s
Asteroid mining	2040s
Mining of water on Mars	2040s
Self sustaining mars colony	2040s

TELECOMMUNICATIONS

90% of calls tetherless	2006-2010
Internet achieves 75% penetration in UK	2006-2010
Star trek style commbadge	2006-2010
Fixed mobile convergence	2006-2010
Wireless LANs become preferred access mechanism for mobile internet use	2006-2010
Wireless LANs in most shopping Malls	2006-2010
Vibration used as part of calls on cellphones to convey emotion	2006-2010
21CN completed	2006-2010
Last ever PSTN call	2006-2010
100Mbit/s wireless speed in office/home	2006-2010
Mobile phones pass standalone music players in market share	2006-2010
Push-to-talk style video clips	2006-2010
Caller can send own ring tone	2006-2010
Calls can be addressed by email address	2006-2010
Storage based networks	2008-2012
Use of microwave photonics in local access	2008-2012

Video download over network at 10 x normal speed	2008-2012
60% of internet accesses from mobile devices	2008-2012
Use of WDM in local access	2008-2012
Simultaneous data delivery in the City	2008-2012
Software radio available in portables	2008-2012
Openzone access covers whole city	2008-2012
Single address for emails, phone calls etc	2008-2012
HDTV over broadband	2008-2012
Most BBC Content available on-line	2008-2012
Video sleepover terminals	2008-2012
Large screen video links reduce loneliness for old people	2008-2012
Domestic demand reaches 50Mbit/s per home	2011-2015
Gigabit wireless in home	2011-2015
All voice calls free	2011-2015

TRANSPORT & TRAVEL

Blimp cargo lifters, carrying 160 tonnes, 6000 miles at 60mph	2006-2010
Assisted lane keeping systems in trucks and buses	2006-2010
Most new cars fitted with positioning systems as standard	2006-2010
Pollution monitor chips built into cars	2006-2010
Smart tickets for navigation through airports	2008-2012
Cars with automatic steering	2008-2012
Scramjet' engine powered planes flying at Mach 10	2008-2012
Urban car co-pilot	2008-2012
All new cars fitted with basic cellular communication with automated distress system	2008-2012
Tourism in some areas limited to net access	2008-2012
High Speed Civil Transport supersonic jet, 300 passengers, 1500mph	2011-2015
GPS and engine management systems linked to limit speed automatically	2011-2015
Road trains using ad-hoc networking	2011-2015
Bus routes based on star and ring architectures	2011-2015
Need to book time slots to use some key roads	2011-2015
Cars with dual wheels that can run on road or rail	2011-2015
Urban tracks for electronically driven cars	2011-2015
Black boxes in all new cars	2011-2015
Dynamic road tolling	2011-2015
Automatic driving makes car pooling feasible	2013-2017
Driverless truck convoys using electronic tow-bar	2013-2017
Fully auto-piloted cars	2016-2020

WEARABLE TECHNOLOGY

Flexible screens	2006-2010
Video tattoos (thin polymer membrane displays)	2006-2010
Wrist based video displays	2006-2010
Teletubby T-shirts	2006-2010
TV jewellery	2006-2010
Light emitting fabrics used in clothes	2006-2010
Smell emitting clothing, uses context	2006-2010
Personal wireless website broadcast	2006-2010
Blogs go wearable	2006-2010
Virtual retinal displays	2008-2012
TV quality video screens built into clothes	2008-2012
Emotion badges	2008-2012
Jewellery that changes shape, colour and texture	2008-2012
Portable translation device for simple conversation	2008-2012
Kaleidoscopic clothes using materials with embedded pigment micro-capsules	2008-2012
Micro-actuators built into clothes for sensory feedback	2008-2012
Video makeup (virtual world)	2008-2012
Shape changing fabrics	2008-2012
Shape memory fabrics	2008-2012
Digital bubble	2008-2012
Cyber clothes	2008-2012
Terahertz jammers in clothes as personal modesty shield	2008-2012
Dual appearance	2008-2012
Laws restrict what can be shown on video clothing	2008-2012
Terahertz jammer banned at airports	2008-2012

Active contact lens	2011-2015
Alpha-wave induction sets	2011-2015
Thought recognition used in sleep enhancement	2011-2015
Computer enhanced dreaming	2011-2015
Projector ring	2011-2015
Mugging by brain state induction devices	2013-2017
Obesity increase due to compelling virtual reality environments	2013-2017
Computer controlled hunger suppressants	2013-2017
Emotion control devices	2016-2020
Dream link technology	2016-2020
Smart makeup, context sensitive	2016-2020

ADDENDUM: WILD CARDS (THAT COULD HAPPEN ALMOST ANYTIME)

<i>Based on an original idea by John Petersen, The Arlington Institute)</i>	Earliest
Megavolcano erupts	2005
Cumbre Vieha collapses, megatsunami wipes out dozens of cities	2005
Asteroid or comet hits earth	2005
Massive solar flare wipes out life on earth	2005
Natural evolution of superbug	2005
Extraordinary US West Coast Natural Disaster	2005
First Unambiguous Contact with Extraterrestrial Life -- The Arrival of ETs	2005
Ice caps melt, Oceans rise one hundred feet	2005
Mass Migrations	2005
Another Chernobyl	2005
Collapse of the United Nations	2005
Global nuclear war	2005
Environmental pressure causes evolution of superbug	2005
Aids or similarly deadly disease mutates and becomes transmittable by air	2005
Bugs resistant to all known antibiotics	2005
Rules Change: Economic and/or Environmental "War Criminals" Are Prosecuted	2005
Terrorists Go Biological	2005
US Economy Fails or collapse of the dollar	2005
Civil nuclear war	2005
Global economic collapse causes mass starvation and conflict	2005
Global civil war	2005
Space exploration creates superbug	2005
Civil war between Soviet States Goes Nuclear	2005
Collapse of World's Fisheries	2005
Computer/Chip/Operating System Maker Blackmails Country or World	2005
End of Intergenerational Solidarity	2005
Gulf or Jet Stream Shifts Location Permanently	2005
International Financial Collapse	2005
Large-scale lengthy disruption of national electrical supply	2005
Major Break in Alaskan pipeline - Significant ecological damage	2005
Major Chaos in Africa	2005
Nuclear Terrorist Attack on United States or Europe	2005
Rise of an American Dictator	2005
Social breakdown in US or Europe	2005
Stock market crash	2005
Human Cloning Perfected, Human Genetic Engineering Arrives	2005
Accidental creation of lethal organism during research	2005
Anti-tech backlash destroys systems – chaos and starvation	2005
Deliberate biotech self-destruct by malicious biotech researcher	2005
Major genetic engineering accident	2005
Terrorism rises beyond capability of government systems	2005
Transgenic accident	2005
Encryption Invalidated	2005
Hackers Blackmail Federal Reserve	2005
China launches cyberwar against Taiwan	2005
Virus outbreak kills 100 million people worldwide	2005
Internet collapse due to security concerns undermining trust	2005
Strike on urban area by 500m asteroid (below current detection threshold)	2005
Biotech terrorist attack goes wrong	2010
Evolved crime destroys human systems	2010
Global civil war between cybernations	2010
Hackers wipe out networks, causing chaos and mass starvation	2010
The hostile arrival of ETs detecting our transmissions	2010
Viruses become immune to all known treatments	2010
End of the Nation State	2010
Foetal Sex Selection Becomes the Norm	2010

Gulf Stream ceases	2015
Computers and robots become superior to humans	2015
Self-aware machine intelligence	2015
Third world exodus destabilises global system	2015
Computers/Robots think like humans	2015
Collapse of the sperm count	2020
Global epidemic with high speed travel and high population density	2020
Global famine caused by manmade environmental change	2020
Hybrid nanotech-organic creatures	2020
International social collapse - widespread civil conflict	2020
Major information systems disruption	2020
Major technology or science research accident	2020
Rise of a global machine dictator	2020
Total social breakdown in US or Europe	2020
Fuel cells replace internal combustion engines	2020
Life Expectancy Approaches 100	2020
Megacities cause global epidemic	2025
Nanotech development by individuals	2025
Nanotechnology accident	2025
Networks become conscious and won't co-operate	2025
Second World Nation Demonstrates Development of Nanotech Weapons	2025
Elimination by smart machines - terminator	2030
Nanotechnology war	2030
Humans access net directly, become an integral part of global information system.	2030
No-Carbon Economy Worldwide	2030
Religious environmentalism destroys environment	2030
Use of asteroid as weapon of mass destruction	2030
Methane hydrate nodules evaporate causing runaway global warming	2040
Creation of Star Trek's Borg	2040
Global electromagnetic communications disrupted for foreseeable future	2040
Political correctness creates new dark age	2050
Whole generation unable to effectively read, write, think, and work	2050
Human genetic engineering creates hostile super-race	2070
Humans assimilated into net	2075
Invention of elimination phaser	2075
Time travel invented	2075
Immortality chip - people move into cyberspace	2075
Faster than light travel	2100