# I've Got You under My Skin: Rationalities, Risks and Subdermal RFID

Abstract

The ongoing development of radio frequency identification (RFID) tags, an emerging technology best described as an electronic version of the barcode, has garnered much media attention over the last few years. Themed with an eye towards understanding the participating rationalities in the management and regulation of risk, this paper endeavors to unpack the risk-saturated discourses of subdermal RFID. In so doing, it provides an exploration into the eroding boundaries between environmental, biological, cultural and ontological risk. Questions will be posed of the ways in which trust is tokenized and technologized, the spaces open to the public to negotiate with risk and the role played by dissident voices in the social construction of RFID risks and rewards.

## RFID Background

RFID tags are built on the century-old infrastructure of radio waves. The tags are composed of two parts: a microchip engraved with up to thousands of digits of information and an antenna which receives and sends this information over radio waves. There are four variations on RFID tags – passive/active and readable/writable. Both types of tags are dependent upon an RFID reader. Passive tags do not have a power supply and are energized by a signal initiated by an RFID reader; active tags do have a power source and actively emit a radio signal. Readable tags, as the name implies, can only be read while writable tags have the capacity to interact with readers and add new data to chips[i]. Subdermal tags are enclosed in a glass casing, and upon implantation, are designed to bind with flesh, making them a permanent body modification.

Though increased media attention has been paid to the tags over the last five years, their history begins much earlier, in the 1940's, with the early adoption by the US and British air forces as a means of identifying friendly aircraft. From here, RFID began to take root in other applications, though few of them commercial. Libraries began to use the chips as anti-theft devices as early as the 1970's, and military applications tested the chips as a future means of inventory control. While the capacity for RFID has been around for decades and the chips have been used to track livestock for several years, it is only with the recent push from the retail sector that they have entered the public consciousness. RFID has been touted by technologists and management consultancies as a step forward from barcode technology by allowing each and every product in existence to have its own unique identifying number. In 2003, Walmart set a target for its 100 largest retailers to implement RFID-technology into product palettes for this very purpose[ii]. Unsurprisingly, another major, but less vocal proponent of the technology has been the US military, which has spent over $100 million dollars to further its development.

The ongoing development of RFID tags, an emerging technology best described as an electronic version of the barcode, has garnered much media attention over the last few years. Through the possible applications of RFID are limited only by imagination, there is an important split in the type of applications currently under discussion: RFID for inventory control; and human implantable or subdermal chips. While in both cases shared privacy concerns come to the fore, it is with subdermal chips that the looming fears of the RFID-dependent body are best expressed. On October 14, 2004, the US Food and Drug Administration approved the use of RFID tags for medical purposes, including human implantation, intensifying the moral panic surrounding these little-understood chips and making these fears all the more corporeal[iii]. This paper examines how notions of citizenship and social capital frame the risk/reward discourse of subdermal RFID and provide a rationale for critical social inquiry into this technology.

To some extent, the rise of subdermal RFID chips can be attributed to the efforts of Applied Digital Solutions (herein referred to as ADSX), a provider of RFID tags and support systems. In the five years after incorporation, the company's RFID revenues grew to $300 million dollars. ADSX provides several configurations of RFID, including chips to track pet, livestock and wildlife populations, RFID infrastructure for the US government and military and VeriChip, a human implantable RFID tag enclosed in a glass casing. Their Latin American arm, Solusat, also provides specialized services such as VeriTrack, a modularized system that can be used to track and control entry into restricted areas. In Mexico, attorney General Rafael Macedo and 160 senior members of his staff were chipped for security purposes in 2004. To aid in distribution of the chips, ADSX has deployed the Chipmobile, a fully-equipped mobile implantation unit, driving across the US and chipping willing bodies along the way. To date, subdermal RFID has yet to be widely deployed for any purpose. This fact, however, has not curbed wide and wild speculation over the future of this technology.

## Constructing Technology, Constructing Risk

Some insight into these speculations can be found in literature examining the historical and social constructions of technology (SCOT), centered on the demonstrating the variability and contestability of technological development. At its simplest, SCOT takes seriously the spaces wherein the "sociocultural and political situation of a social group shapes its norms and values, which in turn influence the meaning given to an artifact" (Bijker & Pinch, 1987, 46). Through this body of theory comes the understanding that social, as well as technical and economic problems, give shape to technology during development. Collectively, groups are wrought with controversies between each other because they have different technical requirements and conflicting solutions to the same problem and moral conflicts (Bijker & Pinch, 1987). In this way, the SCOT paradigm informs the case of RFID by providing a means of understanding the contestable

and discursive, as well as the technological, forces which help to discipline and stabilize technologies. Still, despite application across various technological cases, the social construction of technology does not adequately account for scenarios in which the dominant technological frame conceives of technology in a negative or foundationally problematic fashion. This, perhaps, has to do with the application of the social construction of technology to cases of technological successes, rather than failures and to rhetorically closed, rather than open, cases. The social study of emerging technologies presents numerous challenges to researchers. Whereas established technologies allow and even encourage multiple lines of inquiry, emerging technologies are enfeebled by the limitless possibilities they present: Should researchers be focused on ascertaining or even affiliating themselves with one particular trajectory of technical development?

A more durable and flexible set of analytical frames can be found in constructivist approaches to risk. Like technological systems and artifacts, risks are always undergoing construction within networks of power, belief, action – an argument Deborah Lupton makes clear, by charging that:

> "Those who have adopted social constructionism, regardless of the strength of their position, tend to argue that a risk is never fully objective or knowable outside of belief systems and moral positions: what we measure, identify and manage as risks are always constituted via pre-existing knowledges and discourses. This approach to risk is indebted to writings in the sociology of knowledge, the sociology of science and technology and theorizing from poststructuralist positions."

Lupton, 1999, 25.

Moreover, social theories of risk are those that embrace the notion that risks are both socially constituted and constructed, thereby refuting the one-way dissemination of risks from experts to non-experts. As explained by Beck, and van Loon, the lack of monopoly control on the construction of risk by experts instead encourages researchers to embrace notions of uncertainty and contingency in the construction of risks and creates new strategies and locations for the mediations of social risk. Intersubjectivity, technological risk frames, rhetorical (re)definitions, advocacy, and expert knowledge systems are brought together not only by theoretical approach of this project, but the case study itself. This, as will be later explored, can be demonstrated by examining directly the roles played by stakeholders currently engaged in ongoing contests over the potential uses and representations of RFID technology. Figuring prominently in these discussions are opposition groups, espousing different risks and rewards, through different media, to different audiences, with asymmetrical claims to expertise and for different ends.

But a larger problematic still remains: temporality and the ontological dispositions of risk. Discursive approaches tend to highlight polarized utopic and dystopic

narratives, embracing speculation and building scenarios in order to re-order the symbolic, the substantive and the imagined (Sturken & Thomas, 2004). In this way, such research pushes the past into the future, with the negative implication that such “visions of technology, whether overly optimistic or anxiously dystopian, consistently award new technologies the capacity to transform” (Sturken & Thomas, 2004, 3), and therefore affix themselves to forecasting future events. Following this critique, some have countered that implications of emerging technologies can only be understood once they have faded into the past (Briggs, 2004).

Providing assistance here is Ignar Palmlund, and her work on the risk and social drama. Through her provision of temporal-spatial boundaries and locations, emphasis on social imaginings and synthesis of research approaches tackling questions of technological change and social resistance, Palmlund’s work becomes an ideal fit for asking the questions posed by this research project. Says Palmlund, “the social interaction over risk has strong roots in existential anxiety and in the needs we have to exert control over the unknown and uncontrolled” (1992, 199). As such, she proposes that these interactions be framed as a contest to regain control, and that the contestants should be viewed as the subject of fruitful research. Highlighting the various points of resonance between classical drama theory and social controversies over risk, Palmlund contends that for social drama and risk, action is serious and language important, but it is the conception of an audience, or an other, which makes meaningful the interactions between actors: “When society deals with risk, the statements before the audience have a double aim: to demonstrate a rift in the social fabric and to mend that rift so that a sense of equilibrium can be stored” (Palmlund, 1992, 202).

In so doing, risks work as a social stratifier, creating points of connection and dissonance, closeness and distance (Palmlund, 1992). This allows distinctions to be made between the bearers, generators and arbiters of risk, and for the activities of these groups to be seen as attempts to address emotions and attitudes as facts (Palmlund, 1992). Moreover, the drama metaphor is made useful in that it is “a process for the production of meaning, but also a process in which the meaning is open to interpretation” (Palmlund, 1992, 206).

## RFID & RISK

By following Palmlund’s lead, it becomes possible to demonstrate the narrative orientation/direction of discursive understandings of subdermal RFID as emerging technology. Not only does taking this risk position orient readers towards a future direction, but orients them to a specific type of future – one that is knowable and pre-planned. Moreover, such a paradigm can help to bridge sociocultural understandings of risk and technological discourses, by encouraging a more acute understanding of boundaries which contour understandings of emerging technology. For Palmlund, the metaphor of the

dramatic scene in public discussions of risk allows researchers to embrace contingency as a part of both the risk life cycle and element of technological development.

While subdermal RFID applications have not garnered the broad media coverage of retail applications, there is substantive public discourse on the subject. Wired, Zdnet and other major technology-media outlets have paid special attention to biotech applications; enacting a discourse that examines the reconfiguration of our bodies based on extrapolations of small, localized examples. In this way, we can consider these online media outlets as a primary stage in which the broadly-scoped risk positions of subdermal RFID are discussed and dramatized. Embedded within this macro-discourse is some consideration of the ways social and civic status amplify these risk implications; effectively polarizing rfid-enabled bodies along the lines of risks and rewards.

In other words, subdermal RFID functions as both a source of and solution to social risk. A strong focus on privacy risks – seen as an unauthored risk to the self – masks the larger, anchoring risk positions of subdermal RFID. To a greater extent still, these privacy issues have tended to subsume biopiracy issues in RFID. Perhaps the problem of RFID is the relative novelty and malleability of its biological applications. By overlaying technology on the rituals and routines of the everyday, RFID presents a broad means by which bodies can be contained, captured, monitored and managed. To be sure, this represents an important difference in the operation of subdermal RFID in comparison to other implanted devices. Norplant, for example, works with the body to change the way that it functions and behaves. RFID is different in that it sits above the body's biological processing. If the body is text, RFID is like file-sharing: You lose your right to protect your bio-intellectual property from others. It does not change authorship like Norplant or other bio-interactive applications do, but it does change access levels. As a part of this, the private/public dimensions shift. Potentially, through forced informationalization, RFID could mean constant exposure to biopiracy, with the subjects never knowing when their information is being read or by whom.

Untangling these discourses begins with an examination of the reward component of the risk/reward paradigm. Over the last few years, voluntary implantation has grown significantly among technophiles. The attraction to such an exclusive technology is understandable, especially in light of the longstanding cultural cachet of the biochip. Implantable chips have been mercilessly toyed with for decades figuring prominently in technoculture, and popping up in all realms of SciFi. But moreover, the true attraction of the chip is not merely the status of being ahead of the curve, but self-enrollment into a larger technological system of risk management. A full two years before the FDA gave ascension to the chips, the Jacobs family of Florida, also known as the Chipsons, decided to be pioneers and volunteered themselves to be chipped by the Applied Digital Solutions Corporation[iv]. For the Jacobs, the VeriChip presented itself as a digital medic alert bracelet, cutting admission times at hospitals and acting as a

tokenized form of identity. Others have jumped onboard – literally. The company now has a chip-mobile, rolling from town to town, chipping willing bodies along the way at a cost of a few hundred dollars. Though highly localized, the self-selection of the voluntarily-chipped population has broader implications for the risk/reward tradeoff. Seemingly, the rewards of subdermal RFID accrue to those who are already benefited by their station in life and, in turn, the willingness to pay for a technology with such limited usefulness is directly related to the minimal risks RFID poses to this group.

An inverse but equally stratified situation exists for the risks of subdermal RFID. As has been established, the initial push for subdermal RFID came from corporate, not governmental impetus. However, there has been extensive experimentation with implantable RFID tags in Latin America over the last five years. Overwhelmingly, these experiments were conducted by American companies, rather than domestic government agencies. When subdermal RFID moved into the US in 2002[v], no efforts were made to subject the tags to clinical trials, as other biotechnologies have undergone, for the fact that unsanctioned trials in Mexico and Brazil revealed minimal problems[vi]. Ironically, despite its knowledge of families like the Chipsons, FDA spokesperson David Feigal said at the time that the regulatory body would be concerned if applied digital solutions were to link RFID to medical information[vii], only to rubber stamp this very function some two years later.

There is another interesting paradox in this governmental encouragement of subdermal RFID. While no government ascension was given to the initial experimentation, implementation has been forced on some people by government agencies. One example of this can be found in Mexico where the defense department has required upper-level employees, including Rafael Macedo, the attorney general and 160 members of his staff to be chipped for security purposes[viii]. Regardless of political borders, government acknowledgement of the possible social ramifications of RFID have yet to be fully expressed. Importantly, regulatory action has been taken without much regard for people who do not fit neatly into the category of contributing citizen. In the United States, Canada, and Europe, debates over the uses subdermal uses of RFID tags centers around tracking marginalized populations[ix]. The currently discussed targets of these programs are children, the sick and the elderly. In other words, those who are not only at risk of behavior dangerous to themselves, but also at risk of behavior dangerous to citizens. This echoes van Loon, who made strides in connecting class to biorisks and social risks, contending that these risks are selective and target those parties already at risk, specifically the poor, homeless, refugees and “in short the social excluded” (van Loon, 2000a: 100). But to be sure, public concerns “do not always match the relations of domination marked by social class, gender or ethnicity, and the collective political responses to them reflect this” (van Loon, 2000a: 101).

Take, for example, take the case of a kidnapped child. Child abduction, obviously, causes concern for its immediate family. However, this concern quickly seeps into the public consciousness, and more importantly, requires action on the part of citizens. Ambler alerts and other programs ask for the vigilance of citizens to remedy such situations. Active RFID tags have already been put to use in Brazil and Argentina to help this very cause. And in the chronically ill and the elderly, little to no trust is placed in these individuals to care for themselves. As biological function diminishes, self-reliance is replaced by a dependence on the medicalization of the body. RFID, in concert with other biotechnologies, offers the ability to monitor biological flows and force both awareness of and responsiveness to medical problems away from the weakened bodies of the old and feeble and onto the perpetual perfection of the technical. RFID tracking in all three examples brings the promise of a lower duty of care for these individuals thereby reducing the burden placed on the general citizenship to take care of its weak, its frail, its incompetent, and its forgotten. To a large extent, the rewards of subdermal RFID technology may not accrue to members of these at-risk groups.

What must be underscored is that the expression of resistance to such programs does not necessarily originate from these target groups themselves nor from advocates on their behalf. Government-initiated technology assessment makes an effort to consult with at-risk groups, but those at the margins tend to get left behind, further reinforcing privileged access to the technocracy. This allows the risks associated with such applications to be diminished within socio-technical discourses. To be sure, risks and rewards are not equally distributed throughout the population. Those who voluntarily submitted for chipping are those with the greatest perceived rewards; conversely, those who are the targets of tracking programs are those facing the greatest risks. Importantly, these constructed risks and rewards may forever remain in the realm of possibility.

Understanding these risks through the application of Palmlund's frame of risk as social drama, however, requires a deeper problematization of this risk position. Here, the social rift caused by risk is large in scope and seemingly insoluble by a number of unanswerable questions: How and by who are these risks authored and directed? What social and cultural scripts are used to repair the threat to social stability? Where is agency located?

Despite these challenges there is, however, a different means by which socio-cultural and ontological risks in subdermal RFID can be anchored – one which clarifies the notions of and roles played by bounded communities, expert viewpoints and teleological solutions. Following a 2003 announcement from Applied Digital Solutions that experiments integrating implanted chips with VISA credit card system are underway, the FDA’s action has led many to speculate on the ontological ramifications of RFID, questioning its likeness to the Mark of the Beast. To quote the relevant passage from the Book of Revelation:

"He also forced everyone, small and great, rich and poor, free and slave, to receive a mark on his right hand or on his forehead so that no one could buy or sell unless he had the mark, which is the name of the beast or the number of his name. This calls for wisdom. If anyone has insight, let him calculate the number of the beast, for it is man's number. His number is 666" (Rev. 13:16-18)

Mainstream technology media outlets have been quick to take up this viewpoint. Wired, for example, has made frequent reference to this passage in its coverage of RFID development, and interviewed various RFID objectors who have echoed this passage, ranging from Katherine Albrecht, founder of Consumers Against Supermarket Privacy and Numbering, to Gary Wohlscheid, president of Last Day Ministries, an online apocalypse watchdog. In 2005, CNET ran a story titled “Is RFID the Mark of the Beast?” and Newsweek, in an article called “The Internet of Things” opened the piece with the question “Is RFID the mark of Satan, a tool for Big Brother, or just a technology that could someday connect a billion inanimate objects to the Web?” These articles offer further legitimacy to the apocalyptic standpoint on the technology. But beyond crystallizing these views as valid, these articles work to present a sample of overarching Christian attitudes toward RFID. The failing here, however, is that little consultation with mainstream Christian groups is used in bolstering these claims. Instead, grand inferences are drawn and extremist beliefs are taken as representative of mainstream Christian viewpoints, further entrenching negative secular beliefs about the Christian community.

But a marked difference exists between the content of these articles and readers responses to them. Largely, comments written in response to RFID articles more fully flesh out concerns about RFID, and Big Brother and privacy issues are referenced in almost equal measure. Again, the Mark of the Beast is used to explore the unsettling aspects of RFID. In ZDNet and CNET’s Talk Back feature, invocations of 666 are frequently used tropes. Comments explore the tightness of fit between the biblical prophecy and RFID, asserting that “the Bible makes it very clear that when one takes the mark of the beast they will know without a doubt what they are doing,” enumerating the technological appropriateness of inserting the chip in the right hand or forehead and referencing other surveillance technologies as possible Marks.

But these comments provide little help in identifying readers as Christian. In fact, this is more confused when statements linking RFID to the apocalypse are prefaced by declarations that the commentator is not a Christian. That secular discourses make frequent reference and postulations on Christian viewpoints on RFID is somewhat puzzling. These statements call into question whether one has to be Christian to believe in the power of apocalyptic rhetoric. To some degree, prophecy can be seen to function as a tidy way of capturing and containing the moral panic of this emerging technology. Moreover, these commentators’ reliance on prophecy may be a more subtle means of deferring

resistance to RFID to the Christian community. Whether this is faith in the strong moral and ethical compass of the Christian community or in their organizational muscle, in any case, it nods to unquestioned perceptions of a homogeneous Christian other.

Perhaps a better means of understanding mainstream Christian viewpoints on RFID can be found in the online Christian community itself. Samples of comments appearing at the Christdot.org and Christianity.com forums indicate the breadth of opinion on this matter.

In both instances, the forums house reactions to media coverage of RFID, with comments on stories gleaned from media sources ranging from the Christian Broadcasting Network to Slashdot to Time Magazine. Postings at Christ.org's site range from panicked speculation that RFID tags have already been embedded in currency to support for the technology in thwarting global terrorism. In particular, one thread emphasizes the influence of the socio-temporal context in which the Revelation prophecy was originally written. Here, specific reference is made to and questions asked of believers in other Christian eschatological visions.

Similarly, Christianity.com's Prophecy and Endtimes Forum has threads dedicated solely to the topic of 666, with several comments on RFID. References are made to news items, such as the Baja Beach Bar's move to chipping, the broadcast of the Jacobs family's chipping procedure on the Today Show and American politicians' statements on national identity cards. Though discussions here take seriously notions of RFID as the Mark of the Beast, this thread is but one of many attempts of analyzing the religious overtones of RFID technology. Other threads question ethical implications of RFID, refuting apocalyptic visions and instead proffering that RFID will easily integrate itself into the social landscape in two ways. First, the chips are likened to other technological means of identification, such as dental records and medical alert bracelets. Second, the chips are framed as potentially mitigating social problems, such as making "it harder for thieves to convert stolen goods into cash," reducing the likelihood of kidnappings and offering greater protection for people with medical ailments.

To make sense of these tangled and conflicting discourses, some attempt must be made to recognize that mainstream Christian viewpoints are tempered by religious affiliations. There exists a constellation of other Christian groups entangled in the religious discourses of RFID, including home congregations and electronic Christian media.

As indicated in posts at Christ.org and Christianity.com, many of those concerned with the ramifications of RFID have discussed the technology with clergy and congregation members. Moreover, while Christian churches have yet to put forward a particular dogma on RFID tags, Christian media outlets such as the Christian Broadcasting Network and World Net Daily have not shied away from criticizing the technology. Importantly, their criticisms hinge on privacy and

health concerns, rather than prophecy fulfillment. CBN, for example, cautions against the health risks of subdermal chips, marshalling the expert testimony of Katherine Albrecht and the FDA. In 2004, Pat Robertson's 700 Club television show profiled the Jacobs' family of Florida, the first American family to be chipped, and has had representatives from Applied Digital Solutions appear as guests on the show. Moreover, CBN's struggle for neutrality and mainstream credibility can be captured in the following quote:

"The tiny VeriChip would seem to contain more than electronics: hope, fear, opportunity, some politics and perhaps a dash of theology. But it is another piece of technology that will likely become a part of everyday life."

To be sure, intertwined religious and technological discourses are by no means is new – folk understandings of the linkages between the Mark of the Beast and such technologies as barcodes and cell phones remain popular, and critical academic voices, such as those of David Noble and William Stahl, have successfully detailed the links between religion and technology. What differs in the case of RFID, however, are the means by which these discourses are legitimated, the media in which they circulate, and the wavering allegiance to future dystopia.

## Conclusion

As we construct risk, we construct technology; as we construct technology, we construct risk: there is nothing fixed, stable or empirically evident in either, but they are made real through discursive expectations. But by rejecting determinism in this way, technological trajectories and their accompanying risks are made interdependent and durable, and opens the door to a study of how these emerge as co-constructions. In sum, these literatures rail against risk perception as a responsive or reactive tactic employed by non-experts. It is from this approach we can produce a more refined conception of risk in emerging technologies, not only contextualizing ontological concerns, but placing special importance on their function.

It is not enough to say that risks and rewards are untethered to socio-technical rationality. As Beck and others have contended, risks become real when they impact lived experience, even if their outcomes will never be and, as a corollary, any expressed concern must be treated as equally valid when weighed against other concerns. At a time in the technological development of RFID when anything is possible, no action or belief should be taken to be irrational. Instead and in sum, the case of RFID is but a temporal rift revealing the deep-seated but omnipresent concerns associated with the ascendant technocratic order and its drive to colonize the body.

At the same time, the porous borders of the online Christian community encourage problematization of mainstream representations of subdermal RFID.

To be sure, the case of RFID demonstrates that the imagined online Christian community is just that – imagined. Diffusion across media, belief systems and face-to-face affiliations means that this community cannot be easily compressed, delineated or known. Moreover, attempts to exclude non-believers who share the desire to make sense of the moral panic surrounding RFID are difficult at best. Rather, a greater community of interest exists – one that is defined by the shared ontological concerns over RFID development. Broadly, both religious and secular discourses of RFID speak to the larger concerns of control, order, safety, security, progress and change. Mainstream Christian coverage of RFID mirrors the concerns espoused in secular media – specifically privacy and security, technological reliability and interoperability, and corporate control.

Perhaps this can be explained in the common allegiance of biblical prophecy and technological forecasting to understand and discipline the future. That RFID-related stories speak directly to the dystopic possibilities stemming from technological innovation, rather than real-world measurable effects, allows secular and religious critiques to coexist. Moreover, the strong future orientation of Biblical prophecy makes it a malleable and easily accessible cultural trope. As RFID gains popularity and becomes domesticated, prognostications and prophecy will hold less sway. Without dethroning the concerns expressed by either group, this community of interest is linked not necessarily by morality, but by a more complex set of assumptions, values, beliefs and rationalities. Ultimately, RFID can be seen as a depository for apocalyptic concerns which are housed in a way that defies the simple boundaries between the virtual and non-virtual, or secular and religious experiences.

In sum, the discursive cacophony of subdermal RFID is a fusion of the perspectives on environmental risk and risk-taking behaviour, arriving at a meaningful understanding of the risk-saturated social world. While risks tend to dissipate as emerging technologies stabilize and become domesticated, little risk research has been undertaken during crucial periods of technological instability. There is therefore a need to recognize while many risks may be specific to particular cases, the perennial occurrence of social risks in emerging technologies merits the development of a framework that takes these risks and the social contexts in which they occur seriously, and investigates cases as they occur.

## Notes

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