RFID & Agency
The Cultural and Social Possibilities of RFID

Klaas Kuitenbrouwer

Essay – November 1, 2006

RFID (Radio Frequency IDentification) is rapidly finding new applications and this is giving rise to concerns about threats to privacy. It's therefore worth thinking about how individuals can have a say in which privacy they are willing to share with whom and when. If citizens can acquire more access to particular RFID implementations, then RFID can also become a support for other, socially interesting value systems. Recent developments in online culture provide exciting ideas for this.

If you Google RFID the first ten hits include a few links to major logistical companies and consultants (aim, RFID Inc), for whom RFID is a dream come true; a dream of controllability, transparency and efficiency as regards the worldwide tracing of goods. Five of the first ten hits are links to organizations that see the replacement of the barcode by RFID as the greatest possible threat to the privacy of ordinary people. The search-term ' RFID ' results in more than a hundred million hits, ' RFID +privacy' nearly fifty million hits. In short, if we take Google as the norm, RFID chips are synonymous with 'spychips'. [1] EPC Global Inc. is an organization that promotes and supports the worldwide use of RFID standards. EPC stands for 'electronic product code'. Wal-Mart, the biggest American supermarket chain – and in terms of turnover the biggest company in the world – has demanded of its 300chief suppliers that, before the end of 2006, they equip all their pallets with an epcstandard RFID chip. The American Ministry of Defense demanded the same of its suppliers in 2004. As a result of Wal-Mart and the Ministry of Defense opting for RFID , the technology has suddenly become the focus of global economic interest. Wal-Mart is taunting RFID critics with the planned and already, on a modest scale, implemented introduction of RFID for products on the supermarket shelves. Individually tagged articles can be used to precisely trace customers' routes through the shop as well as their shopping habits, so that special personal offers can be made to customers with a specific profile in real time. In the words of Joseph Turow, a professor at the Annenberg School of Communication, 'This all might make sense for retailers. But for the rest of us, it can feel like our simple corner store is turning into a Marrakech bazaar – except that the merchant has been reading our diary, while we're negotiating blindfolded, behind a curtain, through a translator.' [2] The EPC / Wal-Mart version of RFID uses a worldwide standard for managing the unique identification codes attached to goods, which can be read by high-capacity RFID readers up to a distance of 4m in the euand 8m in the usaand which are linked via expensive 'middleware' to large, heavily guarded databases accessible world-wide via Internet. Big companies buy access to this standard and thus roll out their 'supply-and-value-chains', permanently updated via RFID , across the whole world.

There is absolutely no reason to assume that the large-scale implementation of RFID does not represent a serious threat to what remains of supermarket customers' privacy. It is easy to envisage scenarios in which privatized health insurance companies, for example, have access to dieting information via databases maintained by supermarkets about customers' shopping habits sorted according to postal code, sex and age, so that the data

involved does not quite contravene the law on personal information and the special responsibilities that this entails. The technology is also easy to hack. It is therefore essential to keep a close eye on how personal privacy is dealt with in connection with RFID . But to reduce RFID to 'spychips' obstructs the view of other interesting cultural and social effects that RFID can have.

Agency

Most critics are concerned not so much with maintaining at any cost an unequivocally defined notion of privacy pertaining to individuals deemed to be autonomous, but with the enforcement of negotiability in the interplay between a desired connection with communication networks on the one hand and privacy on the other. This requires flexible ways of defining privacy. Critics of RFID want individuals to have a say in the degree of privacy that they desire in relation to which (market) force at which moment. This degree of privacy can be related to the services or products offered by the market. For example, those who would like to receive a personally tailored dietary advice will have to provide the information needed for such advice. But the degree of privacy can also be coupled to a local context or to the time of day. [3] Ultimately the debate is not about protecting privacy but about promoting 'agency' on the part of citizens: the ability to act in a determinate way.

Analysing the possible distribution of 'agency' in relation to the different RFID components offers interesting handles for getting a picture of the cultural and social significance of RFID . In the EPC / Wal-Mart scenario all the RFID components are in the hands of marketing people. They control what is 'tagged', they determine where the (often invisible) readers are and what is read with them, they have exclusive access to the databases and an idea about the way these react. Ordinary people are only there in this scenario to purchase 'tagged' products and thus to be read themselves.

Preemptive Media – a group of New York-based artist-activists – criticize this type of RFID application and is deliberately and explicitly subversive. Within the framework of their *Zapped!* project (www.zapped-it.net) they developed a few appealing devices specially focussed on RFID . They recently fitted a sizeable group of hissing cockroaches from Madagascar with RFID chips and set them loose in branches of Wal-Mart where, all by themselves and particularly at night, they polluted databases with noise and disruptive messages. [4] Among other *Zapped!* designs is a do-it-yourself RFID tracer which sends out a warning if there is a RFID reader in the vicinity, which can then be evaded or destroyed. They also designed special clothing and bags that are impervious to radio signals. Consumers are thus given the choice of whether or not to participate in the RFID scenario of his or her local supermarket.

A Dutch project that reacts in a critical way to the spychips scenario is Z 25's *Data*, carried out under the auspices of the Huis aan de Werf Festival in Utrecht in November 2005. The makers themselves built the components of their RFID installation. All visitors to Huis aan de Werf were equipped with tags and their movements in the building were meticulously recorded and translated into an obtrusively presented personality profile. [5] An artistic RFID experiment was recently carried out by Sara Smith in The Box in Liverpool, under the title *Attention Please!*, [6] which copied Wal-Mart's marketing fantasy, with its accompanying distribution of 'agency', but then in the context of an art space. Visitors were given a 'tagged' card which was used as an indicator for registering their interest in a video loop. The loops reacted to the length and frequency of the attention paid to them. When one video received a lot of attention, the other videos began to behave more noisily so as to gain more attention.

The projects mentioned so far stand in a rhetorical relation to RFID as a 'Big Brother' instrument, resulting in projects that are conceptually fairly unambiguous. It gets more interesting when creators become interested in different sorts of participation on the part of those present and in other types of entry to RFID systems. If RFID applications are

presented not as hermetic machines and if access to the components is also provided to people other than the creators, then an RFID system becomes more of a platform offering space for different sorts of 'agency'. RFID then becomes a potential medium of communication.

Quite apart from what RFID can be used for, it allows the unique wireless digital identification of physical objects and places. 'Tagged' objects can enable computer-programmed actions to be executed. Everything that an RFID tag can carry can exist simultaneously in physical as well as in digital online reality.

What are the possibilities when access to the components of RFID infrastructures (tags, readers, databases) is not restricted to just the makers, when people themselves are able to 'tag' things and places, and / or when they themselves have readers enabling them to collect information from databases, and / or when they can fill databases themselves? In the first place, it enables other forms of interaction with a computer than via a keyboard or mouse. Collections of self-tagged objects can begin to work as a computer interface. And if we consider networked computers, we can immediately see a relation between the possibilities of RFID and a number of major developments in online culture in recent years – social software, addition of value through social bookmarks, blogs and other forms of user-created and shared content. Besides photos, videos, play lists and urls, physical locations and everyday or special objects can be bookmarked, tagged, assessed and shared.

The Internet of Things

Under the heading 'internet of things', a great deal of inspiring thought, talk and writing is being devoted to the significance of RFID by people like Bruce Sterling, Julian Bleecker and others. [7] Only a few elements of the possibilities imaginable have so far been made visible in various projects. In 2005Nokia, by way of an experiment, equipped one of its telephone models (the Nokia 3220) with an RFID reader. On purchasing it, you get ten square stickers with RFID tags, which can be stuck anywhere you choose, at home or outdoors. [8] The telephone can be used to both read and write the tags, as well as to execute telephone numbers, smses, urls or small commands. Timo Arnall, a designer / researcher at the School for Architecture and Design in Oslo, experimented with this by attaching tagged Post-It notes in a grid on his desk and giving each one a special function: 'Phone Jack', or 'Phone Mama', or ' SMS the office that I'm at home'. [9] He was thus able to transform what were previously thumb and screen actions into spatial gestures. Each friend or family member had its own place on the desk, so that a meaningful spatial relationship was created – who's at the centre? Telephone functions were also given a place of their own on the desk. RFID works here as a means of interacting with computers via embodied spatial forms of cognition.

Another RFID project organized around bodily cognition is the *Symbolic Table*, Mediamatic's interfaceless media player. [10] Users are able tag objects of their own, such as plastic animals, postcards and little Delft Blue windmills. They could then connect their own image or sound files to these objects. The computer played the image or sound whenever the tagged object was placed on the *Symbolic Table*. Tagged objects can thus become physical carriers of memories, or the key to a favourite film, for example, or a piece of music.

An application that combines uniquely identified objects with blogging and social tagging has been developed by Ulla-Maaria Mutanen, a researcher at the University of Helsinki. She designed the *ThingLink*. [11] As soon as records or books, however obscure the editions might be, are mentioned online and are hence findable for Google, it turns out that there is interest in them somewhere on the planet and often even buyers as well. [12] The *ThingLink*

is intended as a way of making unique, hand-made ('crafted') products, now practically invisible, findable online by providing them with a unique digital identification. These 'crafted' things can thus become the object of online discussion, appreciation and sales. The strong thing about the *ThingLink* idea is that it works completely bottom-up. Anyone can give his or her hand-knitted guitar cover a unique id(an arbitrary number and letter combination) and add it to the ThingLink.org database.

Butterfly Works, an innovative Amsterdam-based NGO, is currently developing a project in which uniquely designed Third World products are combined with RFID or another form of digital identification, so that the product's origin can easily be traced online.[13] A collection of stories can also be laid over the various production stages and the journey of the products. The whole thing can be deployed as a marketing instrument, but also as a means of gaining insight into the conditions of production or into the ways that products represent a burden on the environment.

Students at IVREA, the Interaction Design Institute in Milan, developed the scenario for *Sharer*, an ingenious system at neighbourhood level, whereby the things that people have little use for can be tagged and offered in online databases. Anyone can become a member and borrow things for a small rental fee. Lockers in the post office function as physical transit points in this exchange network.[14] Mobile telephones would seem to be the designated apparatus for bearing a public RFID infrastructure; they are omnipresent and form the technical link between places, objects and worldwide data networks. If mobile telephones start being fitted with RFID readers on a large scale, it is inevitable that tagged objects and places will become new domains for an entire universe of digital subcultures. The most unsightly places can offer access to the most interesting online experiences – but only if you're there! Tagged clothing adds completely new virtual and digital dimensions to fashion design. Tattoos can be combined with a subcutaneous tag that opens up special experiences on physical contacts. RFID can help towards a re-evaluation of the physical here and now – a development going in the opposite direction to the online paradigm of 'anytime, anywhere'.

An 'internet of things' can also increase the experienced value of objects. Things that are tagged can start preserving their own history. During their existence, objects gather additional value online. With the aid of RFID , whole new categories of hybrid objects and experiences will be created. As for the distribution of agency, account will then have to be taken of a new type of player: the 'scripted' object. The sofa in my living room would be able to send greetings, independently and via SMS, from my previous guest to the present one if it appears from the address books in their telephones that they are acquainted with each other. My worktable can decide at certain times not to allow me to use my laptop, each time switching it off. Well-meant perhaps – because the children have to be put to bed, for example – but it can also be petulance resulting from a lack of attention, because I'd been working the whole week sitting at the kitchen table.

The enormous interest in RFID from all those businesses for which tracking, tracing and uniquely identified objects play an important role means that the advance of RFID is not going to cease for the time being. Opposition to it from consumer organizations mainly has to do with the ease with which everyone can invent privacy-threatening scenarios in a world crawling with RFID s. At the same time, the complete disregard by the major market parties of a possible say on the part of consumers and citizens concerning the introduction and applications of RFID is also an important factor.

One way out might be to think about other possible distributions of agency on the part of those using RFID applications. We can leave this to market forces, but it would be better to do it ourselves. Just as the Internet after the dotcom implosion has still managed to become the domain of democratic media production, so too can a large-scale

implementation of RFID (after the stumbling of RFID 1. 0over privacy issues) become a terrain for a public sphere developing from bottom-up. Not all its content will be relevant, but what's more important is that RFID 2. 0 [15] offers a network for new relations between people and things, new ways to assign and recognize value, new hypes, new scarcities, new forms of play, which can be useful and make us curious.

Radio Frequency IDentification (RFID) technology consists of components, notably RFID labels, usually called tags. These are small microchips with radio antennas that carry a small amount of data and have a unique identification number. The data on some chips is rewritable. The second component is the RFID reader, which transmits a radio signal so that the RFID tags are loaded up and their unique number is transmitted to the reader. In order to read a RFID tag the reader only has to be in the vicinity of the tag, rather than having to be pointed at it, and the signal penetrates all sorts of material except metal. If the chip permits it, the data on the chip can also be changed via this radio contact. The RFID reader is linked to a computer with a database – the third component. Here the information belonging to RFID tags' identification numbers is stored.

In principle, the tags can be attached to anything – objects, places, animals, people. In addition to their number they can sometimes contain a considerable amount of information, as well as their own power source, for example, so that they can actively transmit their signal and thus be readable at much greater distances. The RFID readers can be weak or powerful, enabling tags to be read at shorter or greater distances, and the databases can be small and only locally accessible, but also enormous and accessible from all over the world via Internet.

With thanks to conversations with Rob van Kranenburg and Pawel Potutyci and to Patrick Plaggenborg and his RFID research at the Utrecht Highschool for the Arts.

(Nokia with RFID reader in use. Website ThingLink.)

Klaas Kuitenbrouwer (the Netherlands) devises and organizes workshops for *Mediamatic* in Amsterdam on crossovers between technology and culture. He researches, writes and provides advice about interactive media practices.

Footnotes

1. www.spychips.org.
2. www.nocards.org.
3. The concept for rfidprivacies was mainly developed by Rob van Kranenburg was the focus for the Mediamatic workshop RFID& Privacies in August 2004.
4. www.zapped-it.net.
5. dat-a.z 25.org.
6. attentionplease.wordpress.com.
7. www.purselipsquarejaw.org
8. In Japan six million telephones are equipped with rfidchips enabling certain services to be automatically paid for, provided a rfidreader is installed.
9. www.elasticspace.com
10. www.mediamatic.net.
11. www.thinglink.org. The *ThingLink* does not work with rfid, but with the more general principle of unique identification, for which other methods can also be devised.
12. Google query: The Long Tail.
13. www.butterfly-works.org.
14. people.interaction-ivrea.it.
15. Analogous to Web 2. 0, the internet of social software and user created content. See O'Reilly - What is Web 2. 0?

Tags

Media Society, Privacy