

The Spychip Under Your Skin: RFID and the Tagged exhibition

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Introduction

What Is RFID? Depending on whom you speak to, it can be a rather mundane thing. RFID tags are used in warehouse logistics management, where they are integral to a new system for identifying objects and replace the scannable bar code which has performed this task for the past several decades. RFID is also the key technology which enables an 'internet of things' within a framework of 'ubiquitous computing' (UbiComp). Minimally, RFID tags link the physical world with the informational world. The process consists of attaching machine-readable information to objects. Maximally, this, some would say, is a new step in the co-evolution of the technological with the social. Its implications seem to mandate a serious engagement with the motives behind these latest developments.

The potential of this move to a next layer of the informationalisation of the world does raise concerns about privacy or the notion of an all-encompassing society of control. Concomitantly, it facilitates new paths of exploration for artists in a range of areas, from commercial interactive product design to art movements such as locative media and new types of performative and interactive-narrative work. According to science-fiction writer and media theorist Bruce Sterling, the spread of RFID technology gives rise to a new type of object, the SPIME. The word is a neologism invented by Bruce Sterling, describing objects which can be tracked in SPACE and TIME. Sterling predicts that a society relying on an infrastructure of SPIMES would have achieved a fundamental change in the relationship of the forces of production. I will expand on this subject later, but only so much here: additional awareness about an object's full life-cycle prompted by use of RFIDs would enable environmental and sustainability considerations to play a greater part in the resource allocation decisions of societies.

Space Media Arts have decided to devote their Tagged series of events to the complex of issues

1. Sterling, Bruce / 2005 / *Shaping Things* / Boston / MIT Press

2. Distances vary between a few centimeters and 10 meters and more, depending on antenna design and which radio frequency is being used

3. RFID relies on an information infrastructure almost like another internet; for more information see the Automated ID webpages – available online from: <http://xml.coverpages.org/pml-ons.html>, last accessed August 2006.

4. 'Passive RFID tags have no internal power supply. The minute electrical current induced in the antenna by the incoming radio frequency signal provides just enough power for the CMOS integrated circuit (IC) in the tag to power up and transmit a response. Most passive tags signal by backscattering the carrier signal from the reader'. *Wikipedia 2006* [online] Available from <http://en.wikipedia.org/wiki/RFID>, last accessed August 30 2006.

surrounding RFID. Following an open call and a jury-led selection process, Space Media Arts have selected four artists/projects and one sound performance to be presented at the Triangle exhibition space and in public spaces in the locality. In this text I will first introduce the technology and its context. I will also briefly introduce Bruce Sterling's ideas about 'shaping things' and add to this some of my own reflections about the contentious notion of techno-social progress. Based on this contextual analysis I will formulate some of the challenges and possibilities for artists who work with technology in general and the routes chosen by the selected artists.

Gloves, Dr.Watson

Radio Frequency IDentification, RFID for short, relies on RFID tags to identify objects digitally and a support infrastructure necessary to read and process the information. An RFID tag consists of an antenna and a chip. Passive tags are made of a small coil and an even tinier chip both wrapped by some adhesive material like paper or film which gets attached to cartons or pallets. When a reader device is in close proximity², the antenna is activated by the frequency it transmits and the chip sends a message. Usually this message would consist of the Electronic Product Code (EPC), 'a unique numbering scheme for every object in the world'³. RFID tags of this type have been falling in prices and are said to now cost as little as 3 pence a piece when ordered in large volumes. More complex RFID tags are capable of storing more information and some have their own power supplies. Those semi-active and active RFID tags are used for access control schemes and car keys, but also the tagging of animals, machines and humans.⁴

Some histories of RFID technology trace it back to the invention of radar. 'Real' RFID, in the way we know it now, however, was first introduced on a relatively narrow scale with the tagging of cattle in the 1980s. It was only considered for more

widespread use in the 1990s and its roll-out has begun in the last few years. As with most available technologies, the development of RFID is fuelled by both military and commercial interest in its applications. Despite the centrality of the United States Department of Defence (USDoD) to RFID R&D, the growth potential for commercial supply chain management may in the long term be more influential in global infrastructural change.

5. A neo-liberal argument which claims that first capitalists need to create wealth so that it can *trickle down* to the masses.

The main beneficiaries of RFID are going to be very big organisations which orchestrate the production and consumption of large quantities of goods, such as supermarkets – Wal-Mart has been another driving force behind the introduction of RFID besides the US Department of Defence. For the customer, the benefits are said to arrive in the form of the reduction of already cheap prices because the whole process can be managed more efficiently. This emphasis on economic expediency cloaks less publicity-friendly consequences for both labour and consumers, a traditional ruse of big corporations and governments seeking to evade the social cost of restructuring or the introduction of new technology. When people are in a generally disempowered state, they have no choice but to vote with their wallet. However, such 'trickle-down effects'⁵ have more often than not favoured the corporation at the expense of the worker and consumer.

Open Doors & Open Wallets With RFID

RFID has raised concerns about the protection of privacy from the very beginning. However, many of the discussions around privacy foreground a limited notion of the protection of privacy of individuals and tend to ignore the larger political economy within which it is embedded. In internet forums about RFID and privacy you can encounter stories such as the one that Wal-Mart might spy on you once you have accidentally swallowed the RFID on your breakfast cereal packaging. This type of criticism is just too easily dismissed. Wal-Mart have no intrinsic interest in their customers.

6. 'In the PR world the war is won or lost by how things are branded. The debate over RFID is no different. Katherine has cleverly referred to RFID tags as spychips. Who wouldn't be opposed to *spychips*? I prefer the term: consumer-value tags. This is a much more accurate term, not only because the RFID won't enable spying, but more importantly because it enables significant consumer value. [...] Perhaps I should mention that I am a card-carrying consumer value tag user. I have lots of CVT's on me. My cell phone. My RFID key to my office building. My Metro Card to ride on the subway. My Mobil speed pass. By the way, if anyone has a rogue scanner, feel free to scan me and extract any info you need'. Rob Atkinson, 2006. *RFID: There's Nothing to Fear Except Fear Itself*: Opening Remarks at the 16th Annual Computers, Freedom and Privacy Conference May 4, 2006, Washington, DC. Available online from: <http://www.innovationpolicy.org/pdf/rfid.pdf>, last accessed August 2006.

7. On top of that, many schemes use the ISM band (Industrial, Scientific and Medical) a licence exempt part of the radio spectrum which can be used by anyone without special permission. It is therefore not illegal to possess hardware which operates in that spectrum.

8. Anonymous, 2006. *Foiling the Oyster Card* [online] Available from http://www.spy.org.uk/spyblog/2004/02/foiling_the_oyster_card.html, last accessed August 2006.

9. *Efficient regimes* are here referring to non-democratic societies exemplified by the regimes of city states such as Hong Kong and Singapore which endorse capitalism but not liberal democracy.

Indeed, even CEOs of RFID supplier companies can shrug off similar suggestions with a laugh.⁶

If we proceed on the premise that sooner or later everything that exists will have a virtual badge attached to itself with information that can be machine-read, this raises much larger questions than the fear of private individuals being spied upon. It could be noted in passing that increasing automated information storage and retrieval can lead to increasing centralization of power, money and control in the hands of very few with an interest in upholding the political status quo – more on this below. Despite those larger issues, let's have a look at RFID's implications for personal information security.

Many RFID schemes have very leaky security. They transmit information unencrypted via radio frequencies.⁷ The information can not only be received by those devices which are meant to read them but also by 'rogue readers' operated by organised criminals or spooks. Public discussion about RFID mainly focuses on supply chain management. However, at the time of writing, the use of RFID is more common in keys, ID-cards and schemes such as the Oyster Card, where London commuters receive a smart card with RFID which gives them access to cheaper fares. Most Oyster Cards are registered with a central database run by Transport for London (TfL). This means that TfL has a record of journeys by individuals. On top of that the smart card chip inside the Oyster Card also records journeys. The cards themselves as well as the database infrastructure are potential points of abuse.

Privacy geeks are already putting aluminium foil around their London Oyster Card.⁸ A similar scheme, the Octopus Card, introduced in Hong Kong 10 years earlier has been extended towards a digital purse which could be used in grocery stores. It is no accident that such a scheme could be tested first in an 'efficient regime' as the whole world intends to become one.⁹ If newspaper

reports are to be believed, the information trail left by Oyster Cards is already playing a role in divorce cases. Police are increasingly asking for Oyster Card records from TfL in criminal inquiries.¹⁰ In the UK, it seems, there is widespread agreement that the dangers of introducing a surveillance infrastructure such as CCTV are outweighed by the benefits of those systems.

The problem with relying on those systems is that they give a false sense of security. The number of web-pages about RFID hacks is myriad. There are open source tools working with conventional reader hardware such as RF Dump (<http://www.rf-dump.org/>) and RFIDIot (<http://rfidiot.org/>). There are manuals about how to turn your mobile phone into a 'skimmer', a device to read magnetic stripe cards.¹¹ There are academic papers about how to break very widely used RFID schemes (<http://www.rfidanalysis.org/>). The only reason why we don't hear more about RFID crime is that for criminals there is still much fertile ground in the exploitation of older and still more widespread technologies such as cheque accounts and credit cards.

Identity theft has already been described as the crime with the biggest growth potential. Supposedly 'secure' concepts for passports and ID cards include RFID capability which exposes unencrypted data contained on your passport or ID card, making these forms of identification readable from a distance. The new British biometric passport has already been hacked.¹² The white hat hacker¹³ who exposed the flaw claims to have used equipment which cost no more than 200 dollars. A bit of Do-It-Yourself and you can copy the content of an Oyster Card or the biometric information on a new passport. While the authorities are busy telling us that these biometric technologies promote our safety, all the evidence is that it is the committed fraudster or terrorist who will travel with greater safety – while millions of ordinary people will be in line for more harassment, inconvenience and identity fraud.

10. *The Guardian*, Monday March 13, 2006, 'Oyster Data Use Rises in Crime Clampdown'. Available online from: http://www.guardian.co.uk/uk_news/story/0,,1729999,00.html, last accessed August 2006.

11. Luis Padilla Visdómine, 2006. *Turning Your Mobile Into a Magnetic Stripe Reader*. [online] Available from <http://www.gae.ucm.es/~padilla/extrawork/mobilesoundtrack.html>, last accessed August 2006.

12. *The Guardian*, August 7 2006. *Hackers crack new biometric passports*. [online] Available from: <http://technology.guardian.co.uk/news/story/0,,1838751,00.html>, last accessed August 2006.

13. White hat hackers are security experts working for companies who make it their business to expose flaws and offer solutions, as opposed to 'black hats' who work completely in secrecy.

Electronic Borders

14. *Just Got My Implants*, from the 'Tagged' RFID implant forums. Online forum posting. Available from <http://tagged.kaos.gen.nz/showthread.php?t=22>, last accessed August 2006.

15. Mafia Fraud Attack is a type of man-in-the-middle attack against secure systems using cryptography. For more information see for instance: <http://www.answers.com/topic/man-in-the-middle-attack-1>

16. In IT security a *brute force attack* is an attempt at breaking a password by simply calculating all possible permutations of characters.

17. What is really *convenient* in this regard is that the industry sells 'solutions' for problems which it has created itself.

Some people can enjoy their alienation more than others: there is a website for RFID freaks who get their tags implanted.¹⁴ Prof Kevin Warwick at Reading University had got his subliminal RFID tag already in 1998, an amazing scientific stunt I had the mixed pleasure of personally attending along with many other dumbstruck representatives of world media. It demonstrated the benefits of being greeted with 'good morning Prof Warwick' by a computer-generated voice on entering the building. This was not only another proof of the overheated attention economy in science but demonstrated the slim appeal of most Ubicomp propositions. I mean, who would really want to live in Mr. Gates' house? And of course there are other issues with RFID implants, besides their propensity to wander around under your skin. The infamous Mafia fraud attack¹⁵ on biometric identification implies the use of dismembered limbs and organs to hack secure systems, completely changing the meaning of the term 'brute force attack'¹⁶ in debates about security.

However, the real danger is the two-faced nature of the technology. RFID gives the holder of a key access to an area, but it also makes the presence of a person in that restricted area subject to monitoring. Thus, RFID can be used to control bodies in space. Companies and public institutions do it by issuing RFID keys. The technology is being applied already in prisoner probation schemes with a view to extending RFID tagging to asylum seekers. Whereas those RFID schemes are mandatory for the 'user', other schemes introduce the very same technologies with a promise of more 'convenience'.¹⁷ As internet users know only too well, password management increasingly becomes a burden. Add to this bank cards, an NHS card, PIN numbers, etc, and the authentication quagmire expands. Now, the IT industry is about to gift us with a new product, called 'identity services'. For large corporations authentication and authorisation concerns increase exponentially regarding security issues both in real space (access to buildings) and

computer systems. It becomes praxis to outsource the management of identity and access codes within their institution to a security IT company.

For privileged individuals this means getting through the security gates of airports more quickly and moving through a 'seamless' environment of managed 'secure' identity. The same technology could also be used to monitor people who are lined up for deportation. Ironically, the frequent business flyer and the would-be 'immigrant' are both part of the 'avant-garde' of RFID deployment. Willingly or not, they are subjected to a new regime where the electronic world holds significant sway over the real world. As spaces are structured by informational layers, access codes increasingly regulate our ability to move or to obtain goods and services. The ordinary individual has a weakening position in this technological armament race. Those who feel this most strongly are immigrants or generally people 'sans papiers', whose mobility and security is suspended by lack of official documentation. In other words, without some plastic with biometric information stored and checked via RFID, a person soon will not really exist. Rather than only being an encroachment on one's privacy, RFID can become an issue of simple biopolitics – meaning survival.

Avoiding Totalizing Vision¹⁸

However, when it comes to topics such as surveillance regimes a writer's imagination is often inclined to jump ahead of developments on the ground. Interestingly, proponents and opponents of this or that new technology will often make the same mistake of buying too much into the propaganda about the technology. How many times have we heard praises of the benefits inherent to a technology which is in fact still very experimental? Some of the scenarios to sell new technologies to the public are so overused that they expose themselves as 'past futures'.¹⁹ In a similar way, the critique of the control society is based on assumptions about totalitarian tendencies

18. Paul Virilio, *Paul / The Vision Machine* / 1994

19. *Past futures* are ideas from the past about technological futures which have not and will not materialize but still have an influence on our imaginations.

20. Enemies will fear consequences which are as virtual as the technology itself. Critics in the Foucault-Deleuze line of critique of the society of control are often those who buy most wholeheartedly into a technological 'vision' which is, fortunately, still far away from becoming a reality.

21. Trials with CCTV and face recognition have been running for years in Newham, East London. Despite not identifying a single criminal the trial has been expanded for a another period.

22. As indeed the use of the word *structure* implies a structuralist or post-structuralist position, which I actually do not share. I use the word in its everyday meaning.

immanent to a technology leaping far ahead of the actual state of deployment.²⁰ In fact, those things rarely ever work as well as advertised.²¹ If the vision is too totalizing, critique fails to hit the spot where it could actually have any impact.

In order to prevent this type of shadow boxing I would like to expand the scope of this article. Let's briefly look at the history of technology and its social critique. How and why do new technologies come into existence? What are the reasons for their being and what are the unintended consequences? Can we find certain structures in the relationship between society and technology? When it comes to those structures, language is a minefield²² that needs clearing. But the best effort of purification will run into recursive loops. Therefore my methodological-ideological disclaimer: there is no objectivity, we always need to consider the multiplied contingencies of the subject of inquiry and of ourselves as people, as subjects of history. This radical relativity is not to be mixed up with dis-engaged Relativism. The forces that shape the evolution of society and technology are observable and concrete.

Technology and Social Relationships

Since Marx we know that new technologies are not neutral but expressions of social relationships. The factory owner leverages new machinery against the human workforce. Scientific management and Fordism have brought this to perfection, shaping a society which consists of workers, who perform very simple repetitive tasks dictated by a machine, the capitalist owner class and a new intermediate class of scientists, engineers and other types of specialist labour necessary to invent, implement and maintain the new systems of production. Fordism was and still is the leading industrial paradigm. Technology embodies social relationships. The particular types of technology we have are the legacy of 250 years of capitalism and industrialism. A key aspect of this development

of technology is a quantitative one: it is driven by an insatiable hunger for numbers. As price dictates measure, the 'need' for quantification is always growing and we have become very efficient in making things more measurable.

This obsession with numbers made the invention of the computer almost a necessity. WWII-era increases in funding for scientific, military and industrial purposes accelerated the process of computational development, driven by the need for automated information key to all these areas. Managing large top-down bureaucratic organisations through central IT infrastructures such as data bases – the principles of Fordism transferred into a machine – is a legacy still at work today, for example in systems such as MS Office. The second world war created a climate that 'inspired' the rapid prototyping of new technologies. A 'science' probably most influential in this regard is operational analysis: statistical methods of evaluating the effect of bombing campaigns or artillery barrages. Operational analysis became an important part of management theory after the war. Such organisational technologies gave an operational and material boost to digital rationalisation.

The second world war engaged a quantitatively more intense movement of people, goods and weapons than ever previously in the industrial era. There were lessons to be learned from this by the inter-disciplinary teams of scientists, engineers, military planners and commanders in the United States, the most advanced industrial society of the time. The links between people and equipment tied together through an electronic communication infrastructure inspired cybernetic theory which imagined society as systems of command and control. It was recognized that the rapid progress in many scientific areas during the war was achieved as a result of research spend and restructuring in techno-scientific workplaces. With the Cold War as a pretext, government funded research budgets remained high. Techno-scientific invention became

23. This entire paragraph is informed by critical readings of AI, cybernetics and information theory by authors such as Sherry Turkle (1995) and N.Katherine Hayles (1999), in particular the notion that information becomes context free as a precondition for it to become fetishized. This enables technoscience to create an image of the world based on its own ontological assumptions, i.e. the universe as a hugely complex parallel computer. It is easy to see the 'cultural fallacy' at work in those assumptions. Computers, the leading technology of our times, are used to explain the world. A couple of centuries ago the universe was running like a clockwork.

organised as a methodically structured venture funded by the state and carried out in sometimes private research labs, sometimes public universities – a system which by the 1950s led to the critique of the military-industrial complex with its secrecy and institutional paranoia. Key elements of today's ICT infrastructure were invented or initiated in the period of the early to late 1960s, from the operating system 'Unix' to the internet. The system of co-ordinated research involving government and big business was copied by many countries and led to the emergence of Big Science or technoscience.

Augmented Reality or Embodied Virtuality

Practically from the start the computer acquired an imaginary symbolic significance that owed little to the actual status of the technology. Alan Turing thought that computers could successfully pass an intelligent test which relied on the successful simulation of a human being in written communication. Von Neumann thought about self-replicating machines which, at long last, would produce a connectionist understanding of the brain and evolve new disciplines such as 'Artificial Life'. Vannevar Bush and J.C.R. Licklider saw possibilities of using computers as universal libraries.²³ The models of information and cybernetic theory enabled information to be conceived as a context-free entity existing independently of its material carrier. In the long run, this led to a technoscientific re-evaluation of what it means to be human, what it means to be alive. The computer was fetishised as an artificial intelligence, a vision soon to be ridiculed but nevertheless supported with billions of research dollars over decades. During the 1980s, Reagan's *Star Wars* project prompted another technology boost, while 'personal computing' started to happen. Now things which had existed on paper only, such as neural networks, could be simulated on home PCs. All those developments together led to a confusion or mixing up of image and reality. Sherry Turkle speaks of a 'walk through the looking glass'.

Technoscience did no longer create 'models' or 'images' of reality but took its models as reality or life itself. For technoscience, life is essentially information replicating itself, consciousness a distributed computer system and the universe an immensely complex parallel computer. This is not the stuff of science fiction but the working assumption for research centres such as MIT's centre for bits and atoms (<http://cba.mit.edu/>) where Ubicomp and RFID are being pushed forward.

The new paradigm of 'bottom-up' thinking in a networked world began to raise its many heads in the 1980s. In this era the concept of 'ubiquitous computing', Ubicomp for short, was proposed by Mark Weiser at Xerox Parc. His idea is a sort of reversed version of immersive virtual reality, where people can experience a 3D world simulated by a computer. Instead, computers should become part of the world, so that reality is *augmented* by an informational layer. Computers, rather than being highly visible 'objects', should become embedded in the environment, which people would only consciously use as needed but otherwise could ignore. There is a certain humanism to these ideas. Weiser wanted to use those possibilities to create a 'calm technology' that worked in the background without dominating our lives.

Ubicomp has landed

Unfortunately, maybe, we are not getting this type of Ubicomp. Maybe there was a point in time when Ubicomp could be imagined as one coherent technology. However, today we see Ubicomp coming from all directions and in all shapes. Chips have already pervaded our life-world in cars, mobiles, keys and cards. All sorts of objects have already become virtualized for various reasons. What saves us from the embrace of the complete surveillance society is that those systems have not yet grown together for various reasons, be they ones of technical implementation or public concern. The ruling paradigm, however, demands

24. slashdot.org, is a community site for computer geeks which offers extensive commenting and rating functions. Every posting on the site is followed by a huge trail of analysis and comment by readers, comments which are also rated by the community according to their accuracy or relevancy, thereby creating a very effective system of harnessing the expertise of a large community.

economic growth at any cost, which makes Ubicomp feel like an alien invasion pushed down the consumer's throat by a blue-faced Intel Men. The main forces behind technological progress remain steadfastly in place – the military, the needs of capital for increased efficiency, rationalisation and quantifiability of everything. This variant of progress has also generated a huge leap in 'data trash', i.e. the entropy of the surveillance trail of data kept about everything and everyone, fed by the *natural* growth in surveillance and control techniques.

However, there have also been some substantial changes made possible through the individualisation of ownership of the forces of production and new ways of working collaboratively and managing intellectual property in a commons. That means that the threat of more commodity fetishism and reification is countered, to some degree, by the democratisation of access to means of communication.

Socializing Technologies

As Bruce Sterling proposes in his pamphlet *Shaping Things*, such a democratisation of the shaping of our techno-social future is already under way. The internet has unleashed the collective mind power of the multitude. In the future the whole world might act in ways similar to communities such as slashdot.org²⁴. The character of *things* or objects would fundamentally change, Sterling claims, because rather than leading isolated and separated existences, things would be linked to the social world in various ways.

'It's mentally easier to divide humans and objects than to understand them as a comprehensive and interdependent system: people are alive, objects are inert, people can think, objects just lie there. But this taxonomical division blinds us to the ways and means by which objects do, change, and it obscures the areas of intervention

where design can reshape things. Effective intervention takes place not in the human, not in the object, but in the realm of the techno-social.’ (Sterling 2005, pp.8-9)

Not completely unlike what Bruno Latour says about the relationship between humans and non-humans,²⁵ Sterling is convinced that the relationship we have with objects defines the phase of techno-culture we are going through. As Fordism made products for consumers, we are now in the era of gizmos owned by end-users, which prepares us for the next step, the era of SPIMES.

‘SPIMES are manufactured objects whose informational support is so overwhelmingly extensive and rich that they are regarded as material instantiations of an immaterial system. SPIMES begin and end as data. [...] Eminently data-mineable, SPIMES are the protagonists of a historical process’.²⁶ (Sterling 2005, p.11)

According to Sterling the era of SPIMES began with RFID, in 2004, when the USDoD demanded that its suppliers use RFID. Only through RFID tags can objects become represented through the trail of information and impart better criteria for certainty to speculation about them. The spread of SPIMES, in this vision, would eventually save the world by triggering a new type of production in a post-Fordist paradigm. By tying together the virtual and the real aspects of the same objects, we would have to consider their whole life-span and interaction with the social on all layers. This would force us to recognize that the wasteful regime which we have now cannot continue. SPIMES, because they are ‘information melded with sustainability’, are ‘little metahistory generators’ which continually allow the world to re-invent itself.

Besides some slippage into too much proselytising for more efficient use of technology (for instance when he fantasizes about 3D printers), Sterling seems to be quite fascinated by the idea of having

25. According to Latour the categorical separation between subject and object which we have inherited from early Greek philosophy is a deeply flawed concept. He proposes instead a different model which is based on transitions between things (non-humans) and the social world (humans) thereby abolishing the subject-object dichotomy. cf. Latour 1999.

26. Interestingly, according to this *vision*, things, and not humans are ‘the protagonists of a historical process’. The agency which is accorded to products is denied humans. Technoscientific progress phases out ordinary people as a significant factor in shaping history whereas it privileges a new digital elite. Sterling shares this viewpoint with many techno-visionaries of the late 20th and early 21st century. Many thanks to Marina Vishmidt for emphasizing this aspect.

27. cf. *The Human Engagement With Objects*. Fig.2, p.51, and *The Mirrored S-Curve of Technological Adaptation*. Fig.3, p.59, design by Lorraine Wild in Sterling (2005).

28. cf. Barbrook, Richard / *Class of the New* / 2006

an interface for everything. ‘We need to invent a general-purpose cultural interface to time’ (p.42) and ‘... I need an interface for capitalism itself’ (p.94), which is, by the way, the only time Sterling uses the *dirty c word*. Maybe as an American, it is difficult for him to acknowledge that his whole way of thinking is a modernisation of Marxism without calling it that, with a bit of McLuhan mixed in. Like Marx, Sterling thinks that the base and superstructure are not separated but intricately linked – his *techno-social* – and that the relationships of the forces of production (and consumption, we might add) determine history. This is not a teleological view, as the eventual outcome remains open, but in the sense that the dynamics that characterizes *progress* (or at least some type of development, a sequence of events in time) are over-determined by the forces of production. His sequence, from artefact to product, to Gizmo, SPIME and eventually biots is a classically modern model of one era – defined by its modes of production and consumption, i.e. political economy – following another, whereby the old does not go away but is absorbed and kept within the new paradigm. He even has nice graphs to make this point.²⁷

The Wranglers

As Sterling rightly recognizes in his crypto-Marxist theory (and as Marx did before him)²⁸ highly industrialized societies have all produced their own versions of a type of human being known as geeks, nerds, anoraks, tinkerers, experimentalists, hackers . . . and the internet has opened the floodgates of communication between them. On the net it is easy to find an expert or a community of experts on everything. This ‘collective intelligence’ has frightened the platinum out of corporate PR’s dentistry. Consumers or users are analysing products, the conduct of corporations in the countries where they produce, the usefulness and reliability of documentation and just about any aspect of a ‘commodity’ which used to be under the full informational control

of the manufacturer. As customers became 'users', instead of complaints they feed back valuable debugging information to companies.

Things Wrangled

As crowds of wranglers wrangle informational control from manufacturers, PR departments and spin doctors, they eventually do not only exert their influence in the informational sphere but also change the shape of things to come. As communities get involved, getting their hands dirty with bending the use of manufactured goods to their needs, the course of technological development changes too. As 'the street' finds its own use for things, information technologies of military origins are turned into socialized, pacified beings. Computers, the internet, wireless and mobile technologies eventually all go down that route, being wrangled away, or liberated from capitalist control, by FLOSS developers and WiFi community network activists.²⁹ Products of the complexity of a jet engine are now produced by free-wheeling communities of developers who reinvent the future in their spare time. What was the exclusive domain of large industrial conglomerates becomes opened up to collaborative inquiry with Open Source. While older layers largely continue as they did, this happens at least in the technologically most advanced sectors where a reconfiguration of the relationship of the forces of productions is under way. What remains to be seen is if the principles governing open source software development can really be successfully transferred to other areas in society.³⁰

Language is the Glue

An interesting observation, worthy of a short parenthesis, is the fact that language³¹ plays such an important role in the creation of the internet of things. RFID is based on an open standard enabling businesses to integrate their processes.³² For the

29. Even Ubicom now is opened up to experiments through projects such as *HIVE Networks*. cf. Medosch 2006a.

30. Some writers have put forward good reasons for doubts that 'open source principles' can be so easily transferred to other areas, one major reason being that bits are more easily reproducible than atoms. cf. Felix Stalder 2006

31. Language is not only the glue but also a suitable point of intervention. Artists such as Wilfred Hou Je Bek have playfully engaged with marking up taxonomies or folksonomies of places. Tagging or annotating places, and creating community-based maps was the *dernier cri* of net art app. 2003. Meanwhile annotating places and inventing folksonomies has become a new mass culture on the net with Google Maps, Del.ici.us and Flickr.

32. 'The Auto-ID Center's vision is to revolutionise the way we make, buy, and sell products by merging bits (computers) and atoms (humans) together for optimal mutual communication. Everything will be connected in a dynamic, automated supply chain that joins businesses and consumers together to benefit global commerce and the environment. The Auto-ID Center opened at the Massachusetts Institute of Technology, USA in October 1999; a second lab opened at Cambridge University, UK in 2000. The Center is developing a standard system to identify objects using RFID [Radio Frequency Identification]. RFID tags are built into objects like food, clothes, drugs or auto-parts, and read' by devices in the environment, e.g., in shelves, floors, doors... The Center has over 30 sponsors including Procter & Gamble, Gillette, International Paper, Sun Microsystems, Philip Morris Group, USPS, Phillips, Unilever, Wal-Mart and Tesco... Field Testing started October 2001; prototype hardware will be tested 2002. Specifications and business cases could be published 2003. Commercial availability is not likely until 2004-5 earliest'. ... Auto-ID Center Research overview. Available from: <http://xml.coverpages.org/pml-ons.html>, last accessed August 2006

33. The tendency of the 'logical layer' to dominate the world could easily be referenced to the privileged concept of the 'logos' in Western philosophy.

34. Such a project does indeed exist. However, at the time of writing the website <http://www.humanmarkup.org> was not available.

35. 'Put differently, any given ubiquitous technology may be understood to comprise its contexts of research, development, manufacture, sale, implementation, use and eventual disposal. Shifting socio-technical arrangements are negotiated in particular space-times, and it becomes impossible to reduce Ubicomp to discrete (stable) objects of computation'. Anne Galloway, 2003. *Resonances and Everyday Life: Ubiquitous Computing and the City* (draft), online article. Available from: http://www.purselipsquarejaw.org/mobile/cult_studies_draft.html, last accessed August 2006.

36. 'Easily envisioned as part of Latour's (1999) "proliferation of hybrids," ubiquitous computing is the archetypal hybrid and mobile technology at work within a society of control. Latour (1999: p.214) claims that we live and act as a "collective of humans and non-humans" in which an increasingly large number of humans are mixed with an increasingly large number of nonhumans, to the point that, today, the whole planet is engaged in the making of politics, law, and soon, I suspect, morality... The nasty problem we now have to deal with is that, unfortunately, we do not have a definition of politics that can answer the specifications of this nonmodern history'. Galloway 2003, quoting Latour, 1999.

layers of the physical object and the information sphere to grow together, *language* is needed. Physical Markup Language (PML) is only one of a range of Markup Languages aimed at describing the physical world, products, sensory data (<http://www.unidata.ucar.edu/software/netcdf/software.html>) or even financial products (<http://www.fpml.org/services/index.html>). Based on the meta-language XML, those semantic web applications cover *the real* with webs of hierarchies, categories and relations. This 'logical layer'³³ introduced by the computer spreads with the help of radio waves from computer to the world and back. From Product Markup Language to Transducer Markup Language and even Human Markup Language³⁴ every thing and every body is getting tagged.

The XML based Markup schemes make us aware that RFID is indeed part of a bigger picture. A whole system needs to be in place to make sense of the remotely transmitted IDs, from tag production, via numbering and naming schemes that constitute almost another internet in their complexity, to the physical infrastructure of readers, network connections, databases and forklifts. The lifespan of a tag and its readability decide which further options are open beyond the point of sale. The object can be tracked and identified till it ends up on an electronic scrapheap. On one hand the 'internet of things' (including living things such as plants, animals, humans?) has the potential to concentrate ever more power in the hands of the ruling classes and technocracies. On the other hand the history trail which the object leaves on the worlds' data banks is increasingly opened up to collective interrogation. For Bruce Sterling, this is the source of a paradigm shift for a culture that deals differently with technology. But it is also the more cautious academics who are talking about 'shifting socio-technical arrangements'.³⁵ Ubicomp and RFID fit perfectly with the priorities of certain directions in science studies which base their epistemology on networks of relations rather than fixed entities and binary oppositions.³⁶

The Praxis of Art and Technology

For a number of decades now we have seen artists engaging with technical artefacts and systems. Artists working in this area have responded to rationalisation and productivism by providing visions of utopian freedoms achieved through using electronic media and networks.³⁷ Other artists have articulated a critique of the one-dimensionality of the technocratic society and have warned about Orwellian sides of the technology. The encroachment of technology into every aspect of our lives does not only raise luddite rage and romanticised resistance to modernity, but also the inside critique of the mole: the parasitic and opportunistic exploitation of holes in the system³⁸ and resistance in a sort of survivalist DIY spirit. One of the first theorists of this new type of art which engaged with 'systems', Jack Burnham, claimed that artists' role was to make themselves redundant as artists by intervening into those decisions which shape our techno-social future.³⁹ The roots of his ideas can be traced back to the avant-garde of high-modernity and in particular socialist writers such as Brecht, Benjamin and later Enzensberger. Not 'everybody is an artist' but a truly just society can only be one where everybody potentially can be an artist and where the people can truly express themselves and the class structure of elite and 'the masses' is abolished. Artists who work in this direction engage with the social relationships embodied in technology, instead of dealing with aesthetics and formal innovation only. They make us aware that things are not merely dead objects, but how they relate to the social world, and how they facilitate certain relationships (of dominance, usually). They are bringing technology out of the Cold War closet, where it was a matter for technocrats and engineers only⁴⁰ and let us have insights into its suppressed collective imaginary. The raising of awareness is a first step towards creating new and more egalitarian models of social production to be embodied in current and future technologies.

37. I am referring to early media art, including satellite transmissions in the 1970s, by artists such as Nam June Paik (*Global Groove*, 1974) and Douglas Davies, 1977 cf. Medosch 2006b and Media Art Net 2006 [online]. Available from <http://www.medienkunstnetz.de/works/last-9-minutes/> last accessed August 30 2006.

38. A good example for a *parasitic* and highly ironic strategy was Heath Bunting's project *Vulnerability* where he used electronic tags to create false alarms on entering a store, not when leaving it. cf. Irational.org 1996 - 2006 [online]. Available from <http://www.irational.org/health/pleasur/postcard.html> last accessed August 30 2006. An echo of this type of work can be found in Paula Roush's project for the Tagged exhibition, *Arphield Recordings*, where she asks people to play back the beep from Oyster Card-reading machines on London tube stations (see further down in this text).

39. cf. Burnham / 1968-2005

40. This is not just a thing of the past. A recent CNN article: 'Scientists at the GE complex, a landscaped, gated campus of laboratories and offices spread out over 525 acres and home to 1,900 scientists and staff, and others in the industry hope to use various technologies to reduce false alarms, cut manpower used on mundane tasks and give first-responders better tools to assess threats. The country's growing security needs also provide an opportunity to boost business. [...] Since 2002, GE has spent \$4 billion buying smaller businesses to take a bigger share of the \$160 billion global security industry, a market that includes everything from building security to narcotics detection. The company expects \$2 billion in revenue from its security businesses this year. That should rise to \$2.8 billion in 2009, said Louis Parker, chief executive of GE's security unit. [...] 'Ever since the Department of Homeland Security was put into place, our business has gone up,' said James

McConnell of Acoustech. The three-person company takes in \$500,000 in revenue a year'. CNN, 2006, online article. Available from: <http://www.cnn.com/2006/TECH/08/07/terrorism.technology.ap/index.html>, last accessed August 2006. Compare also Edwards, 1996. *Closed Worlds*.

41. In a forthcoming text about AmbientTV.NET. In many ways, this article is a preview of the longer piece on AmbientTV.NET.

Current artistic practice with new technologies also shares an interesting overlap with science studies and critical theory. As artists engage with the techno-social, and not simply technology, the theoretical texts of Marcuse, Latour, Haraway, Sterling et al, are being referenced. As I say elsewhere, artists working with technology do science studies' dirty work.⁴¹ Latour, for instance, repeatedly stresses the links and networks of relationships between humans and non-humans; artists investigate and create such links on a practical and concrete level. Each work can be seen as an experimental set-up designed to verify particular aspects of such systemic relationships – perhaps to use 'verify' not in a strictly scientific sense of experiment and evaluation but at least to indicate a practical and concrete instantiation of particular sets of relationships between humans and objects in space and time. Contrary to the designers Sterling talks to in his pamphlet, artists in this process do not need to work under a productivist or utilitarian agenda, but can afford to be critical, negative, nihilistic or ironic. In the following section I will present some recent approaches in this regard.

The Tagged exhibition

The artists participating in the Tagged exhibition were sent a small questionnaire which asked them about their work and their thoughts about RFID and the development of techno-culture. One common thread present in their answers is that their engagement with RFID technology is critical, whereby only the intensity and the flavour of the critique varies, from playful and poetic to outspoken and more aggressively negative.

iTag by Louis-Philippe Demers and Philippe Jean is intended to be an 'ironic statement about all kinds of electronic 'pollution'. The project involves creating a portable device that reads RFID tags of products in a supermarket and generates ambient Muzak.⁴² Louis-Philippe Demers says he wants to 'fight fire with fire'. As the participant in this work walks through a store with a device reading ID tags, different Muzak gets played back by the handheld device. The intention is not to create an aesthetically uplifting experience but on the contrary, the artist would happily take into account if people felt 'a certain discomfort from the tags that are *watching you*'.

Louis-Philippe Demers is strongly critical of the increase in surveillance technologies driven by 'neo-liberalist agendas of better and faster product delivery'. He attacks 'myths spread by security agencies' and 'the propaganda of a better technological world'. He hopes to be able to challenge people's perceptions by making them aware of the 'electro-smog' surrounding them. But, as Demers has found out, item level tagging in retail stores is not (yet) as widespread as assumed. So, for the nightmarish walk through the shopping mall to become true, the artists will probably have to collaborate with a supermarket.

Origins and Lemons by Mute-Dialogue (Yasser Rashid and Yara El-Sherbini) also engages with objects, but with objects from the more informal economy of markets in London's East End. In the gallery space they will arrange objects sourced from markets like a market stall. By passing objects over the reader, exhibition visitors are presented an audiovisual narration about the history and context of the objects. Like the previous artists, they want to create awareness about a technology 'that is seeping into everyday life almost unnoticed.' By understanding how this technology is framed in society they hope to wrangle some new meanings from it.

42. The word Muzak has become synonymous with 'easy listening' music played in shopping malls. It is also the trading name of Muzak Holdings LLC, a US American company, founded in 1934.

The artists try to avoid being too placative and use a more suggestive aesthetic language exploring 'the origin, local and global, of objects' which they hope to relate to 'the complex issues related to the tracking of movements and people.' It remains to be seen if *Origins and Lemons* will be able to let us see more than just the obvious and will, as the artists hope, 'tap into questions such as how does the tracking of people deemed as the most risk to society, such as asylum seekers, effect our perception of these people.'

boredomresearch are presenting a research and development project, ***RealSnailMail***. The installation version of the project will be shown in 2007-8 while at Space the results of the R&D process will be exhibited. (The material will also be made available here: <http://www.RealSnailMail.net>)

The artists, who in their other work engage with Artificial Intelligence and Artificial Life metaphors and explore 'online ecologies', are interested in using 'RFID tags to superimpose a narrative onto inanimate objects in a way that explored our tendency to endow objects with meaning and sentiment'. Their first idea was to suggest 'the possibility of inserting implantable RFID chips into oysters for them to be turned into pearls.' But they encountered a variety of problems with this idea and switched to water snails.

Taking the phrase 'snail mail' – used by Internet people to describe old fashioned postal services – literal, real snails are used to transport messages. Via a *Real Snail Mail* website users can write an email which 'travels at the speed of light' to the server where it is entered into a queue. Using RFID the messages are then transmitted to snails which inhabit a little pond. If a snail makes it to the other end of the pond where a reader is installed it's message gets picked up and becomes an email message again, and will eventually be delivered. A high number of messages can be expected to get lost – which is called 'packet loss' in internet tech-language.

The artists present a playful critique of what they claim is our culture's 'obsession with immediacy'.

'As artists we are more interested in time. We make things that occupy time, that compute in time, that change over time. To experience these things you have to sacrifice time. Time that could have been spent achieving, pursuing or succeeding in some other preoccupation.'

While most people will be mystified about RFID technology anyway, boredomresearch use this element of mystification in such a way that false but imaginative beliefs are encouraged. Technology's promise of increased efficiency and acceleration is turned up-side down with the *RealSnailMail* project.

Arphield Recordings by Paula Roush (<http://odeo.com/channel/85358/view>) is a reminder that sound art projects have a very positive track record in often being the first to realize the suppressed social imaginary of new technologies. Asking people to come to a certain tube station at a certain time and scanning their Oyster cards for 30 seconds each as well as playing back recorded Oyster card beeps, she aims at creating an 'endless symphony of sound surveillance and compliance'.

Roush refers to the practice of 'sousveillance' and a more general understanding of the arphid surveillance/equiveillance of public space and transport.⁴⁹ To explain what she means by *sousveillance* she refers to the work of Steve Mann who has been walking around wearing a live CCTV camera for years. In her opinion 'the emerging field of personal sousveillance – the capture, processing, storage, retrieval, and transmission of an activity from the perspective of a participant in the activity' has been too strongly focused on the visual. At the Tagged exhibition she will present arphield sound recordings and invite people to join her for a performance at a nearby tube station, probably Bethnal Green tube.

43. 'Sousveillance', in the words of Steve Mann, is inverse surveillance, whereas 'equiveillance' describes the balance between surveillance and sousveillance. cf Steve Mann 2006 [online] Available from <http://wearcam.org/> last accessed August 30 2006.

44. I was never an active participant but an early subscriber (as user) to the DLP system; my reflections derive from that experience and may be more or less incidental to the project. In 2003 The University of Openess held a Cartographic Congress. At about the same time the Locative Media concept was developed at a workshop in Latvia.

Having performed the project already a few times, Roush discovered that 'people were already engaging in impromptu sound performances. My documentation led me to discern varied patterns and even participatory scores, with mass arphid soundscapes punctuated by silences, glitches and cracks in the system, all warped up in a circadian rhythm of work-rush hours'.

(The project remains open to contributions for people to download and upload their own *Arphield Recordings* by opening an account at the odeo.com website.)

The **SWAMPOID** project by evoLhypergrapHyCx is a development of the Antisystemic Library, adding RFID functionality to the Distributed Library Project (DLP) at a Space node. Also involved is the University of Openess Library where the DLP has been developed in Limehouse. The Distributed Library Project (<http://dlp.theops.net>) is based on a website where people can enter books which they are willing to lend. They also enter information about their physical location. Every borrower of books is potentially a lender too and people can find out about other people with similar interests who live in their proximity. In my own perception, the DLP implementation in the UK was also influenced by ideas about open and collaborative mapping and the sharing of knowledge.⁴⁴ For the Space Media Arts exhibition the Antisystemic Library will experiment with the usage of RFID tags in their system. Unlike the other artists, evoLhypergrapHyCx has not answered the questions in my small questionnaire one by one, but has written a sharp manifesto about the Sane White Adult Male Propertied Official Identity (SWAMPOID):

'We are entering a period when human transactions are being industrialised, even the industrialisation of identity itself. What television did for the imagination, RFID can do for identity.'

(evoLhypergrapHyCx, 2006. SWAMPOID. The full manifesto can be found at <http://uo.dcnz.net/index.php/SWAMPOID>).

It seems that a strong commonality between the artists is that they see their task in raising awareness. As society is sleepwalking into another technological paradigm change artists hope to raise a discussion by engaging the public with their RFID artworks. Some of the participating artists hope that the technology can also be *reclaimed* in a certain sense, that artists can think up uses which were not intended by the manufacturer and thereby create new imaginative spaces. Mute-Dialogue for instance stress that this type of open engagement is hardly possible in the commercial and creative industries. According to them artists can 'inform new ways of thinking' about existing technologies and offer 'interactions and experiences that are unique.' Mute-Dialogue think that RFID, rather than just being utilized for the tracking of commercial products, could also be thought of 'as social networking tool' or be used for interactive dance performances. But not all the artists share this optimism about an 'alternative use of technology'. Louis-Philippe Demers challenges the notion that artists somehow magically bring 'difference', and *evolHypergraphHyCx* openly confronted the 'aestheticisation of politics' as a 'staple of fascist ideology' in an earlier version of the *SWAMPOID* manifesto.

RFID (proposed to be pronounced 'arphid') may be the technology, but the social practice of 'tagging' and its implications are the real theme of the exhibition. It needs to be recognized that there is not one coherent field of media art today but works and approaches coming from very different backgrounds, some being informed by debates about art and science whereas others are more openly politically motivated. Although the visual field tends to be very predominant, sound art has created its own history of engaging with (anti)social technologies. The fact that different approaches are brought to the theme is in itself important and should help to highlight what contemporary praxis in art and technology really is about – not the technologies as such (as ill-informed critiques of those practices claim) but the various two-way links between the social and the technological, between things and humans.

As this text is written weeks before the exhibition this would appear to impede making any qualitative statement. Although art utilizing new technologies often appears to be strongly concept driven, a good exhibition still works through the senses and creates unintended consequences in the mind of the 'reader' of a work. In this spirit I hope to have given some context to the works without imposing any preconceived meanings.

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Bibliography

Barbrook, Richard / *The Class of the New* / London
Mute Print on Demand publication / 2006

Burnham, Jack / *Systems Esthetics* / (First published in Artforum, September 1968) in *Open Systems: Rethinking Art c.1970* edited by Donna De Salvo / London / Tate Publishing / 2005

Edwards, Paul N / *Closed Worlds, Computers And The Politics of Discourse in Cold War America* / Boston and London / MIT Press / 1996

Galloway, Anne / *Resonances and Everyday Life: Ubiquitous Computing and the City* (draft) [online] / 2005 / Available from: http://www.purselipsquarejaw.org/mobile/cult_studies_draft.html, last accessed August 2006

Hayles, Katherine N / *How we became posthuman: Virtual Bodies in Cybernetics, Literature and Informatics* / Chicago and London / The University of Chicago Press / 1999

Latour, Bruno / *Pandora's Hope. Essays on the Reality of Science Studies* / Boston and London / Harvard University Press / 1999

Medosch, Armin / *Meshing in the Future - the Free Configuration of Everybody and Everything with Hive Networks in Media Mutandis*, a Node.London Reader / Marina Vishmidt, editor / London: Node.London / 2006

Medosch, Armin / *Waves – Introduction'. in Electromagnetic Waves as Material and Medium for Art* / Exhibition Catalogue, Armin Medosch and Rasa Smite, editors / Riga / RIXC / 2006

Stalder, Felix / *On the Differences between Open Source and Open Culture* / In *Media Mutandis*, a Node.London Reader / Marina Vishmidt, editor / London: Node.London / 2006

Sterling, Bruce / *Shaping Things* / Boston / MIT Press / 2005

Turkle, Sherry / *Life on the Screen: Identity in the Age of the Internet* / London / Phoenix Paperback / 1995

Virilio, Paul / *The Vision Machine* / Translated by Julie Rose / London / BFI Publishing / 1994

