**The Relationship Between Technology and the Future in
Modern and Postmodern Thought**

by

Tina Sikka, B.A.

A thesis submitted to
the Faculty of Graduate Studies and Research
in partial fulfilment of the requirements for the degree of

Master of Arts

School of Journalism and Communication

Carleton University
Ottawa, Ontario
September, 2004

© Tina Sikka, 2004

Library and
Archives Canada

Bibliothèque et
Archives Canada

Published Heritage
Branch

Direction du
Patrimoine de l'édition

395 Wellington Street
Ottawa ON K1A 0N4
Canada

395, rue Wellington
Ottawa ON K1A 0N4
Canada

Your file Votre référence

ISBN: 0-612-98999-2

Our file Notre référence

ISBN: 0-612-98999-2

NOTICE:

The author has granted a non-exclusive license allowing Library and Archives Canada to reproduce, publish, archive, preserve, conserve, communicate to the public by telecommunication or on the Internet, loan, distribute and sell theses worldwide, for commercial or non-commercial purposes, in microform, paper, electronic and/or any other formats.

The author retains copyright ownership and moral rights in this thesis. Neither the thesis nor substantial extracts from it may be printed or otherwise reproduced without the author's permission.

AVIS:

L'auteur a accordé une licence non exclusive permettant à la Bibliothèque et Archives Canada de reproduire, publier, archiver, sauvegarder, conserver, transmettre au public par télécommunication ou par l'Internet, prêter, distribuer et vendre des thèses partout dans le monde, à des fins commerciales ou autres, sur support microforme, papier, électronique et/ou autres formats.

L'auteur conserve la propriété du droit d'auteur et des droits moraux qui protègent cette thèse. Ni la thèse ni des extraits substantiels de celle-ci ne doivent être imprimés ou autrement reproduits sans son autorisation.

In compliance with the Canadian Privacy Act some supporting forms may have been removed from this thesis.

Conformément à la loi canadienne sur la protection de la vie privée, quelques formulaires secondaires ont été enlevés de cette thèse.

While these forms may be included in the document page count, their removal does not represent any loss of content from the thesis.

Bien que ces formulaires aient inclus dans la pagination, il n'y aura aucun contenu manquant.

Canada

Acknowledgments

I would like to thank Dr. Sheryl Hamilton for all her help and guidance, Dr. Roman Onufrijchuk for his advice and support, and my friends and family who together made my experience at Carleton University possible.

Abstract

This thesis deals with the relationship between technology and the future as seen through modern and postmodern thought. Chapter one explores modern thought in which the myth of technological futurism operates. This mythology consists of the narrative of the technological sublime, the myth of progress, and the religiosity of technology which work in concert to form a utopic vision of the future. Chapter two explores Roland Barthes' theory of myth and the rhetorical stratagems which contribute to the solidification of modern mythologies. Chapter three illustrates how wearable computing technologies draw upon the modern myths of futurism, the sublime, progress, and religiosity, yet also employ a postmodern discourse of technology since the fusion of human and machine underlies its construction. Finally, chapter four appraises several postmodern theories of technology and the future of which I argue Douglas Kellner and N. Katherine Hayles are the most promising. In summary, this thesis contributes to the understanding of discourses of technology and the promise of postmodern theory.

Table of Contents

Introduction

Chapter 1: Technology and the Future in Modernity

Myth of Technological Progress

Rhetoric of the Technological Sublime

Religiosity of Technology

Narrative of Technological Futurism

Chapter 2: Roland Barthes, Myth, and Technological Futurism

Roland Barthes and Myth Today

The Process of Mythic Signification

The Rhetorical Forms

Chapter 3: Wearable Computing Advertisements and the Futurist Myth

Mobile Assistant V

WSS Technology

SafetyPAD

XyberKids

Chapter 4: Problem of Technology and the Future in Postmodernity

Postmodern Approaches to Technology

Postmodern Theoretical Perspectives: N. Katherine Hayles and Donna Haraway

Postmodern Problems

Some Alternatives: Douglas Kellner and Leo Marx

Can This Work?

Conclusion

Bibliography

Appendices

Figure One: Sony QRIO

Figure Two: Mobile Assistant V

Figure Three: WSS Technology

Figure Four: SafetyPAD

Figure Five: XyberKids

Introduction

That great, growling engine of change -- technology.
ALVIN TOFFLER, *Future Shock*, 1970.

The relationship between technology and the future is a central theme of modernity and is one which continues to inform debates around postmodernity as well. In this thesis I critically analyze the myths underlying the relationship between technology and the future through both modern and postmodern thought through an in-depth mapping of the discourses of technological futurism. I will also illustrate the tensions between modernity and postmodernity as they relate to technology. I suggest that social theories of technology are most often framed in terms of either technology's dependency on, or coterminous relationship with first, an ethos of progress, second, a particular conception of the sublime, and third, religion and/or religiosity. From this, two issues arise which are central to this study. The first is the conspicuously modern orientation of studies like this in that they build upon and promulgate, through their critiques, an Enlightenment preoccupation with progress, rationality, consensus, and humanity. The second issue concerns the traditional separation between these three central tenets, progress, the sublime, and religiosity, in relation to technology which I argue should be thought of as existing in a coterminous relationship with one another under the rubric of a larger narrative or myth, which I call the narrative of technological futurism.¹ This larger

¹ I use the terms myth and narrative interchangeably to connote, as Carl Jung maintains, that which, "frames a view of the world which adequately explains the meaning of human existence in the cosmos, a view which springs from our psychic wholeness, from the cooperation between the conscious and unconscious" (Jung, 1989, 67). Narratives and myths are also understood, for the purposes of this paper, to operate on a cultural level as

narrative paints a “portrait of the future as a...utopia erected on technological and scientific innovation,” a vision which Joseph Corn and Brian Corrigan argue, “has loomed large in our culture. It has proven to be a durable image” (Corn & Corrigan, 1984, xii). This narrative also has the capacity to affirm a socially potent technological ideal through text and image in which technology is imbued with, “the supposed capacity to transform the commonplace into the extraordinary: to create novel forms of human community, new standards of efficiency and progress, newer and more democratic forms of politics, and finally to usher a “new man” into history” (Quirk, 1992a, 190). Within this speculative ideal, a technocratic standard of progress, the rhetoric of the technological sublime, and a religious-like faith in innovation interact with one another to form a dominant futurist metanarrative.

Further, much of popular discourse, like its academic counterpart, is also dependent on this ethos of technological futurism. In particular, I have been struck by the effects-driven technocratic nature of contemporary advertising around futuristic wearable new media technologies. These technologies are produced by high technology corporations who rely heavily upon the discursive and symbolic capital of the modern, Enlightenment narrative of technological futurism to justify their creation and communicate the technology’s

a belief system based on the order of things as it is within the epistemic ordering of knowledge where, as Michel Foucault argues, the fundamental codes of a culture lie. Moreover, these codes, “-those governing its language, its schemas of perception, its exchanges, its techniques, its values, the hierarchy of its practices-establishes for every man, from the very first, the empirical orders with which he will be dealing and within which he will be at home (Foucault, 1994, xx).”

purpose.² These advertisements are cultural artifacts indicative of our contemporary society in that they embody and communicate our ideas, beliefs, and values about technology, innovation, and development. However, by their very nature, wearable computing technologies are also postmodern artifacts in that their central theoretical premise is that the body can be transcended and the mind enhanced through the merging of technology and body. The tension between these two poles is a major theoretical and methodological question in this thesis in regards to the future trajectory of technological development, which I argue is distinctly in the realm of the postmodern.

In addition to outlining and discussing the nature of the narrative of technological futurism, its constituent parts, and its relationship to modernity and postmodernity, I also, in this thesis, analyze four contemporary high-technology wearable computing advertisements in detail using Roland Barthes' theory of myth and semiotic methodology of myth analysis. I argue his seven rhetorical devices operate in service of the narrative of technological futurism – a narrative which continues to play a pivotal role in our social lives. This narrative of technological futurism, therefore, will be presented as one manifestation of a discursive regularity under the aegis of a modernity which continues to shape cultural life. It is further one of several metanarratives still discursively employed, in its representational form, to circulate, “a system of shared meanings, attitudes and values and the symbolic forms in which they are expressed” (Burke, 1978, i). Also evident within these advertisements is the postmodern rejection of the body which exists

² By technocratic, I am referring to an overall elevation of the values of efficiency, technological prowess, and profitable expansion.

simultaneously with the modern futurist myth. This, I argue, indicates a movement away from modernity and into postmodernity.

My position within these debates however, as a scholar of technology within communication studies, is closely aligned with moderate postmodern conceptions of and approaches to technology and innovation. As such, it is my belief that the futurist narrative, replete with its unquestioned acceptance of Enlightenment modernity, is a dangerously prohibitive one that we must and are in the process of moving beyond. The futurist mythology, through its logocentric and pervasive theoretical and practical power, I feel significantly limits alternatives to first, increasingly unsustainable levels of technological growth and second, new ways of envisioning the human-nature-technology relationship. As Donella A. Meadows argues, "Faith in technology as the ultimate solution to all problems can thus divert our attention from the most fundamental problem -- the problem of growth in a finite system -- and prevent us from taking effective action to solve it" (Meadows, 1992, 32). I also contend that society as a whole is increasingly aware of the consequences of unlimited growth and the limits placed by such a creatively impoverished view of the human-natural world-technology relationship, yet it appears that popular representations of technology by and large continue to operate and draw upon the futurist mythology through the language they employ. At the same time, however, the technologies themselves are becoming more postmodern in their construction in their support of the technologization of the body which indicates a definite change in our ideas about technology.

The postmodern approach then, rather than furthering the objectives which emerge from technophilic Enlightenment thought, successfully challenges utopic/dystopic, male/female, and human/machine dualisms. A postmodern epistemology views society as approaching an epoch which has surpassed rational humanism, Enlightenment liberalism, and technological futurism as the guiding narratives of social life and can be characterized by what Jean François Lyotard calls a state of paralogy. Paralogy is a state of social being which allows innovation to function within an “open-system” that “generates ideas,” and has no “overriding metalanguage in which all other languages can be transcribed and evaluated” (Lyotard, 1979, 64). Postmodern approaches to technology build upon this very ethos of plurality and paralogy and advocate for the potentially radical use of technology for purposes of political and social resistance. It is further indicative of a human-technology-natural world relationship that is depicted as reflexive, symbiotic, and resonant – elements of which can be discerned within wearable computing. However, even within the postmodern paradigm, there remains a large degree of ‘theoretical messiness’ since any uniform definition of our postmodern technical future is lacking. Both moderate and revolutionary forms of this paradigm exist in tandem and, despite its lack of conceptual cohesion, I argue that it is within a postmodern domain where the most potential for a reconceptualization of our technological life-world will emerge. I contend that this narrative of futurism, as a myth which remains potent to this day, is in danger of collapsing amid the emergence of postmodernity which is increasingly overpowering it and it is towards the postmodern where we should look.

Chapter One of this study offers a detailed discussion of futurism, the sublime, progress, and religiosity including their history, constitution, interaction, and various manifestations. Chapter Two summarizes Roland Barthes' theory of myth, explores its relationship to the narrative of technological futurism, and reviews the various rhetorical stratagems, outlined by Barthes, as I will use them. In Chapter Three, I analyze four wearable computing advertisements using Barthes' seven rhetorical forms as they operate in service of the myth of technological futurism. The final chapter, Chapter Four, explores postmodern perspectives on technology and attempts to reconceptualize our technological life-worlds through a refashioning of the relationship between technology and the future.

Chapter 1: Technology and the Future in Modernity

My thesis is concerned with mapping and unpacking the narrative of technological futurism and illustrating the tension which exists between modern and postmodern conceptualizations through advertisements for wearable computing. The futurist narrative consists of three component mythologies: the myth of technological progress, the rhetoric of the technological sublime, and the religiosity of technology. I will outline each of these component myth elements and then discuss how they work together to produce the narrative of technological futurism.

Myth of Technological Progress

The myth of technological progress, much like the narrative of technological futurism under which it functions, has several manifestations which are relevant in the context of this study. The various forms of this myth of progress often coexist, either complementing or conflicting with one another. In its first manifestation, this narrative can be characterized as a particular view of history in which humanity's increased capacity to subvert the constraints imposed by nature, through technology, becomes the standard by which progress is measured. This Cartesian mode of thought, as Professor Douglas Burnham argues, began during the late 17th century in which, "The dominant trend of thought in the period (and for centuries before) had to do with the 'superiority of humans to nature (and of man to woman) in which Descartes was just a drop in the ocean'" (Burnham, 2001).³

³ Available at: [www.utm.edu/research/iep/d/descarte.htm].

This view garnered popular acceptance with the rise of capitalist forms of accumulation and industrialism during the 18th century wherein the prospect of material well-being that accompanied the rise of the scientific method and focus on technological advance fostered a profound secularization of nature and the natural world. This change rendered nature ontologically separate from the domain of humanity and resulted in the affirmation of, “humanity’s new intellectual capacity to penetrate the most remote, elusive, or obscure recesses of the cosmos” (Marx, 1998, 203). David Toolan, much like Leo Marx and Douglas Burnham, argues that the objectification of nature, the emergence of science, and an increasing emphasis on progress began with the invention of the printing press and mass literacy which he contends distanced humanity from the natural world and profoundly altered human consciousness. Thus,

Womb-like nature vanishes; we now stand ‘outside’ it-in effect as a spectator...it effect enables us to read the whole history of consciousness as the gradual emancipation of humans from an embeddedness in nature. Nature could now be stilled, dissected, and analyzed to an extent never previously possible or imaginable. That is, modern science became possible (Toolan, 2001, 46-7).

In general, however, the central tenet of this particular view of progress is encapsulated in the notion that social, moral, and political progress can be measured by the proliferation of technological innovations capable of circumventing the natural world.

Another instance of this narrative focuses more heavily on the role of technological progress as a catalyst for economic growth and transformation. Technology, in this context, is thought of as inextricably linked to the market in its ability to increase efficiency, rationalize production, enhance consumption, empower and bring women into the workforce (through reproductive technologies), and eradicate poverty. This

neoclassical and conservative view of technology, the economy, and progress, as Paul Romer argues,

views technological progress as occurring in two steps: the heroic discovery and the ensuing transformation of the economy. According to this theory, once John Bardeen, Walter Brattain, and William Shockley gave us a shove with their discovery of the transistor, we just followed Gordon Moore's famous law down the cost curve, like a skier going down a jump ramp. The digital information revolution followed automatically. There are many examples of this theory. For instance, James Watt invents the steam engine, then the industrial revolution just happens (Romer, 1999, 34).

Moreover, this ethos, in its contemporary form, is embraced by economic organizations such as the Organization for Economic Cooperation and Development (OECD) which, in their April 2002 Policy Brief, argue fervently that the world's economies are on the cusp of an undergoing a transformation in which,

The OECD economies are increasingly [becoming] based on knowledge and information. Knowledge is now recognized as the driver of productivity and economic growth, leading to a new focus on the role of information, technology and learning in economic performance. The term "*knowledge-based economy*" stems from this fuller recognition of the place of knowledge and technology in modern OECD economies.⁴

The narrative of technological progress is framed, in this view, solely within the context of economic growth. There are however, other manifestations of this myth which go beyond this.

On another level, the mythos of technological progress can be understood as a historically derived technocratic elevation of the values of efficiency, rationality and instrumentality such that technology, rather than serving as a process-oriented vehicle in pursuit of social goals, becomes an end in itself whose exclusive purpose consists of an intensified

⁴ <http://members.shaw.ca/competitivenessofnations/Anno%20OECD.htm>

accumulation of technological artifacts. This view of progress is considered technocratic because of its marked departure from a traditionally Republican definitional heritage of progress wherein technological advancement was identified as a necessary corollary of social liberation and equality. Politicians and inventors like Thomas Edison and Thomas Jefferson argued that,

Science has liberated the ideas of those who read and reflect, and the American example has kindled the feelings of right in the people. An insurrection has consequently begun, of science, talents, courage, against rank and birth, which have fallen into contempt...Science is progressive (as quoted by Marx, 1987, 35).

Even Jean-Jacques Rousseau, who was initially skeptical about the faith placed in technological 'progress,' later argued that culture and technology could, "lead mankind to a higher condition of freedom...by guaranteeing him political freedom in the form of unalienable rights of the citizen" (Dooyeweerd, 1955/1975, 270-1). Moreover, this technocratic view of progress, once the shift from Republican idealism had been secured, became socially solidified into the 'philosophy of an epoch'⁵ through the adoption of Fordist mass-production and Taylorist scientific management wherein the accumulation of capital, productivity, and authority were elevated and Nature became othered, vacated of its past metaphysical properties, and thereby subjected to the control, manipulation, reconstruction, and exploitation of a reasoned and enlightened humanity. Arnold Pacey, furthers this technocratic view of progress by placing it in a social context. He argues that,

A technocratic value system...gives rise to what is often called a 'technocratic' outlook that is single-mindedly insistent on an unambiguous view of progress, of problem- solving, and of values. Those intolerant of ambiguity see only one

⁵ Whitehead, Alfred North (1925). *Science and the Modern World*. Macmillan: New York.

course for technology, on that leads to greater progress and efficiency (Pacey, 1978, 127).

This tension between ends and means, that is – technology as a means to achieve a higher social good as opposed to innovation as an end in itself – is unclear and muddled at best.

In its dystopic manifestation, this view of reason and ends-oriented technological progress is argued by such theorists as Lewis Mumford and Herbert Marcuse to be a, “thrust into barbarism aided by the very forces and interests which originally had been directed toward the conquest of the environment and the perfection of human nature” (Mumford, 2001, 154). Thus, the myth of technological progress, and its correlative technology for the sake of technology ethos, is thought of as categorically oppressive, anti-human, and barbarous. “Theoretical reason, remaining pure and neutral, [enters] into the service of practical reason,” where, “domination perpetuates and extends itself not only through technology that as technology, and the latter provides the great legitimation of expanding political power, which absorbs all spheres of culture” (Marcuse, 1964, 58). Chris Hables Gray, in a more contemporary and distinctly postmodern example, draws upon a similar approach to technology in which technical systems are argued to potentially take humanity on horrific trajectories of progress. If this potentiality becomes realized, as Gray argues, “infowars will blur the line between business competition and politics/war and crime” (Gray, 2001, 65), and lead to the ruin of mankind:

Cyborg technoscience renders mass society a thing of horror. Uniformity is technically possible as it has never been before, making totalitarianism a nightmare to be feared ... But reaching forward toward greater democracy, stronger citizenship, and a proliferation of human and posthuman possibilities is our only choice beside a turn to the past that, since it would be in the context of

postmodern technoscience, would make the Holocaust and the Gulag look like rehearsals. (Gray, 1996, 201)

However, for all three theorists, accompanying their critiques of our increasingly technologized life-worlds, are strategic and amelioratory proposals wherein human-oriented and socially-driven technologies are developed which strive for a harmonious balance with nature and others and whose, “goal of etching civilization as a whole...[is] not more power alone, but a greater intensification of life: color, perfume, images, music, sexual ecstasy, as well as daring exploits in arms and exploration” (Mumford, 1971, 104). This merging of the seemingly oppositional poles of nature and technology or technology and humanity, based on sustainability and communal deference, is simply a re-assertion of earlier humanist proposals made by Jefferson and others in which quality of life, balance, sustainability, and freedom become values that are elevated, rendering aggressive technological progress mute.

An epistemological assumption uniting each of these manifestations of the narrative of technological progress, including its anti-natural world, economic, Republican, technocratic, and dystopian forms, is contained within their common philosophy of technology called technological determinism. This approach posits that technologies are placing us on an inevitable path of progress and are the engines of social change. Each of the different manifestations of the progress mythos exhibits precisely this ethos. Technology therefore, in and of itself, is conceived of as having the capacity to circumvent nature, rationalize the economy, achieve a Republican political idea, and automatically better social life. Even in its dystopic form, the deterministic dimension of the myth of technological progress is palpable within the amelioratory proposals put

forward by its critics since it is still the technology itself which is conceived of as having the capacity to revolutionize our existence.

Rhetoric of the Technological Sublime

The technological sublime is distinct from the mythos of technological progress because of its aesthetic, affective, and emotive properties, yet related because of its focus on democratic revival and an ethic of equality. It has five primary representations, including that of heightened self-awareness, technological awe, social unification, technological panacea, and technological dystopia, which, like its religious and progressive counterparts, can be both antagonistic and complementary. I would argue that of all three, this narrative's various forms are the least clearly demarcated thus both blending into and supporting one another.

To begin with, the narrative of the technological sublime, on one level, refers to the capacity for nature and technology to excite feelings of awe, terror, and critical reflection within the observer his/herself. For Kant, this means that,

In the appearance of this apparent infinity...[the] subject experiences weakness and insignificance, but then recuperates a sense of superior self-worth, because the mind is able to conceive something larger and more powerful and the senses can grasp. In this experience the subject passes through humiliation and awe to a heightened awareness of reason (Nye, 1996, 7).

This ethos of heightened self-awareness and humility is clearly discernible in public reactions to monuments, world's fairs, and public works projects such as bridges during the seventeenth, eighteenth, and nineteenth centuries. Moreover, this ethos has also been further solidified and sublimated into a prevalent belief that man's relationship with

technology and the natural world has been transformed for the better. Leo Marx, in his book, *Machine in the Garden*, quotes Charles Caldwell, a junior intern at Bush Hill, who, in explaining the aesthetic and emotive features of the sublime as experienced through technology, stated that,

Objects of exalted power and grandeur elevate the mind that seriously dwells on them, and impart to it greater compass and strength. Alpine scenery and an embattled ocean deepen contemplation, and give their own sublimity to the conceptions of the beholders. The same will be true of our system of Rail-roads. Its vastness and magnificence will prove communicable, and add to the standard of intellect of our country (Marx, 2000, 195).

On another level, and more specific to this thesis, the rhetoric of the technological sublime also functions as a compelling myth by conflating dispassionate man-made technologies with the beauty of the natural world whereby the same sense of awe and wonderment experienced within nature is juxtaposed onto the experience of technology – minus the critical self-reflection. John Ruskin's work on the sublime confirms this particular expression of the technological sublime since, for him, in the context of modern culture it is the city and its requisite technological artifacts which successfully cut entire social groups off from the beauty of nature and enhance the human tendency to romanticize technology and relish its picturesque manifestations (Ruskin, 1979). This particular feeling and experience of the technological sublime can be described as transitory, ephemeral, deceptive, and based on an early American desire to integrate the new machines into the moral and physical framework of a nation (Kasson, 1977, 142).

The rhetoric of the technological sublime also, in its final three manifestations, successfully conflates technology, democracy, and pastoral idealism with material and

spiritual fulfillment, which Leo Marx characterizes as an endeavor to place at the behest of a machine our faith that technology will improve not only our working lives but our spiritual lives as well. This version of sublime mythology is palpably evident again in audience reactions to world's fairs and technological monuments as well as in the popular drive towards the decoration and ornamentation of technological artifacts with 'naturalistic' elements, using flowers and leaves – or drawing upon Greek architecture. This practice makes manifest the prospective capacity for technology and nature to co-exist in a harmonious balance, as well as the potential perfectibility of the human mind, both of which are of paramount political importance. Further, it is within this narrative's ability to integrate 'the public' through a common political and spiritual goal that its paradoxical social reception of both denial and affirmation emerges. As Tuomi Forrest argues,

Commentators such as Lewis Mumford and Marvin Fisher explain machine decoration as a denial of the destructive environmental impact that manufacturing had upon the land and landscape--upon the ecosystem and the esthetic value of the 'natural'. "When these machines were brightly painted or garbed in Greek Revival. . . Their invitation to be viewed as works of art became almost irresistible. This movement parallels another trend in which many looked towards "Nature and Progress" as surrogates to history (Forrest, 2000, 36).

Hence the technological sublime expresses itself through a social conviction that technology, nature, and humanity can, first, coexist harmoniously, and second, through their relationship with one another, improve social life politically, morally, and economically.

During the mid 1800s, however, with technological improvements, rapid industrial growth, and changes in political realities, the sublime experience, as it was related to

technology, underwent another definitional transformation. This transformation further drained the sublime of its humbling capacities and redefined such that technological and electric advancement was, and continues to be, increasingly,

Invoked as the panacea for every social ill and the key to whole range of social and personal transformations that promise to lighten the toil of workers and housewives, to provide faster and cleaner form of transport...to unify the citizenry...and [to work as] active forces for democracy (Nye, 1996, 33).

This combination of skill with technology was also, in the American context, invoked to solidify nationalistic sentiment such that, “technological achievements were becoming part of a hegemonic system in which the nation merged with its most impressive technological and natural works” (Nye, 1996, 70). This merging was meant to solidify the nation and citizenry under the banner of American technological prowess and create the conditions for the peaceful cohabitation of innovation and farming, nature and culture. Leo Marx characterizes this element of the technological sublime as a necessary heightening of,

A sense of cosmic harmony, suggesting an obscure kinship between Webster, the spirit of the Republic, the machine power, and the progressive forces of history. Everything, it says, is working out according to a divine plan. Now the disturbing images of change, the screaming monster and the defacer of the landscape, seem embarrassingly squeamish, effeminate, and trivial (Marx, 1964/2000, 214).

Underscoring the faith placed in the peaceful coexistence of man and machine, is what James Carey refers to as the specifically middle class ethos of the technological sublime. In this context, the sublime asserts that, “communication, exchange, motion brings humanity, enlightenment, progress and that isolation and disconnection are evidence of barbarism and mere obstacles to be overcome” (Carey, 1992, 208). The sublime is thus equated with the investment in a nation’s moral economy and contains within it a latent

call to American Manifest Destiny. Extrapolating this ethos to its more contemporary manifestation, the technological sublime is infused with the afore-mentioned rhetoric which, on the one hand, proselytizes Information and Communication Technologies (ICTs) as intuitively possessing profound economic, social, political, and cultural promise.

The rhetoric of the technological sublime has, of course, its dystopic variations which can also be seen in the texts of theorists skeptical of the myth of technological progress (as I have discussed above) as well as in popular literature. Patricia Warrick suggests that there are four essential themes in the portrayal of technological dystopias. Although her thematic characterizations are meant to be applied specifically to literature, they are also reminiscent of the objections launched by opponents of irresponsible innovation and unguided technological advancement. They are,

1. The "Promethean" theme which revolves around the notion of humans wrongfully possessing knowledge or technology they ought not to have;
2. The ambiguity of the technology humans do have;
3. The effects of humanity's rejection of their technology; and
4. The shifting roles of master and servant - creator and created (Warrick, 1984, 23-4).

These thematic question and problematize the myth of the technological sublime such that the social change technological development is believed to guarantee becomes an artificial system which, "eliminates or subordinates the natural world" (Ellul, 1984, 17).

However, each of the technological sublime's various forms cumulatively comprise a narrative whose interaction with a particular notions of progress and religiosity, in the

context of technology, work in concert to construct a futurist myth that is both dominant and in danger of collapsing.

Religiosity of Technology

The final mythology evident within the narrative of technological futurism is referred to as the ‘religiosity of technology’ and is expressed in one of three forms (again, note that two, or all three, can coexist simultaneously): the first involves the religious ethos which surrounds technological advancement; the second refers to the modernist rejection of religion in pursuit of technological advancement; and the third is related to the religious fervor with which technological innovation often occurs. It should be reiterated that an ethos of both antagonism and dependence characterizes the interaction between all three mythologies and between their various manifestations.

David Noble, Erik Davis, and James Carey have all drawn attention to the relationship between the drive to innovate and the ethos of religion whose roots can be traced to Greek mythology and the annals of Christian history. All three theorists maintain that the traditional modern philosophical argument, based on Enlightenment dualisms and values, which dichotomizes science and religion into separate domains of social and historical thought is erroneous, ahistorical, and fails to take into account the religiously saturated contexts which surround contemporary technological endeavors. David Noble, for example, argues that technological innovation has and continues to occur with a, “vision of creating human perfection in the field of genetic engineering; and the ambition among some pioneers in the area of artificial intelligence to achieve human immortality by

transferring minds to machines” (Noble, 1999, 89). In his book, *The Religion of Technology*, Noble illustrates historically how Christianity has influenced the course of technological development over time. It is not until the second section of his text that he draws attention to how particular technological endeavors within America, “namely space flight, artificial intelligence, and genetic engineering, reflect a religiously based preoccupation with preparing for and helping to bring the millennium (millenarianism)” (Noble, 1999, 1). Noble successfully makes the argument that modern technological innovation can be understood not only in terms of augmenting social life, but also as “technologies of transcendence” promising to pave the way to a brighter phase in the history of humanity.

Erik Davis takes this manifestation of the religiosity of technology one step further to examine what he calls the ‘spiritual cyborg’ and show how, “the religious imagination, far from disappearing in our supposedly secular age, continues to feed the utopian dreams, apocalyptic visions, digital phantasms, and alien obsessions that populate today’s technological unconscious” (Davis, 1999, 2). James Carey’s ritual model of communication is another example of the interpretation of the religiosity of technology paradigm which takes a slightly different trajectory than that of Noble. This model posits that the process and function of communication through technology itself is essentially a religious one which, by altering reality and joining communities – much like religion – solidifies the social bond. As Carey argues,

A ritual view of communication is directed not toward the extension of messages in space but toward the maintenance of society in time; not the act of imparting information but the representation of shared beliefs ... the archetypal case under a ritual view is the sacred ceremony that draws persons together in fellowship and

commonality (Carey, 1989, 18).

In essence however, apart from Carey's interpretation, the function of this perspective of religiosity, in relation to technology, is meant to make manifest the connections between old world religions and new technologies. Similarly, John Durham Peters' 'problem of communication' thesis, which argues for the use of a dialogic form of communication – which can also be applied to the question of technological growth – is profoundly religious since, as Peters argues, "Communication is ultimately unthinkable apart from establishing a peaceable kingdom in which each may dwell with the other" (Peters, 1999, 268).

The second 'secular technology' perspective found in the religiosity of technology posits that modern technology and science are associated with an increasing skepticism towards religion and superstition which, as Rosenau argues, "entered history as a progressive force promising to liberate human kind from ignorance and rationality" (Rosenau, 1992, 5). It pledges a release from religious tutelage and the possibility of knowing the world, thereby gaining mastery over it. The secular technology view is further characterized by, "an affirmation of existence, enthusiasm for progress and the perspectives of the future, it is sustained by the will to freedom in thought and politics. It undertakes the venture of human independence; motivated by the idea of humanity, it makes man a purpose in himself" (Jaspers, 1973, 150-1). As a result, it became the active objective of 17th and 18th century philosophers and scientists to depart from the cloak of religion towards Enlightenment as realized by the rational exercise of human intellect towards self and social improvement – an ethos which remains prevalent even today. As Andrew Feenberg

argues,

The European Enlightenment of the 18th century demanded that all customs and institutions justify themselves as useful for humanity. Under the impact of this demand, science and technology become the new basis for belief. They reshape the culture gradually to be what we think of as “rational.” Eventually, technology, becomes omnipresent in everyday life and technical modes of thought predominate over all others. In a mature modern society such as Japan, technology is taken for granted much as were the customs and myths of the earlier traditional society. One might say that scientific-technical rationality has become a new culture (Feenberg, 2003, 48).

Additionally, it is from this interpretation of the religiosity of technology myth that religious opposition to technological advancement (specific to biotechnology/cloning etc.) can be discerned by turning the ‘rational technology’ argument on its head. That is, religion has also been used as a vehicle for opposition to technological development if the technologies appear to infringe upon the religion’s basic tenets of life. Consequently, the qualities of ‘rationality’ and ‘efficiency’ become demoted and ‘the sanctity of life’ gains preeminence. Finally, it also should be pointed out that this instance of the religiosity of technology narrative manifests itself antagonistically in relation to its explicitly religious counterpart.

The third, and final, version of the religiosity of technology narrative views technology and innovation as an obligatory, morally necessary, and intrinsically beneficial human practice. It contains within it, “a semi-religious faith in the inevitability of [technological] progress...to bring the greatest good to the greatest number” (Pursell, 1983, 38-9), and can be characterized as an attitude in which, “one sees all hope for mankind’s future happiness in technical and scientific progress” (McDonald, 1996, 1). The emergence of its central tenets can be historically traced to such theorists as Friedrich Dessauer who

argued that technology, in and of itself, has the capacity to better human existence:

The autonomous, world-transforming consequences of modern technology are witness to its transcendent moral value. Human beings create technology, but its power-which resembles that of "a mountain range, a river, an ice age, or planet"-goes beyond anything expected; it brings into play more than this-worldly forces....With Dessauer, technology becomes a religious experience-and religious experience takes on technological meaning (Mitcham, 1994, 32).

Additionally, this variant of the religiosity of technology myth executes the function of a truly modern moral myth as delineated by Moojen Momen who, drawing heavily on Carl Jung, argues that,

Myths can be debased and uprooted. All that happens is that modern myths and rituals replace the traditional ones, for myths and archetypes are an inherent part of the human psyche. Human beings appear to need a religious underpinning both to their personal and to their social lives. At the personal level, human beings need a mythology within which to frame their identities and the meaning of their lives. At the social level, some ideology is needed to give people a vision of their history, their present place in the world and their future direction, to act as a focal point of unity, an agreed framework for public policy and a justification for the public rituals that affirm social cohesion. Where formal religion no longer provides this underpinning, various alternatives have evolved. At the social level, 'pseudo-religions' such as Marxism and nationalism have been successful partly because they do provide an alternative picture – a myth of history and a direction for the future (Momen, 1999, 296).

Technology, then, according to this third perspective, constitutes an alternative to religion in the precisely the same manner as Momen intimates. By fusing innovation with a moral imperative, the religiosity of technology forms the basis upon which faith in technological growth, progress, and innovation, as a cumulative social endeavor, characterizes the identity of a social group whose movement away from religion necessitates a new mythology.

I will now go on to discuss how these three myths of technological progress, the sublime,

and religiosity work together to produce the narrative of technological futurism.

Narrative of Technological Futurism

It is my contention that the futurist metanarrative still forms the epistemological basis upon which the majority of 'state-of-the-art' new media technologies are contextualized, discursively constructed, and communicated socially, politically, and culturally.

However, it is also my belief that the futurist myth exists in tandem and in tension with the postmodern in wearable computing advertising. In general, the futurist narrative most often appears in 'closed texts,' such as political speeches, newspapers, magazines, literature, and advertising, which show a strong tendency to encourage particular interpretations which, in the case of futurism, consists of an embrace the inevitability, necessity, and virtuosity of technological innovation. In doing so, futurism's manifestation within advertising tends to encourage a dominant reading on the part of the audience which readily accepts the authority of the futurist ethos (Hall, [1973]/1980, 136-8). However, without drawing upon the narratives of technological progress, the sublime, and religion, it is difficult to define the futurist ethos because by its very nature it is more akin to a philosophy, an outlook, or an approach to life than a tangible concept which, as such, defies literary quantification.

There are several theorists however, such as John J. Quirk, Neil Postman, Marshall McLuhan, and Hans Moravec, who have attempted to define the futurist ethos and its many characteristics. I analyze these theorists in order to offer a more comprehensive understanding of technology and futurism. Marshall McLuhan incorporates an element of

technological determinism into his conceptualization of the future and technological futurism and argues that it is only through the inevitable spread of holistic and tactile communication technologies that human beings will gain the capacity to participate actively and authentically in social and political life. Although much of McLuhan's work involves constructing a futurist narrative specific to electrical technologies, I would argue that it is representative of a large body of work revolving around a futurist world-view in general. In *Understanding Media*, McLuhan argues that, "As electrically contracted, the globe is no more than a village. Electric speed at bringing all social and political functions together in a sudden implosion has heightened human awareness of responsibility to an intense degree" (McLuhan, 1964, 5).

In contrast to McLuhan, many other critical-technology theorists approach technology and the future from a standpoint that regards technology's pervasive influence unfavorably. Cinzia Sartini Blum, for example, argues that the futurist mythology, "hail[s] the destruction of the decrepit myths of the past and predicates a new mythology on an optimistic representation of technological progress vis a vis the challenges of modern life: a fiction of individual and national power" (Blum, 1995, 77). Neil Postman is another such futurist critic who, in his book *Technopolopoly*, argues that,

The Technopolopoly story is without a moral center. It puts in its place efficiency, interest, and economic advance. It promises heaven on earth through the conveniences of technological progress. It casts aside all traditional narratives and symbols that suggest stability and orderliness and tells, instead, of a life of skills, technical expertise, and the ecstasy of consumption. Its purpose is to produce functionaries of an ongoing technopolopoly (Postman, 1997, 179).

Postman identifies *Technopolopoly* as embodying the essence of futurism itself which, as he argues, is prohibitively utopian and inherently detrimental. John J. Quirk, in his essay,

“History of the Future,” characterizes the futurist ethos as prophetic and predictable. He posits that a variety of political and social mechanisms draw upon the future as a rhetorical source of stability. Quoting C. Wright Mills, Quirk notes: “The more the antagonisms of the present must be suffered, the more the future is drawn upon as a source of pseudo-unity and synthetic morale” (Quirk, 1992a, 179). Quirk’s central thesis is precisely that, “the future is often regarded as cause for a revitalization of optimism, an exhortation to the public to keep faith” (Quirk 1992a, 174). The future functions together with the myths of progress, the sublime and religiosity as a mechanism for social acquiescence and consolation meant to limit opposition and ameliorate anger at the incapacity for technology to deliver what it has promised.

Finally, the futurist ethos, as a conservative political movement, has such adherents as robotocist Hans Moravec and Frank Tipler who contend that in the future, technological progress will lead us, inevitably, to achieve the dream of longevity – even human immortality and super-intelligence – through the application of innate human reason and libertarian philosophies to the futurist project. Moravec, in his prediction of the end of human beings, argues that robotic life will become heirs to our evolutionary legacy: “Intelligent machines, which will grow from us, learn our skill, and share our goals and values, can be viewed as children of our minds” (Moravec, 1999, 25). Tipler’s Omega Point Theory of the universe and God advocates for a future state of the world in which maximum information and social technification will bring about a utopian state of wellbeing. Christopher Dewdney, in his book, *Last Flesh: Life in the Transhuman Era*, along the lines of Moravec and Tipler, postulates that through a positive futurist ethos,

The collective nature of posthuman consciousness may pre-empt the individual – at least, our current notions of individuality - entirely. It is not out of the question that the unique, individual human being is a transitional evolutionary stage, an ultimately expendable aberration that is now poised at the brink of a precipitous slide into collective consciousness. Individual human consciousness may well turn out to have been a temporary, but necessary, detour on the road to meta-consciousness (Dewdney, 1998, 183).

Despite the different political engagements with technological futurism, it is from these competing theories of technology and the future that a clear definition of futurism can be formulated. First, futurism cannot be understood apart from its constituent mythic components – thus, it must be emphasized that as constitutive and complexly inter-related elements of the larger myth of technological futurism, the sub-narratives of religion, progress, and the sublime work in concert with futurism to discursively construct a politically pre-ordained and prophetic future in which universalized political, economic, social, technological, and cultural goals and ideals are met. As such, drawing from Quirk, Postman, and McLuhan, an authentic form of participatory democracy is realized; material needs are abundantly met; the ethos of a global village is brought to fruition; violence, conflict, and fear become non-existent; and a harmonious existence with nature becomes a reality. In its most radical form, this futurist vision of technologically-induced emancipation has been used to advocate for the adoption of a social system led by industrialists who would constitute a new technological aristocracy. In such a technocracy, innovation becomes a moral and ethically infused undertaking supplanting religion as the primary purveyor of moral and cultural codes. As Henri Saint-Simon argues, “The doctrines of work and progress are the driving ethical concepts of the new society. Man progresses ethically to the degree that industry became perfected. It is therefore moral to spread and inculcate ideas which tended to increase the productive

activity” (in Manuel, 1956, 88).

In its more moderate, politically pervasive, and generally accepted form, however, the narrative of technological futurism, through its conflation of science with history, supports,

A belief in the sufficiency of scientific and technological innovation as the basis for general progress. It says that if we can ensure the advance of science-based technologies, the rest will take care of itself (the “rest” refers to nothing less than a corresponding degree of improvement in the social and cultural conditions of life) (Marx, 1987, 39).

On a philosophical level, I would also argue that the futurist mythology, through its reliance on the language of revolution, is also inherently teleological in orientation. It therefore defines the universe in terms of Aristotelian-like final causes in which the world is argued to be approaching its inevitable, authentic, and natural state of democratic freedom and social well-being. Moreover, as a teleological philosophy, the narrative of technological futurism provides a framework from which to understand the interaction between reality, technology, and ethical social action. That is, as Alasdair MacIntyre argues, specifically addressing Aristotelian teleology, “it provides a context in which evaluative claims [function] as a particular kind of factual claim” (MacIntyre, 1997, 77),⁶ in addition to confirming the notion that the universe has a design and purpose conducive to the technological world-view.

Overall then, the narrative of technological futurism, as I will use it for my analysis of

⁶ It should be noted, however, in my use of MacIntyre, that he argues the Enlightenment brought with it the end of teleological frameworks, thus resulting in the failure of the Enlightenment project.

wearable computing devices, can be defined in the following manner: A teleological world-view which envisions the future as a place made accessible by technology where we can “transcend” our chaotic humanity and achieve a level of social, economic, cultural, and political perfection denied to us in the present.

Chapter 2: Roland Barthes, Myth, and Technological Futurism

Roland Barthes' theory of myth is a useful tool for analyzing techno-cultural myths and revealing the tensions between modernity and postmodernity by first drawing out the myth of futurism in doing so laying bare the postmodernism dimension of these advertisements. Because of its focus on observing and examining cultural forms, myth analysis makes the connections between the discrete advertisements I have chosen of complex new media technologies and larger social systems. As John S. Nelson argues,

[Barthes'] analysis is rhetorical. Ever attentive to audiences, myth scapes trace the figures, themes, and strategies that run throughout images, bodies, gadgets, events, videos, characters, texts, and other objects from our vernacular cultures. A myth scape delimits its objects sharply, to keep the analysis concise. It justifies its choices by the implications it finds, and it shows how the target tries – however boldly or obliquely – to sway us through its symbols and stories. The aim is not to reduce the objects to epiphenomena of class conflicts, modes of production, rational choices, biological desires, or other magical keys to history. The purpose is to probe the targets as figural networks in order to track how they engage our lives (Nelson, 2003, 124).

In the following sections, I will navigate through Barthes' theory of myth both generally and as it has been interpreted for the purpose of technology-specific analyses. I have done this because I feel it is crucial to understand the methodic structuralism of Barthes' approach to myth, both on a theoretical and methodological level. Hence, the first two sections outline Barthes' theory of myth and its relationship with language in *Mythologies* while the latter sections delve more explicitly into the practicalities and methodological specificities of myth analysis as I will use them.

Roland Barthes and Myth Today

Roland Barthes' discussion of myth in his essay, "Myth Today," is both semiological and structuralist in its epistemological disposition and therefore language is argued to be *the* medium through which meaning is created. As Rick Rylance argues, "the nature of individual things or persons [is argued to be] determined by their place in a larger social structure...which requires a fundamental reorientation of our understanding" (Rylance, 1994, 33). For Barthes, this larger social structure is characterized by a dystopic, hyper-capitalist, and bourgeois ethos which negates 'reality' through its intentional and base manipulation of particular symbolic forms. Notwithstanding the political problems with this approach, including the positing of all blame on the bourgeois class, Barthes' analysis of myth provides a rigorous methodology which proves useful in the study of technology as symbolically-rich category of social life. In the following sections, I lay out the basic tenets of Barthes' mythological approach.

Within "Myth Today," Barthes presents a dual-level interpretation of Ferdinand de Saussure's semiological theory to illustrate how myths operate as first, a 'second-order semiological system' of meaning with global signification (Barthes, 1970, 110), and second, as a type of speech whose material, or content, is used, or, as Barthes posits, "already worked upon" (Barthes, 1970, 110). Barthes' theory of myth is given spatial form within a two-level metaphoric model he includes to illustrate how myths operate on a semantic (language) level and on an ideational or meta (mythic) level. In this model, the sign (that is, the "associative total" of the signifier and the signified), which is indicative of common everyday speech, becomes the signifier on the mythic level of the

semiological system.⁷ Together, they (habitual language plus myth) constitute a mythologized language-object which can be used to uncover the unrecognized codes or homologies of mythic signification. These homologies, according to Barthes, “assume a narrative coherence for a culture” (Champagne, 1992, 22), through the connection they have to the basic values of a society. Hence the codes upon which the myth of technological futurism is based, consisting of a technocratic approach to progress, a redefinition of the sublime experience, and the ethos of religiosity, are indicative of Western values around technology, innovation, and material well-being wherein Enlightenment rationality continues to hold a considerable amount of ideational capital. In his essay, “The Great Family of Man,” Barthes launches a scathing attack on Enlightenment humanism and the very concept of a universal human condition – condemning it as a mythology which functions by, “postulating a human essence...[wherein] the diversity of men proclaims his power, his richness” (Barthes, 2000, 12).⁸ As such, it appears that Barthes himself, through the process of myth analysis, is drawn to the idea that the postmodern rejection of one essential human nature and the grand metanarrative will ultimately prevail over myths such as that of futurism.

The Process of Mythic Signification

However, the precise process by which mythologies operate on a cognitive level according to Barthes becomes much more complicated after the initial bifurcation of language and myth. To begin, the first principle, of several, posits that within the context

⁷ A signifier, in this context, is the concept to which the signified, or the symbolic/rhetoric form, refers.

⁸ In this essay, Barthes’s is analyzing a photographic exhibition being held in Paris called ‘The Great Family of Man.’

of mythologization, language becomes, “reduced to a pure signifying function as soon as it is caught by myth,” that is, it becomes purged of its original contextual history wherein, “myth sees in them [the materials of mythic speech: language] only the same raw material...their unity is that they all come down to the status of mere language” (Barthes, 1970, 114). This point is fundamental to Barthes’ theory. It means that, by its very nature, the process of mythologization demands that concepts and symbolic systems be cleansed of their original histories and contexts such that a new, mythic conceptual and ontological schema can take its place.⁹ This new ontological schema, however, takes as its motivation a degraded version of the former history in so far as it requires a basic conceptual framework from which to depart.

Barthes goes on to describe the process of semantic impoverishment by explaining how the connotative element of myths operate which, as he argues, transpires through partitioning the signifier of myth (formerly the sign of the first order semiological system) into two components: the form and the concept. It is at this point, within ‘form’ itself, that Barthes’ contends lies myth’s ability to naturalize conceptual systems. While continuing to retain the basic elements of meaning, the signifier at the level of myth undergoes a ‘paradoxical permutation’ an ‘abnormal regression from meaning to form’ such that its intrinsic history, geography, values – the basic contextual legacy of particular representations and ideas are evaporated (Barthes, 1970, 117), (this referring to the impoverishment of meaning). The signified or conceptual portion of the second order, mythic, semiological system, meanwhile, takes the denatured contextual history of form

⁹ It must be kept in mind that this not a total purging of historical meaning. Rather, it is a sanitization, an appropriation, or a reconfiguration which occurs.

and reconfigures it by, “reconstituting a chain of causes and effects, motives and intentions,” such that, “a whole new history is implanted in the myth.” One that is, “drained of its contingency” (Barthes, 1970, 118-9), made shallow, isolated, and confused, with the proviso that it retains a degree of ontological flexibility and ephemerality (Barthes, 1970, 120).

Finally, signification provides the crucial link between form and concept, between the concrete signifier and the nebulous signified within myth itself. This relation of signification, Barthes maintains, “is essentially a relation of deformation” (Barthes, 1970, 122), which “buttonholes” interpellated speech into impoverished generalities and instrumentalities. As he argues,

Motivation is unavoidable. It is none the less very fragmentary. To start with, it is not ‘natural’: it is history which supplies its analogies to form. Then, the analogy between the meaning and the concept is never anything but partial: the form drops many analogous features and keeps only a few...Myth is a pure ideographic system, where the forms are still motivated by the concept which they represent while not yet, by a long way, covering the sum of its possibilities for representation (Barthes, 1970, 126-7).

It must be stressed however that for Barthes’ myth is not a lie or deception, rather, it functions by, “[transforming] history into nature...”(Barthes, 1970, 129) such that, “myth is read as a factual system, where it is but a semiological system” (Barthes, 1970, 131). Further, mythologies operate to depoliticize and rob language of its expressiveness such that it, “it narrows language’s signifying potential, and thereby reduces the human capacity for creative usage” (Rylance, 1994, 50). Its usefulness as a methodologically rich approach then lies in its ability to describe the connection between first and second order systems of language, “to close the gap between form description and social

content” (Rylance, 1994, 52), and, in the context of this thesis, illustrate the tensions between modernity and postmodernity. Thus, when interpreted through Barthes, images and discourses around high-technology advertising can be understood as being located within a particular system of social life which renders them, “transfixed by a system which codes their perceptions, institutionalizes creativity, and organizes reality” (Rylance, 1994, 41).

The Rhetorical Forms

The particular rhetorical forms Barthes’ delineates within “Myth Today” ground my method of myth analysis. They include: Inoculation, Neither-Norism, Identification, The Privation of History, The Quantification of Quantity, The Statement of Fact, and Tautology. Each of these rhetorical forms operate in the service of the narrative of technological futurism within the context of high technology devices thus instilling the values of universality, equality, efficiency, progress, and the sublime into the respective advertisement’s images and discourse. Briefly, in the next section, I will explain each of these rhetorical stratagems, supplementing each with an example from the Sony QRIO (See Appendix One). Sony’s QRIO is a robotic companion technology created primarily to aid users in everyday tasks and for overall entertainment and companionship.

Inoculation

Inoculation is a rhetorical form which functions by co-opting institutions, social forms, and concepts that are antithetical or in opposition to a prevailing or dominant social form, institution, or conceptual framework: i.e. the narrative of technological futurism in its

high-tech form (as an example of a dominant conceptual framework). According to Barthes, by virtue of inoculation our modern social environment has been engineered such that, “the bourgeoisie no longer hesitates to acknowledge some localized subversions: the avant-garde, the irrational in childhood, etc. It now lives in a balanced economy: as in any sound joint-stock company, the smaller shares – in law but not in fact – compensate the big ones” (Barthes, 1970, 151). Inoculation therefore, as Stephen Cullenberg and Indraneel Dasgupta argue, “Immunizes the contents of a meaning-system by means of a small inoculation of acknowledged dissonance, thus protecting it against a generalized loss of coherence” (Dasgupta & Cullenberg, 2000, 17).

The means by which the narrative of technological futurism draws upon inoculation as a rhetorical stratagem varies. The Sony QRIO, for example, uses a process of inoculation to speak specifically to the potential criticisms from human rights groups, and others with human rights concerns, who may question whether in fact these robotic technologies deserve the same protections and liberties as their human counterparts. Sony writes,

Having robots perform tasks in place of humans is 'helpful', but wouldn't it be 'fun' if people and robots could not only work together, but live together too? SONY decided to create a 'partner' that talks to you, plays with you, encourages you. And inside this small body, lives the same frontline technology and wealth of knowledge that fostered the development of SONY products like the HANDYCAM and WALKMAN.

By equating the QRIO with the handycam and the walkman, while simultaneously endowing it with the qualities of humanity, i.e. play, work, encouragement, learning etc., Sony is able to deal with possible opposition by dealing with openly – even raising the issue itself.

Neither-Norism

The next rhetorical form, neither-norism, as Barthes' succinctly explains, "consists in stating two opposites and balancing the one by the other so as to reject them both" (Barthes, 1970, 153). It results in the dismissal of alternatives by reducing them to analogues and equating one with the other. Hence, "one no longer needs to choose, but only to endorse" (Barthes, 1970, 153). A potent example of a neither-norism can be seen in the following passage,

We're talking about entertainment robots in general, beyond QRIO. What I would like to make is a robot companion for human beings. To give you just one example, a robot can hold things in its memory indefinitely. The hardware might break down over the course of many years, but by taking the memory stick and putting it in a new robot you could transfer those memories to it. And in doing so, share with it a short time's worth of memories and knowledge and visions. In some ways, I think a robot could be the ultimate companion. Or yet another idea would be a robot that listens to you. The basis for this is the active listening method of counseling proposed by one Carl Rogers, wherein the counselor gives no information, simply listens. A robot can do that too. A robot can listen to complaints, share information, and be a counselor anytime, day or night.¹⁰

This specific example of neither-norism is a slightly more implicit than the examples Barthes gives in his text of "Myth Today." Here, the scientist being interviewed, through his framing of the robotic QRIO technology and its capabilities, takes hold of the importance of human memory and friendship, disparages them as on the one hand fallible and, on the other, passive and replaceable, renders them equal, and thus implicitly advocates that replacing memory and friendship with the QRIO is both desirable and necessary: "The entire debate is thus dismissed by imposing an equivalence of approximation errors by fiat" (Dasgupta & Cullenberg, 2000, 19).

¹⁰ Accompanying the QRIO advertisement or, arguably, within it are four interviews with its four creators from which this quote has been taken.

The Privation of History

The third rhetorical form is the privation of history which, as the phrase suggests, implies a neglect of origin, of history, of struggle, etc. It also potentially implies the naturalization of entities, of ideas, of social formations by removing all trace of origin or choice (Dasgupta & Cullenberg, 2000, 20). As Barthes asserts,

Myth deprives the object of which it speaks of all history...all that is left to do is to enjoy this beautiful object without wondering where it came from. Or even better: it can only come from eternity: since the beginning of time, it has been made for bourgeois man...all one has to do is to possess these new objects from which all soiling trace of origin or choice has been removed (Barthes, 1970, 151).

Within the context of Sony's QRIO, the privation of history stratagem is visible in two areas. The first instance occurs in the section of the advertisement which delineates QRIO's '*story*.' In this section, a connection is made linking QRIO's creation, that is, the creation of robots in general, with industry: "Until a decade ago, the word 'robot' was associated primarily with industry. Having robots perform tasks in place of humans is 'helpful' but wouldn't it be 'fun' if people and robot could not only work together, but live together too?" Arguably, the mass roboticization and automation of industry from the 1920s on, beginning with Fordist mass production and later computer automation, had other social consequences beyond simply being 'helpful' and 'fun.' The second example of privation of history, within the context of the narrative of technological futurism, takes place in a section labeled 'QRIO's History.' In this section, a detailed account of QRIO's genesis, from the announcement of its SDR-4X backbone technology on November 21st, 2000 to its January 26th, 2004 performance in 'Astroboy,' is documented and presented

such that QRIO appears to have been developed in a social vacuum. That is, the history of robot technology in relation not only to work but also to its rich social history in science fiction, as at once the harbinger of harmony and the death knell of humanity, is left unexplored and, as such, “We can see all the disturbing things which this felicitous figure removes from sight: both determinism and freedom” (Barthes, 1970, 151).¹¹

Identification

Identification, the fourth rhetorical form in service of the narrative of technological futurism, implies the discursive reduction of otherness to sameness for the purpose of assimilation, security, and stability (Barthes, 1970, 151-2). This process of finding out, “what forces already at work can be reinforced so that they can move toward the desired change and how the conditions that oppose change can be gradually weakened” (Dewey, 1990, 292), is essential to Barthes’ notion of identification because of its ability to circumvent potential criticisms. If, however, the ‘Other’ is found to be irreducible, it or ‘they,’ as is often the case with social groups, are relegated to the domain of spectacle, or of pure object. Specific to the Sony QRIO, identification operates through the aesthetic form of the technology which is based on a human prototype such that we are able to identify with it on two levels: as an example of a miniature person as well as, as an object in service of people. Toshitada Dai, one of the QRIO’s creators, when asked what he thought the ‘character’ of the robot was, stated,

We suggested the idea of an "eight year-old space life form" to the designer -- we didn't want to make it too similar to a human. In the background, as well, lay an

¹¹ Possible dangers include a return to slavery (humans over intelligent robots or vice versa), the danger of self-replicating robots dominating the human species. The possibility the robot technology may be used in service of ethnic cleansing etc.

idea passed down from the man whose work forms the foundation of the Japanese robot industry, Masahiro Mori: "the valley of eeriness". If your design is too close to human form, at a certain point it becomes just too . . . uncanny. So, while we created QRIO in a human image, we also wanted to give it little bit of a "spaceman" feel.

The designers and advertisers have thus walked a very fine line between the two types of identification thereby attempting to reap the benefits of both. Additionally both examples invoke the future but also contain the threat or risk of the future by using a human prototype yet commenting on the eeriness of such a similarity.

The Quantification of Quality

The quantification of quality form of rhetorical construction entails the process of reducing quality to quantity such that truth and reality are understood economically. According to Barthes, "By reducing any quality to quantity, myth economizes intelligence" (Barthes, 1970, 153). This further entrenches an excessively positive and futurist depiction of technological innovation. The example Barthes gives is that of dramatic art whose inner dignity and intuitive appeal has been quantified and thus maligned through tiered ticket prices and conspicuous special effects. Specific to the narrative of technological futurism as evidenced through the QRIO, quantification of quality can be discerned in several areas, including its price, but what I will focus on is how it has been used to describe QRIO's various capacities. In a section entitled, *QRIO's Technology*, four subsections have been created within which a detailed explanation of QRIO's wide range of capabilities is given. These sections include; 'Walking Stably,' 'Surviving a Fall Unscathed,' 'Remembering People,' 'Talking; Seeing and Acting,' and 'Living with People.' Within 'Living with People,' QRIO is sold as a technologically rich

and state of the art robot equipped with: “wireless networking equipment; miniaturized, high-density technology; precision mechanisms; pinch detection sensors; lightweight and quiet construction; safety cover; shock resistance; heat dispersal; and long-lasting lithium-ion batteries” which, cumulatively, quantify and confer substantial weight to QRIO’s power. Hence this technology’s essential value and potential social import is reduced from a discussion of the complexity of technological innovation and human adaptation to technology, to technical jargon and performance related capacities thus reifying and further entrenching the myth of technological futurism in its narrative form.

Tautology and Statement of Fact

Although these final rhetorical forms are presented separately by Barthes in, “Myth Today,” I have combined them in this final section because of their mutual support of one another and the proximity of their objectives. Tautology, according to Barthes, “is a verbal device which consists in defining like by like (*‘Drama is drama’*)” (Barthes, 1970, 152). It is thus the place where fear, anger, and failure must take refuge when, “one is at a loss for an explanation” (Barthes, 1970, 152). Because tautology implies a degree of interaction and discourse, it must be supplemented by the statement of fact rhetorical form to be used within the context of advertising, with respect to technology and futurism, such that a proper analysis can occur. The statement of fact then, much like tautology, consists of investing proverbs and other so-called ‘truisms’ with a universal hold on truth. It,

[Buries] the traces of production under a self-evident appearance of eternity: it is a counter-explanation, the decorous equivalent of a tautology...The foundation of the bourgeois statement of fact is *common sense*, that is, truth when it stops on the arbitrary order of him who speaks it (Barthes, 1970, 152-3).

The advertisement for Sony's QRIO, for example, draws on both tautology and statement of fact through its matter of fact depiction of the QRIO which is said to, unequivocally, "make life fun...make you happy...QRIO's dreams are limitless. But one is clear-to make your life fun and happy." As such, there is little room for negotiation or debate because of the self-evident nature of the assertions themselves.

Chapter Three: Wearable Computing Advertisements and the Futurist Myth

The four advertisements I have chosen to examine in detail include xybernaut's Mobile Assistant V, Symbol Technology's WSS device, Open Inc.'s SafetyPAD, and xybernaut's XyberKid device. These particular advertisements were chosen after extensive web and magazine searches because they are all indicative of one particular and highly futuristic trend: wearable computing. Wearable computing can be defined as any technology which,

Facilitates a new form of human-computer interaction based on a small body-worn computer system that is always on and always ready and accessible. In this regard, the new computational framework differs from that of hand held devices, laptop computers and personal digital assistants (PDAs). The "always ready" capability leads to a new form of synergy between human and computer, characterized by long-term adaptation through constancy of user interface (Young, 2002, 22).

Because these particular manifestations of futurist technologies attempt to transcend the materiality of the body, through the fusion of man/woman and machine, it is particularly pertinent to the postmodern element of the thesis at hand.¹² I would argue that these technologies express a tension between modernity and postmodernity in that they continue to draw upon the myths of futurism, the sublime, progress, and religiosity, yet also go beyond this through a postmodern attempt at merging technology with the human body for the purpose of achieving a state of individual authenticity and technological perfection.

¹² A primary claim of many postmodern technological thinkers is the transcendence of the body through technology.

These advertisements will be analyzed through the narratives of the technological sublime, the mythos of technological progress, or the religiosity of technology in order to highlight how each advertisement produces and normalizes the power of each myth. A final advertisement (XyberKids) will then be evaluated using all three of these narratives in order to illustrate how they operate to support the larger narrative of technological futurism.

The precise process of choice involved the creation of a file with various high-technologies from MIT's computing media labs, to University of Toronto Professor Steve Mann's website, and even Seiko Instruments from which advertisements were selected based on criteria of clarity, corporate status, novelty (specific to the technology), possible usefulness, and, finally, universality, that is, is this technology and the way it has been framed indicative of a larger trend? The richness of image and text within the chosen advertisements was also pivotal to my selection process because of the level of analysis this depth allows. However, often, particular to MIT's work, the technologies were depicted as 'works in progress' rather than as commodities existing within a production-consumption relationship which, because of their preliminary technological status, I have chosen not to examine. I would argue, however, that the study of research clusters, and the way these clusters frame and discursively construct their technologies, is a potential area of further analysis using the strategies I have laid out here.

Mobile Assistant V

The first advertisement to be analyzed is for xybernaut Corporation's Mobile Assistant V technology (See Appendix 2). Xybernaut's Mobile Assistant V technology is the fifth monetarily successful effort by xybernaut Co. to build a task-oriented high technology device created for the purpose of "empowering the mobile worker" to communicate with other workers and to "manage tasks, retrieve and send data, review plans, and even learn on the job." It is essentially a wearable and portable computer which can be attached to clothing and used as a source of information and communication both on the job and for leisure. Technicians, quality control specialists, aircraft mechanics, military professions, and even health workers, as the advertisement argues, will benefit from this centralized, efficient, instantaneous, and cost-effective device. In addition to workers, another demographic targeted by the advertisement are everyday users who can profit from this technology during travel or leisure. Photographs depicting each of the afore-mentioned professions using the Mobile Assistant V, and smiling, are included both within the advertisement and on the first page. Also on the first page, is a time-clock juxtaposed against four pictures of satisfied workers thus signifying the efficacy and productivity-enhancing capabilities of this device. In the following sections I will use this advertisement as an example of the myth of technological progress.

Inoculation

The process of inoculation occurs within the advertisement on two levels. The first level occurs through the intentional juxtaposition of text and images which sends contradictory messages about nature, people, machines, and the condition of their relationship(s) with

one another. Within the images, workers are depicted as possessing the capacity to interact with and utilize the Mobile Assistant V within the natural world effortlessly. That is, there are no pictures depicting harsh environmental conditions to overcome or difficult terrain to conquer; nor does the technology appear out of place in its interaction with people and the natural world. Thus, nature is depicted as passive and the Mobile Assistant V is portrayed as existing and functioning seamlessly with individuals situated and working in a 'natural' environment. This ethos of natural-technological-human synchrony not only underlies economic progressivism, in which profitability and productivity is promised through seamless technological integration, but also its technocratic counterpart whose promise of social, cultural, natural, and political harmonization through technological advance is simultaneously expressed and accepted.

Conversely however, within the text, xybernaut's use of technocratic and progressive jargon to characterize the Mobile Assistant V as "powerful, rugged, fully functional" in the beginning of the advertisement and later, again, as having the capacity to, "bring the power and functionality of a state-of-the-art desktop computer into the remote, rugged, and space-constrained environments that highly mobile workers experience everyday," constitutes a reversal of the harmonious depiction of man/woman and machine existing within nature. Thus, xybernaut is successful in inoculating against prospective opposition to the potentially pervasive, jarring, and ineffective injection of technology into the life of the mobile worker through its use of images while, simultaneously, lauding the capacity of Mobile Assistant V to overcome an irrational natural world through its discursive use of text. It therefore reaps the benefits of allowing both versions of the human-machine-

nature relationship which, when considered in conjunction, renders the advertisement that much more powerful and persuasive. It could also be argued that the workplace, rather than nature itself, is framed as 'natural' within this advertisement – thus illustrating the profound separation between humanity and the natural world the myth of technological progress cultivates.

The second instance of inoculation occurs through xybernaut's characterization of Mobile Assistant V as an 'empowering' technology which can be successfully utilized in almost any context. By consistently referring to the technology as 'empowering,' any concerns related to worker displacement, as a result of automation and digitization, are negated. The advertisement explicitly claims that the Mobile Assistant V will, "[eliminate] repetitive data entry resulting in reduced errors...[provide] instant access to enterprise systems and task critical information..[and allow for] multimedia enhanced tele-maintenance." The jobs and livelihoods potentially lost by this increased efficiency are, however, offset by a discursive reliance on the language of techno-empowerment which, as the advertisement intimates, facilitates workplace flexibility, increases safety, and promotes authentic participation in the work process. The advertisement thus inoculates itself against, "the risk of a generalized subversion" (Barthes, 1972, 150), through the language of emancipation and technological progress thereby enhancing the myth of futurism upon which it is based.

Neither-Norism

Barthes' neither-norism rhetorical form can be discerned within this advertisement through the 'scenario section' which, by juxtaposing successful instances of use with one another, communicates implicitly what will occur if the Mobile Assistant V is not actively utilized in the workplace. As such, the negative corollaries of each of these scenarios are then reduced to analogues, made equal, and therefore dismissed as ridiculous:

Scenario 1: A maintenance technician on a pole repairing a telecommunications line accesses detailed schematics and confirms a work order in real time to quickly restore phone service to customers.

Scenario 2: A quality-control inspector with speech recognition software and diagnostic equipment instantly communicates defect information to an up-stream co-worker to correct a deficiency in the manufacturing line.

Scenario 3: An aircraft mechanic instantly accesses maintenance schedules and reference diagrams without leaving the plane to reduce maintenance time and decrease flight delays.

Scenario 4: A remote expert walks military field personnel through complex installation procedures with streaming video guidance from anywhere in the world.

Scenario 5: An EMT wirelessly relays critical patient information at the scene and in route to the emergency room so that critical equipment and medical professionals are prepared to provide immediate treatment.

In scenario one, the negative implication is that phone services will be left unrestored due to the inability to access schematics and confirm work orders, while in scenario two the negative implication is lost time and productivity. Scenario three's negative corollaries are less efficiency and persistently delayed flights; number four's can be linked to a decreased level of safety and a higher number of potential casualties, while scenario five's ultimate negative consequence can be death due to ineffective health care delivery. By obliquely alluding to these corollaries, condensing them, and connecting them to one another it becomes almost automatically accepted that to use the Mobile Assistant V is to

reject inefficiency, lack of security, tardiness, and reduced personal safety outright.

Additionally, the positive manifestations of each of these scenarios – efficiency, security, health etc. – are in line with a technocratic narrative of progress which gages progress in terms of increased efficiency such that, “The result [of technological innovation, i.e. the Mobile Assistant V] is productivity gains in the work force, improved quality of service for your customers and a measurable return on investment for your organization.”

The Privation of History

Barthes’ privation of history rhetorical strategy can be perceived via the ahistoricism underlying the entire advertisement. The individual titles of each of the sections within the advertisement are a testament to precisely this fact. They include: Technology for the Task-at-Hand, Skill Extending Functionality, Computing without Compromise, and Specification. Each section outlines possible contemporary workplace problems and barriers to productivity – all of which the Mobile Assistant V, through technological efficacy, extended functionality, novel computing applications, and malleable specifications, can and will overcome. Moreover, by focusing on Mobile Assistant V’s, “state of the art functionality [replete with] enough power to run enterprise applications,” on ergonomics, efficiency etc., it becomes difficult to perceive this technology as having been developed in anything but a socio-historical vacuum because of the focus placed on its ability to increase productivity and profits in the present. One might ask: What about the persistent privacy infractions technologies like the Mobile Assistant V have historically facilitated? What of the energy costs? Of potential waste (once the technology has been obsolesced)? And what about the socially and historically

problematic effects of job displacement, work rationalization, and surveillance? All these questions are disregarded through the privation of history. As such, progress is defined both technocratically, since the focus is on manipulation, control, and efficiency, and economically, since the objective of the Mobile Assistant V is to enhance profitability and transcend the constraints of the workplace through the technological empowerment of the worker.

Identification

Identification is an important discursive tool used frequently in xybernaut's advertisement of Mobile Assistant V and can be detected within the numerous 'technology-as-tool' characterizations of this artifact. By consistently referring to Mobile Assistant V in terms of "efficiency, productivity, teamwork, and job satisfaction," "seamless integration," "ergonomic comfort, and function issues," and as part of xybernaut's extensive range of "products that empower users to achieve the tasks-at-hand," it becomes apparent that this approach is meant to constrict our view of technology in service of an overall ethos of conceptual, "assimilation, security and stability" (Barthes, 1970, 152). Hence any debate around the capacity for technology to change the nature and experience of work, as well as the users themselves, is negated. This technology-as-tool paradigm of communication studies, otherwise known as the social constructivist school of thought, is particularly revealing in the context of the myth of technological progress as it operates in this specific instance of identification. It has such adherents as Harry Braverman and Hughie MacKay who argue that, "technologies emerge out of processes of choice and negotiation between relevant social groups"

(Somerville, 1997, 1), while, conversely, theorists like Bruno Latour argue for bridging the divide between society and technology. These latter theorists also insist upon the non-passivity of technical forms such that, “sociotechnological change and development [become] addressed through the concept of the actor-network. The essential element of this approach is the way it links technological and non-technological (human, social, organizational) elements together into networks and does not distinguish them into hierarchies” (Somerville, 1997, 3). Taken to its extreme, the social constructivist approach, as evidenced by xybernaut’s advertisement – and specific to the domain of advertising – successfully uses identification to constrict the range of possible perspectives vis-à-vis technology through its contextualization of the Mobile Assistant V as a pure object and through its identification of alternative views as, “a scandal which threatens [its] existence” (Barthes, 1970, 151). In regards to the narrative of technological progress, because technology is being viewed as a passive object created and used at the behest of humanity, it also implies a specific view of evolution in which the degree of complexity indicative of the technologies of a given culture are used to gage the progress that that social system has made.

The Quantification of Quality

It is through the focus on power, technological specifications, and overall functionality that the Mobile Assistant V economizes intelligence and achieves the quantification of quality by focusing solely on capabilities of scale.¹³ In a section entitled ‘Computing without Compromise,’ xybernaut characterizes their technology as, “a robust, full feature

¹³ This would be in opposition to ‘capabilities of scope’ which would focus more on quality and less on raw power-which this advertisement tends to do.

computer that integrates seamlessly with standard computing technology,” containing the following features:

A 500 MHz Intel® Mobile Celeron® computer provides state-of-the-art functionality with enough power to run enterprise applications. An integrated Digital Signal Processor (DSP) increases processing efficiency for calculation intensive applications, such as speech recognition. An ultra low-voltage, lowheat CPU, powered by rechargeable, hot-swappable Lithium-ion batteries allows users to stay on the job longer.

In another area, the advertisement lists all of Mobile Assistant V’s various specifications from ports to audio/visual, and the CPU chassis to its XyberKey Wrist-worm Mini-Keyboard. Thus, by placing so much attention on quantified power and technical attributes, quantification of quality naturalizes conspicuous effects as the sole indicator of what is good, worthy, and valuable. This penchant for effects is relevant to and indicative of the mythos of technological progress because progress is characterized within the advertisement as technology-driven, “irreversible and unceasing...[while being] increasingly embodied through its instrumentarium...and through image technologies” (Ihde, 1992, 383).

Tautology and Statement of Fact

These final rhetorical devices can be observed in xybernaut’s advertisement first through its matter-of-fact characterization of the Mobile Assistant V’s ability to augment, emancipate, and revolutionize social life through its unequivocal adoption. Again, this depiction of Mobile Assistant V as, “The Ultimate Productivity Tool,” capable of “Empowering the Mobile Worker,” is distinctively tautological because of its tendency, “to take refuge behind the argument of authority” (Barthes, 1970, 153). There is thus no

room to critique and/or question the mythos of technological progress (within the context of the advertisement) due to the universality of the mythology made possible by these rhetorical forms. Second, the advertisement also draws upon technical ‘truisms’ including ‘seamless integration,’ ‘full-featured,’ ‘instant access,’ and ‘just-in-time’ to universalize and cement its hold on truth, “under a self-evident appearance of eternity” (Barthes, 1970, 154-5). As in all other categories, progress assumes a distinctively technocratic and economic manifestation through a repeated espousal of technological and economic optimism. Moreover, it is the emphasis on these particular ‘truisms’ which further supports the progress mythology through the operation of the technological imperative which stresses the idea that, “if something can be done, it should (and inevitably will) be done” (Besser, 1993, 73).

Technological Progress & Mobile Assistant V: Commentary

Cumulatively, xybernaut’s advertisement for its Mobile Assistant V technology is useful as an example of a wearable technology advertisement guided by the narrative of technological progress. It draws upon all possible rhetorical strategies as delineated by Roland Barthes to solidify the technological imperative of progress which appears to guide our social world. In the privation of history, for example, this advertisement glosses over historical problems with technology, including that of privacy and energy, and opts instead for a technocratic interpretation of progress and value. This focus on the myth technological progress fails to adequately contextualize technology and growth in general. As Shallis argues,

The imperative implies that the invention of a new technique demands its adoption and development, and although there are countless examples of ‘useless’

inventions that no one wants and which are not developed but fade away, the general tendency has been to pursue possible developments for their own sake. The technological imperative concerns that self-motivated pursuit and implies that it is somehow inevitable... Technology is promoted... as if the idea of the imperative was true. (Shallis 1984, 64-5).

What is most important, however, are the possibilities which exist around a postmodern reconceptualization of the human-technology-natural world relationship – the cyborgian beginnings of which are evident within this advertisement and exist in tension with the myth of technological progress.

WSS Technology

The WSS 1040/WSS 1060 technology, manufactured by Symbol Technologies Inc., is a high-technology device that advances a technocratic logic and is framed by the narrative of technological sublime. Again, using Barthes' rhetorical mode of myth analysis, I will attempt to unpack and study the operation of this narrative in its various forms. I have chosen, within the analysis, to combine the individual advertisement for WSS with its corporate parent's introductory advertisement because of the orientation it gives readers of these advertisements into the mandate, purpose, and objectives of the company, as well as further contextualizing the technology it is attempting to sell.

The WSS is a wearable scanning system meant to be used primarily for business purposes which, as the advertisement asserts, can be used in, "warehousing, transportation/logistics, manufacturing, retailing and other industries including e-commerce." It differs from the Mobile Assistant V both in its function and the fact that the particular human capacity it is attempting to obsolesce is human vision. In this respect, the WSS is particularly postmodern.¹⁴ In the past, wearable scanning systems have been developed specifically to replace older barcoding technologies which, as Stein, Ferrero, Hetfield, Quinn, and Krichever of Symbol Technologies Inc. argue, "will increase efficiency and productivity through mobility and hands-free computing and scanning" (Stein, Ferrero, Hetfield, Quinn, and Krichever, 2003, 2). This device is further touted on Symbol's website as a technology which successfully fulfills their corporate mandate to

¹⁴ It is postmodern because postmodernity attempts to transcend the body and human capabilities.

be a, “leader in enterprise mobility solutions that create new advantage – streamlining supply chains; empowering people to do more with less; driving productivity and profitability.”¹⁵

Inoculation

Inoculation is apparent within this advertisement through the technology’s intensive focus on comfort, safety, and reliability. Consider the following:

The WWC 1040 and WWC 1060 wrist computers offer powerful information gathering, processing and communications performance, yet are easy to use. They feature a programmable keyboard and backlit display, both optimally positioned for effortless keypad input and viewing, even in dimly lit environments... Symbol’s design engineers thoroughly tested these Wearable Scanning Systems, putting them through more than 40,000 user test hours with active customer participation. The result is maximum comfort and flexibility plus proven performance. The RS 1 Ring Scanner fits fingers of all sizes and is reversible, allowing it to adapt equally well for right- and lefthanded users. The lightweight wearable wrist computers adapt to fit every wrist. Both the ring scanner and wrist computer mount to straps that stay with each operator, eliminating worries about hygiene. Safety is not a concern because the ring breaks away under 20 lbs./9kg of pressure.

Arguably, the principal hesitations concerning a business’s decision to adopt technologies like the WSS, as evidenced by the excerpt above, can be related to: first, whether or not the investment will increase returns, second, whether its employees will enjoy and feel safe using it,’ and third, whether or not the technology actually operates in the manner it is purported to. By directly acknowledging these potentially problematic areas, Symbol Technologies successfully deals with reservations owners, shareholders, and employees are likely to hold. The technology is thus portrayed as user friendly, accommodating both “right-and lefthanded users;” safe, “since the ring breaks away under 20 lbs./9kg of

¹⁵ <http://www.symbol.com/about>

pressure;” efficient, through its ability to offer, “powerful information gathering, processing and communications performance;” and comfortable, based on tests which ensure, “maximum comfort and flexibility plus proven performance.” This strategy thus successfully maintains a level of conceptual coherence and a ‘balanced economy’ by, “means of a small inoculation of acknowledged evil” such that, “one thus protects it from the risk a generalized subversion” (Barthes, 1970, 151).

These elements of competence, effortless usability, security, and adaptability are particularly pertinent and applicable to the technological sublime through the discourse of empowerment and security. Feelings of empowerment are indicative of an ethos of the sublime before its technocratic transformation in the sense that, as Kant conjectures, it is through our interaction with innovative and powerful technological and natural devices we, as social beings, can transcend fear and, “recuperate a sense of self-worth because the mind is able to conceive something larger and more powerful than the senses can grasp” (Nye, 1994, 7).

Neither-Norism

This particular stratagem functions in the service of the narrative of technological futurism within Symbol’s WSS advertisement much in the same way as it did in relation to the Mobile Assistant V. That is, through the use of negative corollaries drawn upon in a section detailing the features and benefits of the WSS :

Features:

1. Data management system
2. RS 1 Ring Scanner—the world's smallest wearable scanner.
3. Ergonomically designed miniature computer with backlit display and programmable keypad.
4. 11 Mbps direct sequence (DS) high data rate (WSS 1060).

Benefits:

- User's hands are free to handle worn on the index finger materials and perform other tasks and forearm.
- "Point-and-scan" data capture is comfortable and reliable.
- Powerful computing and communications capabilities can go anywhere—even dimly lit environments.
- A high-performance wireless network solution for wide bandwidth applications.

By linking data management to ease of use; size to comfort and reliability; design, display, and functionality to power and range of operability; and, data rate and efficiency to performance and problem solving, this advertisement successfully compels its consumers to reason that without this technology, one's workplace would be transformed into one characterized by an unpredictable, difficult, powerless, inflexible, inefficient, stagnant, and problem-ridden environment. It would also imply that the workforce would be unable to cope with the range of demands placed on it. These seven negative corollaries are thus reduced to analogues, subsequent to their correlation with one another, and dismissed, thereby enhancing the authority of the narrative of technological futurism to dictate the objectives, values, and vision of both technological and economic development. Alternatives are also dismissed in this process of neither-norism since, as Barthes argues, they create an environment in which the, "physical [or technological] plenitude establishes a kind of moral clarity" (Barthes, 1970, 131).

Turning to the myth of the sublime and specific manifestations of it within this instance of neither-norism, it becomes evident that this particular instance of the sublime narrative, in which technology becomes the, “expression of our culture, encoded with our dreams, purposes and insights, and limitations” (Staudenmaier, 1990, 710), is predominant. That is, the largely technocratic or efficiency-driven context of this advertisement successfully replaces the previous aesthetic conception of the sublime, which referred to attempts to, “represent the majesty, grandeur, and awe of nature” (Kellner, 1999, 170), and instead, technological innovation and the values of efficiency inspire the admiration once left to the natural world.

The Privation of History

The privation of history rhetorical stratagem is used within the WSS advertisement through a concentrated focus on the present and a vision of the future devoid of both context and history. An example of this denial of context can be seen in the advertisement’s opening sentence in which Symbol Corp. states, without any further elaboration or contextualization. “Today, one company provides the tightly integrated capabilities that not only make enterprise mobility work, but that make it an enabler of real advantage: Symbol. The Enterprise Mobility Company.” The following inventory of benefits which will inevitably flow through the use of the WSS is also indicative of this ahistoricism because of their wider implication that mobility, wireless capability, centralized monitoring, and networking are the most important issues of innovation and technological growth,

Mobile computing and advanced data capture systems work consistently and reliably in even the most demanding physical

environments.

Wireless network infrastructure functions persistently and securely while integrating with other enterprise networks.

Monitoring and management capabilities provide centralized visibility and control of thousands of devices across multiple networks and locations

Specialized mobility services – from design to deployment to post-deployment – optimize solutions on an ongoing basis.

A global network of **business partners** provides industry-leading applications, added value and integration services.

These benefits of mobility, wireless functionality, management, service, and potential business networking opportunities, when taken in conjunction, operate on the premise that technologies like the WSS are socially constructed, value neutral, and ahistorical artifacts which emerge through a complex process of action and interaction between a heterogeneous milieu of players, rather than being determined by any one player (an issue I brought up earlier) (Pinch and Bijker, 1984). The problem with this perspective is that potential problems with technology, whether social, political, economic, or ecological, are never anticipated. Could, for example, such human-technology coupling lead to an ill-advised transformation of human values, increased surveillance, erosion of privacy, increased workload, policy problems (both nationally and internationally), a further separation of the technologically rich from the technologically poor, conspicuous waste, and potential economic stagnation as opposed to increased returns, flexible work, safety, integration, workplace solutions, and value-added services? I would argue that is only through a historical reading of technology, the claims made around it, and the consequences which have resulted that such technologically optimistic assertions, as those delineated above, can be either avoided or read more critically.

As for the narrative/myth component of this advertisement, in relation to this particular rhetorical form, an interesting example of the rhetoric of the technological sublime can be perceived through its focus on the potency of technology's ability to solve problems proactively and in conjunction with humanity. In particular, neither-norism and the quantification of quality accomplish this best through their specific focus on how the technological capabilities of the WSS, including its design, display, and interoperability, can operate as workplace panacea thus solving all workplace problems. This, in turn, is meant to excite within us a populist and participatory vision of the technological world and our collective futures. The sublime element of this vision resides in the notion that it is through technology that humanity's hopes and dreams will be realized and that technology, nature, and humanity can coexist harmoniously.

Identification

Identification can be identified within the WSS advertisement in its very first section, entitled 'Breakthrough Technology and Ergonomics Revolutionize Workplace Productivity,' through its portrayal of technology as pure object which, in turn, communicates to the viewing audience that the WSS is in fact an innocuous machine capable only of augmenting human experience:

The WSS 1040 and WSS 1060 Scanning Systems from Symbol Technologies help users achieve new levels of productivity and accuracy while advanced ergonomics make them easy to use and comfortable to wear. Scanning, portable computing and wireless networking can now be performed while the user's hands remain totally free. Plus, the WSS 1040 and WSS 1060 systems represent breakthroughs in miniaturization, performance and data transmission. These new capabilities can increase productivity and ease of use in warehousing, transportation/logistics, manufacturing, retailing and other industries including e-commerce.

Thus the WSS is simply a tool through which productivity, accuracy, comfort, ingenuity, and performance is enhanced. By identifying and reducing Symbol Corporation's technology to an object, a spectacle – it follows that critical analysis is unnecessary in the context of such an innocuous device. Technology, in this view, is, “pure instrumentality, is indifferent to the variety of ends it can be employed to achieve. Thus, the neutrality of technology is merely a special case of the neutrality of instrumental means, which are only contingently related to the substantive values they serve” (Feenberg, 1991, iv).

In another instance, identification can also be discerned through the advertisement's intensive focus on “tightly integrated capabilities, “centralized control,” integration, and interoperability which anticipates a potential civil liberties critique of the WSS that admonishes such technologies for facilitating workplace surveillance and infringing upon the privacy rights of workers. By tightly integrating and highlighting the benefits of such centralized capabilities, this advertisement is successful in reducing otherness to sameness for the purpose of maintaining stability and conceptual cohesion.

Through both instances of identification, an optimistic vision of the technological future is perceptible, as is an ethos of technocratic sublime, which, when combined, lends credence to the notion that the humans, machines, and the entire social world can exist collectively in what Leo Marx refers to as, “middle landscape” where people, technology, and the social world together construct a pastoral landscape of apparently harmonious continuity (Harsh, 2003, 23). This is evident due to the positive contextualization of such functionalities as centralization and control and the simultaneous cooptation of pessimism which results – thereby communicating the adaptability and

innocuousness of this device. In addition, because of the reduction of this technology into pure object or spectacle, the sublime also operates by engendering in the audience the notion that it is through the appropriate application of technical knowledge that, “technology [can and will] engender epochal transformations of the human condition” (Routledge Encyclopedia, 2002, 42) through breakthroughs in technology, efficiency, and productivity.

Quantification of Quality

Quantification of quality occurs throughout this advertisement and it is arguably the most relied upon rhetorical form. The economization of truth and reality, through a focus on quantity as opposed to quality, can be seen most dramatically in an extensive section entitled, “Wearable Scanning Systems Specification Highlights.” The pure breadth and depth of this section is striking and it is clear that its inclusion is meant to amplify, within the audience, a clear conception of the range of positive technologically-induced benefits, and thus prestige, of this device. This section is divided into two sections based on the WSS scanner’s technical components entitled, ‘WWC 1040 and WWC 1060 Wearable Wrist Computers,’ and ‘RS 1 Ring Scanner.’ These two sections are further divided into the categories of, ‘physical characteristics,’ performance characteristics, ‘power,’ ‘user environment,’ ‘regulatory,’ and ‘wireless communication.’ Each category then expands upon the specifics of, for example, the degree of battery power, light, storage temperature, pitch contract, size, weight, color, dimensions etc., almost to the point of absurdity. The focus on technical capabilities also arises in other areas within the advertisement.

The WWC 1040 and WWC 1060 wrist computers offer powerful information gathering, processing and communications performance, yet are easy to use. They feature a programmable keyboard and backlit display, both optimally positioned for effortless keypad input and viewing, even in dimly lit environments. They weigh just 11.3 oz./316 gm and are powered by a long-lasting lithium ion battery. The ring scanner and computer are connected via an unobtrusive, lightweight cable.

An open and unquestioning embrace of technology, through the quantification of quality, then becomes the logical, perhaps even the inevitable, consequence which, in turn, results in conspicuous effects replacing negotiated, quality technological advance.

Within the examples of the quantification of quality rhetorical form, a unique instance of the narrative of the technological sublime can be identified operating through two out of its three possible manifestations. Its first instance occurs in accordance with a 'Websterian'¹⁶ approach to technology in which technological tools are viewed as consistent with and capable of adapting to the natural world. The use of language such as 'unobtrusive' and 'effortless' within this advertisement are testament to precisely this ethos. Conversely, the sublime can also be discerned within this rhetorical form (specific to the WSS) through displays of technical ingenuity, including the listing of such theoretically tight terms and categories as 'physical characteristics,' and 'power,' which cumulatively, as Leo Marx argues, invokes in us the sentiment that the evolution of human knowledge, "has accomplished revolutions in the character and condition of the human race so beautiful and sublime as to excite in every observing mind feelings mingled with the deepest admiration and astonishment" (Marx, 1964/2000, 197). As

¹⁶ Referring to Daniel Webster who, in the mid-1800s successfully toured the USA, as a politician, to gather support for the railroad and its capacity to co-exist peacefully with humanity and nature.

such, a sense of awe and wonder is potentially excited within the audience and the promise of technology to better social life is accepted unequivocally.

Tautology and Statement of Fact

These final rhetorical strategies have been utilized within Symbol Technology's advertisement for the WSS in several instances. The assertion that the WSS will, "help users achieve new levels of productivity and accuracy," whose, "super-smart algorithms, advanced mobility and security features, and much more combine to bring you the best in high-speed wireless LAN technology and services," are indicative of both tautology as well as statement of fact in that they facilitate the solidification of the narrative of technological futurism through the use of assumptive truths. In addition, the use of aphorisms including "high-speed wireless," and "high-performance," similarly reinforces myth because, as Barthes argues, "[it buries] the traces of production under a self-evident appearance of eternity" (Barthes, 1970, 155). These aphorisms and so-called 'truths' about technology are both futuristic and progressive in nature. They imply a sublime vision of technology coexisting with humanity, thereby augmenting human experience, and an ethos of revolutionary and emancipatory change, specific to the human and social condition. This is demonstrated through a reliance on technical jargon and innovative socio-technological claims which, together, signify a continuing faith that, "the latest technological gadgets...[constitute] a force *outside* history and politics," and that, "The future as it is provisioned is one in which cybernetic machines proved the dynamic of progressive change...[This] despite the manifest failure of technology to resolve pressing social issues over the last century" (Quirk, 1992a, 191).

Technological Sublime & the WSS: Commentary

The WSS is another example of a wearable technological artifact whose very creation, purpose, and objectives include boundless expansion, self-transformation, dynamic optimism, intelligent technology, and spontaneous order (Hughes, 2002, 3). Moreover, this technology draws heavily upon the narrative of technological sublime for its justification and overall validation. It is through Barthes' rhetorical mode of myth analysis the technological sublime can be discerned in this advertisement operating either as a source of reflection and pride, as in the example of inoculation; through technological optimism, as in the instance of neither-norism; or through harmonious human-nature-technology integration, of which tautology and statement of Fact are examples. As such, it is through the pervasive operation of the technological sublime that it becomes widely accepted that any problem created by technology will ultimately be solved by future innovation. As the advertisement states, this technology, through its 'super-smart algorithms, advanced mobility, and security features,' will enhance productivity, communication, and commerce to such an extent that it will revolutionize the workplace and, by extension, the social world. Existing in tension with this myth is a postmodern conception of the body as vessel capable of integrating seamlessly with technology. The implication of this co-existence, that is myth of the technological and the postmodern, is for the future of technological development which may be on an entirely different trajectory than it is in the present.

SafetyPAD

The SafetyPAD technology (See Appendix 4) is the third advertisement I will also present and examine as an example of a wearable, high-technology computing artifact and which both employs and relies upon a religious narrative of technology and innovation to validate its existence and communicate its benefits. This particular advertisement is unique in format in that it has been presented online by OPEN incorporated through a series of hyperlinked webpages entitled, “Product,” “Overview,” “Features,” and “Equipment,” all four of which are part of my analysis and have been included in the appendices.

The SafetyPAD technology is a wearable computing device created for EMS (Emergency Medical Services) professionals to safely store and quickly disseminate patient information when needed. As the advertisement argues, “improve efficiency, seamlessly collect, manage, and distribute information, possess critical outcome data to support your existence, not overburden medics and staff, enhance patient care, and still cut costs.” Its SafetyPADmobile and SafetyPADbase component systems, which comprise the SafetyPAD technology, manages, cross-references, shares, and distributes information about patients through an “intuitive pen and voice enabled interface [part of the SafetyPADmobile system],” meant for the purpose of enhancing medical delivery. It is characterized as a ‘pre-hospital’ information management solution capable of saving lives by correlating vital information with other institutions including hospitals, doctors, government agencies etc. Moreover, I have chosen OPEN’s technology to illustrate the

use of religiosity because this particular advertisement, more so than the other two, since out of technologies targeted specifically to issues of health, well-being, and mortality, like the SafetyPAD, rise the types of moral and ethical issues of which religion is comprised. This narrative manifests itself in three ways, in opposition to religious skepticism of technological advance, the triumph of humanity over the natural world, or in a religious-like belief in the capacity for technology to better our social world.

Inoculation

Barthes' first discursive form, inoculation, manifests within the SafetyPAD advertisement through the framework of cost. In several areas of the advertisement, the phrase, 'cut costs' or 'cost cutting' appears and is drawn upon in order to mitigate and circumvent potential cost-related concerns in relation to the technology itself as well as the cost of training people to use the technology. In its 'Features and Benefits' section, the SafetyPAD is endowed with the following monetary capabilities,

cut costs

Electronically managing information can drastically lower costs associated with gathering, assembling, distributing, analyzing, and utilizing information.

SafetyPAD is an effective electronic information management system that allows agencies to actualize significant cost savings

- Eliminate inconvenience and expense of using paper.
- End redundant, delayed data entry and transcription errors into other systems.
- All entities utilizing patient data (billing, QA/QI, administration, etc.) will realize significant cost savings.
- Reduce time and resource requirements needed to enter and manage information.

By directly and proactively acknowledging and co-opting the issue of cost, OPEN Inc. effectively mitigates a source of critique thereby reinforcing both the futurist mythology and the authority of the SafetyPAD technology itself. Another area in which inoculation

functions is within context of legality. As the advertisement states, again under the 'Features and Benefits' section:

legal protection

A complete patient encounter record is pivotal to a strong defense. SafetyPAD solidifies protection of pre-hospital care providers from litigation by insuring comprehensive documentation."

- Content-sensitive guidelines to augment appropriateness of care.
- Insure regulatory compliance.
- Decrease liability exposure with comprehensive documentation of findings, rule-outs, etc.
- Confidential data protection and encryption capabilities.
- 'Active Guidelines' feature leads to accurate and complete reporting.
- Significantly reduce errors and omissions.

Fundamentally, it is through the ready acknowledgment of possible dissonance, such as cost, legality, and even waste – a traditional concern of the environmentally conscious –, that inoculation functions so successfully. The concerns around centralizing medical information in a database, in relation to legality, which this advertisement addresses through inoculation is two-fold. The first pertains to doctors and health care professionals concerned about the legal ramifications of medical mistakes, including missed patient allergies, past medical history, and mix-ups in general, while the second, relating to the patient, has to do with privacy and confidentiality of the individual vis `a vis health and disease. By indicating that the SafetyPAD possesses the solution to both the health care provider and patient's concerns, the coherence of myth is maintained and even strengthened.

Within this context, the narrative of religion is both evident and active. Religiosity manifests as both technocratic and secular rather than overtly religious through this rhetorical form's focus on the rational, cost-effective, and quantitative corollaries of

technology – all of which are modern Enlightenment ideals. It thus becomes evident, as Jacques Ellul and Kanigel argue, that,

The "prime characteristic"—indeed, the "supreme imperative"—[of innovation] is the principle of least effort or efficient ordering (Ellul, 1985, 151). This includes rationalization, measurement, standardization (e.g., of the production process), linearity, segmentation, simplification, minimum waste, and speed. Human values [including any allusion to religion] are filtered out except where they facilitate the technical means which are omnipotent and often "unfriendly," thereby requiring the user-friendly convention. No real choice exists among technical methods: after all the necessary calculations are factored, the decision is obvious because technique dictates the *one best means* or least effort (Kanigel 1991, 441).¹⁷

However, it can also be argued that this technology itself, as a tool to enhance well-being, has been created and situated through a religious imperative to, through technology, work towards a better world. Technologies marketed specifically to well-being, such as the SafetyPAD, fulfill precisely this imperative.

Neither-Norism

Neither-norism has been drawn upon and used in several areas of the SafetyPAD advertisement in order to solidify and augment the myth of religiosity. The most remarkable example can be found within the section of the advertisement entitled, 'Overview.' Within this segment of the ad, the bolded words in the latter half, including that of 'manage information,' 'real-time,' 'intuitive,' 'handwriting,' 'voice,' keyboard,' 'tuned,' 'Active Guidelines,' 'interact with medics,' 'entry,' 'reference,' 'reporting,' 'Open architecture,' 'configurable,' 'unlimited,' 'easily,' 'rapidly,' 'hands-free,' 'complete,' 'ergonomics,' 'unmatched,' 'solution,' effectively draws the reader to the

¹⁷ A large portion of this quote has been taken from: Russon, John Paul (1998). *The Humanities in a Technological Society*. Humanitas. Vol. XI (1). National Humanities Institute: Washington, DC USA.

conclusion that the opposite of these attributes, informational disarray, delayed, counter-intuitive, difficult, problematic, will constitute the consequences of rejected technological implementation. As such, each of the negative corollaries of the positive attributes are reduced to analogues and, as Barthes argues, rejected and dismissed such that, “one no longer needs to choose, but only to endorse” (Barthes, 1970, 153).

The mythology of religiosity is seamlessly integrated into this rhetorical form through each of the characteristics endowed upon the SafetyPAD device. The religiosity narrative manifests itself through both its technocratic and secular forms. In relation to religiosity’s secular-rational manifestation, it can be argued that each of the positive technological characteristics, including those of ‘real-time,’ ‘intuitive,’ ‘handwriting,’ ‘voice,’ ‘keyboard,’ ‘tuned,’ ‘Active Guidelines,’ and ‘interact with medics,’ give credence to the Enlightenment notion that rationality and efficiency are the most important values of technology and of life – not religion or spirituality. This position, as Sampson posits, “argues that there is enduring opposition between religion and science. It [this secular mythology] tells of the modern world, based on science, with its rational and democratic forms of government and economic organization and its technological progress. By contrast, religion is based on faith and leads to superstition and authoritarianism” (Sampson, 1961, 23).

The Privation of History

The privation of history operates throughout this advertisement through the glaring omission of what data collection, whether medical or other, has led to in the past, upon which valid concerns pertaining to the vulnerability of such centralized databases have

been historically leveled.¹⁸ A few of these critiques include the possible invasion of patient privacy, which is augmented in the context of accumulated genetic information; the breach of patient/physician trust, in cases where information about patients may be transferred to a their party; the lack of an independent review mechanism; possible abuse of patient consent, in cases where consent is not mandatory; and the possible commodification of medical data are just a few of the concerns such technologies as the SafetyPAD invoke (World Medical Association, online). Moreover, questions such as who would be in charge of data acquisition (the government or the private sector?) and under what conditions medical information will be released, are glossed over in favor of the unquestioned implementation of a technology which this advertisement argues is ‘A benefit for everyone,’ where ‘Productivity gets a shot of adrenaline, and ‘Active Guidelines enhance patient care.’

Religiosity is visible in this rhetorical form in the opposition between religion and the central tenets of reason and secular rationalism. As such, a line is drawn between irrational skepticism and questioning of this technology, particularly in relation to privacy and commodification, and rational technological acceptance.

Identification

Barthes’ identification rhetorical form is palpable through the conflation of qualitatively distinct occupations which are argued, by this advertisement, to benefit equally from the use of this device. It is stated that that,

¹⁸ Examples include the link between identification systems and totalitarianism (i.e Soviet Russia and Nazi Germany).

The data managed by *SafetyPAD* can empower **everyone** involved in EMS. **Medics** can focus on patient care with a non-intrusive tool to rapidly collect, reference, and communicate data. A **patient's** assessment, treatment, and the underlying care they receive can be enhanced. **Administrators** can manage resources and link information systems. **QA/QI** is provided with unlimited data analysis capabilities to detect trends and modify education. **Billing** is given complete, pre-coded information, reimbursement-critical data capture capabilities, and automated system interfacing options. **Medical direction** is provided with accurate, complete information with the data elements necessary to continually improving guidelines. **Doctors, nurses, and hospitals** receive legible, timely, wirelessly delivered reports. **Dispatch** can share run and patient information. **Legal arms** can decrease liability exposure. **Area agencies** can receive properly formatted, paperless run data. *SafetyPAD* makes the possibilities endless.

As such, these diverse professions are reduced from otherness to sameness in order to maintain the stability of the secular religious mythology. By including this expansive list, OPEN inc. successfully covers the medical occupational landscape such that its *SafetyPAD* system is portrayed as essential to the successful delivery of health care and health care related services. Issues related to whether or not all agencies agree to or have the funds for the purchase of the *SafetyPAD* technology are therefore left unaddressed.

Within a larger context, I would argue that the ethos of simplicity, participation, confidence, and efficiency argued to be equally enhanced in all occupations by the *SafetyPAD* can be connected to what David Noble argues is a vision of the social in which, “human beings experience an “enhancement of the senses” and the seemingly infinite extension of their mental powers and reach-delusions of omniscience, omnipresence, and omnipotence that fuel fantasies of their own God-likeness” (Noble, 1999, 159). This element of religiosity is in large part discernible because of the degree of enthusiasm and level of conviction with which this advertisement communicates the values as delineated above.

Quantification of Quality

This particular rhetorical form, much like the other two advertisements, is most visible in sections which describe the precise technical capacities of the respective technological artifact. Specific to the SafetyPAD, which differs slightly from the other two advertisements since its inclusion of technological specificities is limited to interoperability and ease of use rather than the particulars of hardware technology, includes the following stated capacities:

- Wired / Wireless network connectivity
- LAN / WAN
- Win9x, NT connectivity
- Internet / Intranet
- Infrared, RF (public & private)
- Secure dialup, wireless, or Ethernet
- Real-time or per your needs
- Ports (Infrared, serial, parallel, Ethernet, USB, PCMCIA)

In another section, entitled 'Devices,' a more technical inventory of the SafetyPAD's capacities can be found, although again each capacity is specific to function, not hardware:

Our solution also seamlessly interfaces with other beneficial technology. **GPS / mapping** helps you easily find a scene. Multimedia displays instructional **video**. Digital cameras capture detailed **pictures** (which are sometimes worth a thousand words). Infrared allows users to '**beam**' information to other IR-enabled devices. **Wireless** modems provide untethered two-way connectivity. Advanced interfaces with a variety of **medical devices** and **defibrillation** products integrate critical physiological information into one, comprehensive system. And we'll continue to find better ways to provide you with the best **solution** available.

Overall, however, it is the reduction of the SafetyPAD's potential social value and medical significance to technical capacities, resulting in the economization of intelligence, which fulfills the requirements of the quantification of quality rhetorical

form. It must be noted, however, that this particular advertisement does pay much more attention to social benefits on a larger scale than the Mobile Assistant V, WSS, and Sony QRIO which, in turn, is tied to it mobilizing religiosity more effectively.

As for the narrative of religion at play, religiosity is both secular and technophilic in this instance due largely to the focus on the efficacy of technological functionalities and its promise to usher in a better world. This significant impression of inevitability and a religious faith in technological promise is also discernible in this context due to a focus on a range of display, input, and wearability options through which the SafetyPAD is argued to meet the challenges of difficult work environments and allow users to personalize a configuration that works best with them to get the job done. Although a tenuous argument could be made connecting the creation and contextualization of the SafetyPAD to a religious enterprise of human betterment, much more information in relation to the company and its creators would have to be ascertained in order to reach such a conclusion.

Tautology and Statement of Fact

These final two rhetorical forms operate within this advertisement to support the religious narrative through their cumulative capacity to endow empirical statements with an aura of truth. Within the advertisement it is argued that the SafetyPAD is, 'a part of you,' capable of 'linking it all together' and whose features are 'a benefit for everyone.' It is also contended that this device will, inevitably, 'enhance patient care.' In the 'Features and Benefits' section, the following statements are presented,

“Information gathered in the field must be accurately communicated to those continuing patient care. SafetyPAD permits care providers to quickly and effortlessly distribute critical patient information to the appropriate agencies.”

“Acquiring accurate, legible, and complete call and patient information is critical for every arm of EMS care. SafetyPAD was designed to provide uncompromising flexibility and ease-of-use to match an agency's data needs. Information can be realistically gathered at a patient's side in most cases by using a variety of simple yet potent entry options.”

“Everyone has special needs. SafetyPAD provides comprehensive features and the flexibility to accommodate unique requirements.”

“People are less apt to use a system that is an inconvenience or makes their job more difficult. SafetyPAD has been tediously shaped into a beneficial tool that can be comfortably used by personnel, regardless of their computer skill level.”

The matter-of-fact nature of each of these assertions lends credence to Barthes' notion that both tautology and statement of fact operate to pass mythologies off as truths. As such, these, “statement [are] no longer directed towards a world to be made; [they] must overlay one which is already made, bury the traces of this production under a self-evident appearance of eternity” (Barthes, 1970, 152). Religiosity is in operation and, again, supported by these two rhetorical forms. Religiosity is manifested secularly through a focus on how technology will alone enhance our lives.

This, as Edward A. Locke reiterates, stems from a historical and ideational shift resulting in, The triumph of reason and rights made possible the full development and application of science and technology and, ultimately, modern industrial society. Once man's mind was freed from the tyranny of religious dogma, and man's productive capacity was freed from the tyranny of state control, scientific and technological progress followed” (Locke, 2000, 1).

These two forms also promote the religiosity of technology to the extent that this technological device excites a religious-like faith in the efficacy of innovation. It fosters, Noble argues, an, “optimistic open-ended outlook which is fueled by a remarkable and

seemingly endless succession of technological and industrial advance...” (Noble, 1999, 103).

Religiosity of Technology & the Safety Pad: Commentary

Overall then, it is clear that our contemporary popular technological environment, specific to our representations of and discourses around technology, remains firmly indebted to the narrative religiosity which simultaneously forms its symbolic and epistemological base. It can also be argued that the Sony QRIO, Mobile Assistant V, WSS, and SafetyPAD technologies, through their invocation of these narratives, also remain indebted to the central tenets of modernity and Enlightenment rationalism whose characterization of the relationship between technology and the future – which have come to define our social world. As such, technologies like these become endowed with the following social corollaries and promises as argued by Professor M. Surman,

1. that massive and positive social change will emerge from the introduction of a single, discreet [sic] communications technology;
2. that these changes will be caused by the inherent technical properties of the hardware; and
3. that the social revolution occurring as a result of the new technology is of a scale not seen for hundreds, or even thousands, of years." (Surman, online).

However, as I argue in the introduction, it has become increasingly apparent in other areas of social life, such as that of academe, politics, and economics, that these narrative structures are becoming unhinged, disjointed, and increasingly questioned in the face of particular social realities, such as that of environmental degradation, technological disasters, and overall failed promises, which contradict technophilic approaches to technology and social life. In addition, wearable computing technologies, in their

cyborgian mixing of organic and inorganic, human and machine, are hinging upon the postmodern and its own unique, diffuse, and local vision of technology and the future. What this means for the future and our future conceptualization of technology will constitute the subject of my final chapter.

XyberKids

The XyberKids advertisement (See Appendix 5), selling another of xybernaut's many wearable technologies, is the final technology I will analyze. However, the analysis of this particular advertisement will differ from the others in that I will not only be unearthing the modern myths of technology and the future within it, but also explaining how the narratives of the sublime, progress, and religiosity work to cement, uphold, and reconstitute the narrative of technological futurism. This futurist narrative, to reiterate, is a teleological world-view which envisions the future as a place made accessible by technology where we can "transcend" our chaotic humanity and achieve a level of social, economic, cultural, and political perfection denied to us in the present.

Xybernaut's XyberKids technology is a classroom and learning-specific wearable technological device. It is essentially a wearable computer attached to a backpack which, as the advertisement states, "includes a backpack, powerful speakers and the MA V with an all-light readable flat panel display." Xybernaut specifically points out that this technology is not only designed for regular students, but can also be used to augment and "empower" the experiences of students with disabilities. As the advertisement argues,

XyberKids, a breakthrough in assistive technology, empowers students with communication challenges, bringing them the power of a desktop computer in a wearable package. The XyberKids solution has been developed around a functional, lightweight wearable computer, the Mobile Assistant® V (MA®V), designed to boost your student's rate of learning.

Inoculation

Inoculation functions in this particular advertisement through its visible cooptation of otherness through a small acknowledgement of “some localized subversions” by drawing upon disability as a vehicle through which it can protect the narrative of futurism from a loss of coherence (Barthes, 1970, 151). As the advertisement states, in its characterization of images depicting learning and physically disabled children using this device, XyberKids is an, “Assistive Technology empowering students with disabilities.” It goes on to note that,

Not all students benefit from traditional learning tools found in the classroom. To communicate and participate in classroom activities, many students benefit from having a full-function computer at their side to assist them. The XyberKids product is a multi-component solution for students who face the challenge of a disability, allowing them to have powerful computing with them everywhere they go.

By including the disabled as a demographic whose experience of learning will be enhanced by this device, our modern narrative of technology and the future is further entrenched and solidified. This ‘improvement through technology’ ethos constitutes a potent, progressive, and optimistic vision of the future world in which, “The general improvement of mankind by higher organization of the individual and society [through technology] is connected to the end of promoting at once man’s goodness, power, and happiness” (Stocking, 1994, 70). It is also indicative of the hope that humanity will one day have the ability to transcend the limitations of the body through technological advance.

The means by which the futurist narrative is constituted within this rhetorical form is, one, through the operation of a view of technological progress which is indicative of, as John M. Staudenmaier argues, “the Western world’s love affair with progress and its identification of progress with science and technology” (Staudenmaier, 1990, 715), since disability is presented as something which can be overcome with technology. Second, a technocratic manifestation of the technological sublime, which operates through an experience of awe and wonder elicited through the human reason to create a technology meant to augment the learning process of disabled children; and third, an ethos of religiosity which operates through a religious faith placed in the ability for this particular technology to help children overcome learning problems and social difficulties. The futurist narrative, with assistance from these rhetorical forms, is thus presented as a historical world-view that gives, “hymns to progress that rise like a froth on a tide of exuberant self-regard, sweeping over all misgivings and contradictions” (Marx, 2000, 76).

Neither-Norism

Barthes’ neither-norism rhetorical device operates within the XyberKids advertisement much like it has in the other advertisements, that is, through the use of negative corollaries. It is argued that this technology is empowering, capable of “[boosting] your student’s rate of learning,” and helping children with disabilities, to have powerful computing with them everywhere they go.” It is implied therefore, that if this technology is not used, children, particularly those with learning difficulties, will lack personal empowerment, learn at a slower rate, and never reach the potential of which they are

capable. As such, these oppositional consequences are reduced to analogues and dismissed, thereby augmenting the authority of this device and its positive attributes.

Within this particular form, progress is defined by the language of ‘development through technology’ in which technological innovation is presented as a vehicle with which to overcome human suffering or, in this case, educational obstacles. The sublime, on the other hand, is manifested through the language of empowerment since it is through technology that disability is argued to be overcome – much like the natural landscape was overcome in past. It also presents itself, as James Carey argues, through a techno-optimistic mentality in which technology is presented as effecting social change (Carey, 1992). Religiosity, however, is not only manifested secularly, but also overtly religiously since technology is viewed as an ostensible ‘savior’ able to navigate and overcome a difficult world – specific, however, to those with problems learning. This view, as Paglia argues, posits that,

Technology is an artificial construction, a defense against nature's power. Without technology, we would be storm-tossed on the barbarous sea that is nature. Technology is a system of inherited forms reducing our humiliating passivity to nature. We may alter these forms, slowly or suddenly, but no change in society will change nature. Human beings are not nature's favorites. We are merely one of a multitude of species upon which nature indiscriminately exerts its force. Nature has a master agenda we can only dimly know (Paglia, as cited by Harvey, 1994, 9).

As for the over-riding narrative of technological futurism, it is apparent that each manifestation of the individual mythologies of progress, the sublime, and religiosity together construct a mythic vision of social life as evolving in terms of successive stages of technological development of which XyberKids is a part. This, as Lewis Mumford argues, bodes well for, “those who [favor] progress and simple-mindedly believe that

evils [and social problems] are the property of the past and that only by moving away from the past as rapidly as possible can a better future be assured” (Mumford. 1971, 199). Within the advertisement, the focus on values like efficiency, comfort, flexibility etc., indicative of this ‘improvement through technology,’ ethos, constitutes a potent, progressive, and optimistic vision of the future world. As such, the sublime and progress are defined through technological growth and the awe-inspiring encasement of nature. Turning to religiosity, there is also a particularly divine component within the advertisement (specific to inoculation) vis `a vis the afore mentioned values it both propagates and contends this technology contains.

The Privation of History

The privation of history is accomplished in this advertisement through its focus on flexibility and assistance:

Flexibility for all Situations

Xybernaut® provides assistive technology that extends beyond the classroom and into the playground, the grocery store and anywhere students need the power of mobile computing. More than just a communication device, the XyberKids product brings the ability to do standard computing functions, such as calculations, multi-media, word processing and the accessibility of the internet to the students anywhere they take it. The specially designed XyberKids pack makes this discrete, lightweight and durable package easy for students to take with them from home to school and everywhere in between.

By underlining the flexibility and wide applicability of this device, what is ignored is the potential liability and problems the reliance on technology has caused in the past. Lessons from these technological failures, including the unsuccessful launch of the Sony PDA and media technological convergence in general, remain in this device. For example: What if the technology breaks down? Do and will children always require the technology to communicate? What is the cost? What about the upkeep/upgrade requirements? How

much will they [upkeep/upgrade] cost? Do children really want to use the technology everywhere they go? How much technological baggage is too much technological baggage? None of these questions are addressed thereby naturalizing technology, and the myths which accompany it, to deprive us of choice. It can also be argued that the privation of history is also accomplished by the advertisement's failure to acknowledge where this technology was made, how it was created, and by whom.

In this instance of privation of history, the mythos of progress is made evident through the universality or wide applicability of this device – such that it can be used in the classroom, playground, and grocery store – for purposes of performing calculations and accessing multimedia. This, in turn, leads one to infer that this device is another tool with which we, “will derive robust and sustainable economic [and technological] progress, strong democracies, better solutions to global and local environmental challenges, improved health care, and – ultimately – a greater sense of shared stewardship of our small planet” (Gore, 1995, 4). The sublime is similarly communicated through the “awe, wonder, mystery, fear—formerly reserved for images of boundless nature or for representing a response to divinity” (Marx, 1992, 631), albeit in a much less dramatic form, that such range of use inspires. Finally, not only can the secular version of the religiosity of technology be discerned within the privation of history rhetorical form, through its explicit separation of humanity from the natural and religious world, but also, because this device is presented solely through such attributes as applicability and flexibility (and because of the elevation of such values), it also draws upon the ‘religion’ of technology manifestation of religiosity. However, it can also be argued that because this device is to be used to help those less able to succeed in education because of their

disability, a religious ethos of helping, befriending, and assisting those in need is also present.

As such, the mythos of futurism is made manifest through the cumulatively positive trajectory of each of these technological qualities (flexibility, assistance, and applicability), whose arbitrariness and contingency is masked by a narrative which promises a technological utopia it can never deliver, and by the mythologies of first, a technologically inclined view of progress, second, the subliminality of technological universality, and third, a secular and overt form of religiosity. In addition, futurism's view of history, as a result of its focus on the accumulation of configurable, helpful, and universal technological attributes in this advertisement, is indicative of the former of C. West Churchman's two paradigms of progress:

There are at least two ways in which one can view human progress. One is to take man as the great accumulator, engaged in the endless effort to add more units to the growing stockpile of power, of information, of natural resources, [of technology]. The other is to view him in the endless effort of gradually approaching certain ideals: cooperation, perfect knowledge, complete distribution. The two ways are in some cases easily translated into one another, because a boundless scale can often be expressed as a bounded scale. Yet there is undoubtedly some difference in feeling attached to the two descriptions (Churchman, 1968, 87).

It may be, however, towards the latter conception of technology and the future that we are now turning.

Identification

Identification functions in the XyberKids advertisement through, again, the reduction of otherness to sameness, directed specifically to those with difficulties learning, but also by reducing or incorporating children into the adult world using technology and high-tech

capabilities. Companion technologies which can be “customized for students’ specific needs, is capable of accompanying them anywhere, can “grow with the students as they learn,” and “provides instant access to computing,” are functionalities usually attributed to adults and the workplace, not children in the school environment. The consequences of bringing such technologies to children may not all be negative, but they can compel a redefinition of play and of childhood itself.

The narratives at play throughout this example of identification function to reinforce the futurist narrative through their ability to, together, identify a view of the future as a utopian place made admissible through technological advance and innovation. Supporting this ethos are the narratives of progress and the sublime whose ability to further solidify futurism’s, “philosophy of becoming, that is expressed by an activism exalting history as progress and celebrating life as the constant evolution of being” (Lista, 2001, 10), is accomplished through a view of progress that is technocratically inclined and a sublime approach to technology which identifies with and inspires wonder through such functionalities as customizability, accessibility, and growth. Religiosity advances the futurist mythology not only through a religious belief that technological growth will enhance our quality of life, but also through a Christian-based belief that innovation is practical virtue – particularly if used to help one’s fellow man/woman.

Quantification of Quality

This device is used within the XyberKids advertisement in a section entitled: Technical Specifications: XyberKids Pack which includes the following specificities:

- 500 MHz Intel® Mobile Celeron®, 1.1 V Ultra Low Voltage

- 128 MB SDRAM expandable to 256 MB
- 5 GB internal HDD, externally expandable to 40 GB
- 1 GB removable HDD through the use of a 1 GB Compact Flash Card
- Ports – Compact Flash, USB, Firewire®, DC-in jack, User Interface Port(supports LVDS and GVIF), PDP (Power Docking Port), power switch, hibernate button
- 5.9" x 3.5" x 2" (15cm x 9cm x 5cm)
- Approx. 1 lb. (455g)

Back Pack

- Fully insulated mesh storage pouch with adjustable elastic strap
- Heavy duty polyester and rip stop nylon
- Adjustable waist strap with quick release clasp
- Padded shoulder straps
- Approx. 15" x 10" x 5" (38cm x 25.4cm x 12.7cm)

Xyber Panel Digital Flat

Panel Display

- 8.4" viewable (21.3cm), all light readable display
- 800 x 600 color SVGA
- Brightness Control, up to 500 cd/m²
- Onscreen keyboard and built-in handwriting recognition

The amount of attention paid to technological capabilities functions to compel a replacement of functionality, power, display, and storage for quality technological use.

This use of quantification of quality buttresses the futurist myth since efficiency and power are acclaimed as the defining values of technological advance which also sets the framework for a further entrenchment of what are decidedly humanist and futurist conceptions of our social world. The narrative of technological progress most obviously advances the futurist myth since it is the through the accumulation of technological capabilities that progress is presented as having been accomplished. The technological sublime operates through this list by amplifying a, "naturalistic, teleological and utopian conception of technology" (Quirk, 1992a, 64), as well as an uplifting sense of awe at the capability of human reason to overcome naturally-born human disabilities. Finally, the

religiosity of technology operates in this example of the quantification of quality through its obligatory form since technological functionalities are presented here as the most beneficial means by which to augment human life. All three of these mythologies function to uphold a narrative of futurism of which progress, the sublime, and religiosity are key components.

Tautology and Statement of Fact

These last two devices can be discerned in this advertisement through the matter-of-fact manner almost all statements are made. It is argued that the XyberKid technology will, “boost your student’s rate of learning,” that it empowers students with disabilities, “grows with students as they learn, and helps them “face the challenges of a disability.” Through such statements, questions and discussions, including that of usability, maintenance, and fit, which weigh technological advance are negated. It also cumulatively promotes what Barthes’ argues is an ethos of unquestioned reality, truth, and, “common sense, that is, truth when it stops on the arbitrary order of him who speaks it” (Barthes, 1970, 152).

The narratives of progress, the sublime, and religiosity are all evident in the above demonstration of tautology and statement of fact. Technological progress is manifested in this advertisement through productive, efficient, and rational terminology such that progress becomes defined only having been accomplished through technological advance, while the language of empowerment strengthens the sublime wonder which accompanies technological progress, human reason, and the overpowering of nature. Finally, religiosity is not only in operation through the ‘religion of technology’ thesis this

type of advertisement promotes, but also on a larger, more complex level through the notion that the use of technology to end human suffering will bring us that much closer to God.

The Futurist Myth & XyberKids: Commentary

Cumulatively, this section is meant to illustrate not only the presence of the futurist myth, but also how the sub-mythologies of progress, the sublime, and religiosity operate to buttress, solidify, and reinforce a view of the future which is, as John. J. Quirk argues, portrayed as the inevitable actualization of a democratic utopia in which past and present social, economic, political, and environmental trials and tribulations will be overcome and liberty experienced by all (Quirk, 1992a, 174). These sub-myths operate by setting a theoretical framework for the futurist myth such that the relationship between technology and the future becomes defined solely in terms of technocratic interpretations of progress, the sublime, religiosity. Moreover, technologies past and present are thereby reduced to milestones on our trek to a technological utopia. The XyberKids advertisement is a particularly useful tool to illustrate precisely this fact since its child-specific purpose proves precisely how pervasive the futurist myth is. This modern myth, to reiterate, forms the basis of a widespread and pervasive cultural belief that it is through technological growth and innovation our future will inevitably be superior, more fulfilling, and equally civilized.

However, because this technology is wearable, it also borders on the postmodern since, as I have argued, the fusing of technology and the body is the enactment of postmodern

theory of the body and technology. The tension between both poles, that of modernity and postmodernity, will be discussed in the next chapter.

Chapter 4: Problem of Technology and the Future in Postmodernity

In this chapter, I explore the possibilities of postmodern approaches to and conceptualizations of technology and the future and their potential to destabilize the dominant modern futurist narrative which has been the subject of this thesis. The first few sections of this chapter will further expand upon postmodern theory as it relates to technology and the future, in the context of wearable computing, followed by a discussion of the various interpretations of this theoretical paradigm by such theorists as N. Katherine Hayles and Donna Haraway. I will then outline a summation of the critiques this paradigm often incurs, followed by an explanation of two less revolutionary but equally innovative alternative views of technology, and finally an evaluation of postmodern possibilities, as I see them, related specifically to wearable high-technology devices and the future.

Postmodern Approaches to Technology

As I have argued, the majority of postmodern approaches to technology and science are qualitatively different from modern paradigms, yet in the context of wearable high-technology advertising the two exist in tension. As such, wearable computing, and the advertising which surrounds it, can be perceived of as a site where modern and postmodern approaches to the relationship between technology, ourselves, and the future meet. Moreover, this type of advertising also functions as a theoretical compass in that wearable computing may be the harbinger of future conceptualizations of the relationship between technology and the future. However, postmodern theory itself is not a cohesive

or uniform approach to, or characterization of, the social world. Rather, there are several competing visions of the postmodern which I explore in this chapter. In general, however, postmodern theory views the social world as fragmented, diverse, non-rational, and hostile to traditional metanarratives. Thus, no longer is the “I think therefore I am” Cartesian Enlightenment belief system indicative of social, cultural and political existence. Rather, according to postmodern discourse, society has emerged from a context of industrialism and corporate homogenization and is now submerged within the dynamism of informationalism and diverse localism. A further element of postmodern discourse worth noting in relation to technology is its focus on the non-essentialist embrace of partial identities and contradictory standpoints. Thus identity, according to Angela McRobbie, “on the one hand, is fluid, never completely secured and constantly being remade, reconstructed afresh. On the other hand, it only exists in relation to what it is not, to the other identities which are its other” (McRobbie, 1991, 149). It is out of this postmodern context that a politically revolutionary form of postmodern innovation emerges of which Donna Haraway and N. Katherine Hayles are two such intellectual advocates.

Postmodern Theoretical Perspectives: N. Katherine Hayles and Donna Haraway

Haraway and Hayles, like other postmodern technologists, approach techno-human hybridity through a distinctly political perspective in which the postmodern or posthuman cyborg entity becomes the site for political and social resistance rather than a source of ideological subjugation, cultural repression, and the continuation of the modern project – the beginnings of which can be discerned within wearable advertising. The postmodern

vision of technology, as Bjorn Wiman, argues,

...smashes the pedestal on which humanity has put itself and reconfigures the human condition to incorporate a frictionless interlacing with intelligent machines. In the posthuman condition, there are no differences between bodily existence and computer simulation, not between cybernetic mechanism and biological organism. Information is the originate, the physical body is the derivate” (Wiman, 2000).¹⁹

Moreover, postmodern conceptualizations of technology, through theory, attack the traditional unities of the subject and object (i.e. technology), of information and the body by arguing, as Eric Schatzberg does,

That [in postmodern theories of technology] objects are simultaneously coherent and incoherent, single and multiple, characterized by what he [John Law] terms “fractional coherence”: the state of being more than one but less than many, in the same way that Mandelbrot’s fractals exist in more than one dimension but less than two. Through this idea of fractional coherence, Law claims to avoid the choice between modernism and postmodernism, between singular coherence and multiple incoherence. He also claims to avoid the performative contradiction of postmodernism that arises when postmodernists construct narratives about the inadequacy of narrative (Schatzberg, 2004, 407).

N. Katherine Hayles, in her book, *How We Became Posthuman: Virtual Bodies in Cybernetic, Literature, and Informatics*, explains, along very similar lines, that postmodern approaches to technology are literally a *post-humanist* phenomena characterized by the following:

First, the posthuman view privileges informational patten over material instantiation, so that embodiment in a biological substrate is seen as an accident of history rather than an inevitability of life. Second, the posthuman view considers consciousness, regarded as the seat of human identity in the Western tradition long before Descartes thought he was a mind thinking, as an epiphenomenon, as an evolutionary upstart trying to claim that it is the whole show when in actuality it is only a minor sideshow. Third, the posthuman view thinks of the body as the original prosthesis we all learn to manipulate so that extending or replacing the body with other prostheses becomes a continuation of a process that began before we were born. Fourth, and most important, by these and other means, the

¹⁹ Available at: [www.spikemagazine.cm/1199posthuman.php].

posthuman view configures human beings so that it can be seamlessly articulated with intelligent machines. In the posthuman, there are no essential differences or absolute demarcations between bodily existence and computer simulation, cybernetic mechanism and biological organism, robot teleology and human goals (Hayles, 1999, 2-3).

Hayles's theory of the posthuman, however, revises some of the definitional attributes she, Wiman, and Shatzberg describe in the designations above. For her, posthumanity, as a social phenomena, is concentrated specifically around the revitalization of an identity politics which *respects the materiality of the human body*²⁰ while simultaneously creating a space for the possibilities of information technologies to augment human experience. Hayles predicts a future in which humans enter into a relationship with their technologies that is symbiotic, reflexive, and resonant. However, she warns that there is a limit to how seamlessly humans can be articulated with machines that remain distinctively different from humans in their embodiments (Hayles, 1999, 284): "The terror," as she states, "then, though it does not disappear in this view, tends away from the apocalyptic and toward a more moderate view of seriated, social, technological, political, and cultural changes" (Hayles, 1999, 284). She argues that the traditional view of information as disembodied and thus disconnected from its human substrate is erroneous and even dangerous. Hence, the body, for Hayles, plays a central role in consciousness since, "the human mind without a human body is not a human mind" (Hayles, 1999, 246). As such, she avoids the following scenario put forth by Mark Dery in his book, *Escape Velocity*,

Assume, then, that the mind could be distilled from the body, that we could follow to its ultimate conclusion the process of bodily extension and "auto-amputation" which, according to McLuhan, constitutes the history of technology, "downloading" our selves after having delegated, one by one, all of our mental

²⁰ Hayles argues strongly that the information cannot exist separately from the material entity which brings it into existence.

and physical functions to our machines. Still, a shadow of a doubt remains, nagging at the edge of awareness -- the doubt that once our bodies have been "deanimated," our gray matter nibbled away by infinitesimal nanomachines and encoded in computer memory, we might awake to discover that an ineffable something had gotten lost in translation. In that moment, we might find ourselves thinking of Gabe, in [Pat Cadigan's novel] "Synners," who unexpectedly finds himself face-to-face with his worst fear while roaming disembodied through cyberspace: "*I can't remember what it feels like to have a body....*He wanted to scream in frustration, but he had nothing to scream with" (Dery, 1996, 256).

Thus, it is from this basic premise that Hayles' conception of our postmodern cybernetic future is presented as one, "that avoids the desire of mastery, the objectivist account of science, and the imperialist project of subduing nature" (Brooks, 1999, 4).

Similarly, for Donna Haraway, as she argues in her article, "A Cyborg Manifesto Science, Technology, and Socialist-Feminism in the Late Twentieth Century," a cyborgian-based society, within which the human and nonhuman co-exist, intermix, and eventually unite, is not a scenario inherently antithetical to authentic human existence.²¹ Rather, the 'cyborg' is distinguished by Haraway as existing within a,

Post-gender world," and, as having, "no truck with bisexuality, pre-oedipal symbiosis, unalienated labour, or other seductions to organic wholeness through a final appropriation of all the powers of the parts into a higher unity. In a sense, the cyborg has no origin story in the Western sense – a 'final' irony since the cyborg is also the awful apocalyptic telos of the 'West's' escalating dominations of abstract individuation, an ultimate self untied at last from all dependency, a man in space (Haraway, 2000, 152).

Hence, the cyborg construct is strategically appropriated and transfigured such that it evolves into a vehicle from which to confront and transform hierarchical and gender-biased social and political realities. The cyborg then becomes the locus through which a

²¹ Donna Haraway does not make or draw attention to issues of embodiment and the body to the same extent as N. Katherine Hayles does.

possible “re-crafting” of bodies can occur, the self can re-code, and the humanist distinctions which defined the 20th century can be subverted (Haraway, 1991). Haraway also emphasizes the need for scientific and technological literacy to empower users, and disempower corporations, and the importance of protecting and acknowledging the competing narratives of technoscience. It is through these strategies that Haraway proposes the social world can unite in political action to question and ultimately overcome the class, race, and gender inequalities which characterize social relations. Ira Livingston and Judith Halberstam subscribe to a similar view of the man-machine hybrid and succinctly abridge their politically progressive vision of post-humanity in the following passage,

The posthuman does not necessitate the obsolescence of the human; it does not represent an evolution or devolution of the human. Rather it participates in re-distributions of difference and identity. The human functions to domesticate and hierarchize difference within the human (whether according to race, class, gender) and to absolutize difference between the human and nonhuman. The posthuman does not reduce difference-from-others to difference-from-self, but rather emerges in the pattern of resonance and interference between the two. (Livingston & Halberstam, 1995, 10).

Postmodern Problems

There are, however, several potentially problematic epistemological and practical issues which arise from postmodern conceptualizations of technology and the social world, the most basic of which is its failure to resolve the ambiguity of individualism, that is, as Borgmann argues, it has lead to social anomie, the destruction of communal bonds, and despair (Kellner, 1997a).

Despite its beneficence, the transformative power of postmodernism is in doubt because it has failed to resolve the ambiguity of individualism. The latter term designates the human condition that has lost its premodern communal bonds. But

we lack a unified and positive understanding of the person who would answer to the term. The individual was thought to be the beginning and end of the modern project, its author and beneficiary...(Borgmann, 1992, 79).

As such, any reconceptualization of technology firmly embedded in the theory of postmodernism, including that of Hayles and Haraway, runs into the potential problem of social disunity in that, by a very fact of postmodernity's ontological position, there can be no firm bonds between individuals and social movements. The question then arises as to whether a revolution in social relations according to postmodernity will amount to much more than chaos and technological stagnation.

Other critiques, more specific to technology and postmodernism, have been launched by such theorists as Neil Badmington who warns that postmodern accounts of technology and society may also too hastily embrace the end of "man" and of the "metanarrative" as an ideal example of post-modern ideology. Badmington, relying heavily on Derrida, Lyotard, and Freud in his article, "Theorizing Posthuman," argues that the death of man, and other such "transgressions," may in fact, "all too easily become false exits," as the "force and efficiency" of tradition effect a stricter and more naïve reinstatement of "the new terrain on the oldest ground" (Badmington, 2003, 15).²² This process of reification and fetishization, whereby one hegemonic ideological reality is replaced with another,²³ and further presented as both natural and ideal, is a critical analysis of the epistemological assumptions underlying postmodern discourse using a logic not unlike

²² In this quotation, Badmington is citing Derrida's: *Of Grammatology* (1976). Translated by Gayatri Chakravorty Spivak. The Johns Hopkins University Press: Baltimore and London.

²³ Modernism is replaced by postmodernism.

Adorno and Horkheimer's analysis of myth wherein, as they argue in the *Dialectic of Enlightenment*, the myth of rational progress has evolved to embody the very irrationality it embarked to eliminate. Consequently, in an attempt to avoid this dangerous dialectic, Badmington advocates for the re-writing of modernity and humanism, in the context of a new postmodern discourse, through humanism itself.

The writing of the posthumanist condition should not seek to fashion "scriptural tombs" for humanism, but must, rather, take the form of a critical practice that occurs *inside* humanism, consisting not of the wake but the working-through of humanist discourse. Humanism has happened and continues to happen to "us" (it is the very "Thing" that makes "us" "us," in fact), and the experience—however traumatic, however unpleasant—cannot be erased without trace in an instant. The present moment may well be one in which the hegemony and heredity of humanism feel a little less certain, a little less inevitable, but there is, I think, a real sense in which the crisis, as Gramsci once put it, "consists precisely in the fact that the old is dying and the new cannot be born" (Gramsci, 1971, 276). The scene is changing but the guard is not. Not yet, not now. A working-through remains underway, and this coming to terms is, of course, a gradual and difficult process that lacks sudden breaks. An uneasy patience is called for (Badmington, 2000, 24).

I find compelling Badmington's argument highlighting the difficulty and potential impossibility in removing oneself from an episteme that is still overwhelmingly dominant and would argue that this is very much the case now as evidenced by the pervasiveness of the modern, humanist ethos which continues to surround high-technology advertising. I would also point out that postmodernism often fails to take into account the many ways modernism has contributed to its formation since it is in opposition to the majority of modernisms precepts that postmodern theory begins.

Some Alternatives: Douglas Kellner and Leo Marx

There are however, two positions on technology and the future worth considering, as put forth by Douglas Kellner and Leo Marx, which attempt to reconfigure modern futurist conceptualizations of technology and the social world in a less overtly revolutionary, but no less substantive, way. Both these theorists agree that the guiding futurist metanarrative, in which technology is depicted as the solution to the world's problems from the political to the economic, the social to the cultural, requires serious reformulation. They also question whether postmodernity, as Frederic Jameson (1991) contends, has already become a "cultural dominant" replete with new modes of subjectivity and experience. As such, both Kellner and Marx study technology from within the modern paradigm itself, yet continue to critique technology and propose alternatives to what they see as an increasingly dangerous, autonomous, and futurist technological milieu.

Douglas Kellner, in his various studies on postmodernity, modernity, technology, and globalization, presents an interesting perspective on the future of technology within a postmodern milieu which is only postmodern only to the extent that logocentric metanarratives, like that of futurism, are rejected in favor of several smaller narratives, and macropolitics are replaced by local politics and theories. In *Crossing the Postmodern Divide with Borgmann*, Kellner argues for the adoption of a *dialectic optic* of technology, that is, a view of technology which is not static but fluid and, "plays off extremes against each other to generate a more inclusive position, indicating how technology can be used as instruments of domination and emancipation, as tools of both dominant societal

powers and of individuals struggling for democratization and empowerment” (Kellner, 2000).²⁴ He posits that all social groups and individuals interested in reconfiguring their techno-futurist life-world must refocus,

[Their] energies on the devising of uses for new technologies that will enhance our lives and serve the values that we hold in common. Consequently, I share the practical and political concerns of those philosophers of technology who want the philosophy of technology to concern itself with how technology can enhance our lives, can be put into progressive political uses -- or that counters destructive and life-negating technologies and applications (Kellner, 1997a).

His theory of technopolitics, meant to convey how technology has become a normalized aspect of politics, raises the question of whether, in a postmodern world, advanced technologies (hybrid, information, or cyborgian) can in fact promote partial interests, breakdown hierarchies, and refashion human existence. Kellner argues, however, that for such a ‘revolution’ to occur, we must also,

Articulate models and ideals of a post-capitalist economy, a radical democratic polity, an egalitarian and socially just multicultural society, and diverse, free and open culture. Ideals of the past can and no doubt will enter into revolutionary thought of the future, but new ideals, values and forms of everyday life will no doubt emerge. The future of revolution is thus open and requires new theory and practice as well as appropriation of the best progressive heritages of the past (Kellner, 1997b, 188).

Kellner also proposes the construction of a standpoint of critique from which distinctions can be made in relation to positive and negative uses of technology such that the positive social values of democracy, community, freedom, and self-development, “can be deemed life-enhancing and meritorious, while those forms and uses of technology which promote domination and oppression, or which subvert democracy, community, freedom, creativity, and other positive values, can be considered blameworthy” (Kellner, 1997a).

²⁴ Available at: [<http://www.uta.edu/huma/illuminations/>].

Kellner does, however, acknowledge the muddiness with which such social forms, values, and ideals like democracy, self-development, and freedom have been defined and the ambivalence of technologies whose unintended consequences are often left unseen, yet he emphasizes that to valorize only non-technological activities is a mistake and, as such, on one level, is not unlike Hayles and Haraway in recognizing the potentially beneficial consequences of technological advance. Kellner is also not unlike Andrew Feenberg who proposes that constructive and innovative dialogue must accompany technological growth since technology, being neither neutral or autonomous, is always, “open to alternative developments with different social consequences” (Feenberg, 1999, 136).

Leo Marx, on the other hand, explores the possibility of an alternative conceptualization of technology and the social world which not only puts into question the narrative of progress and futurism, but does so without recourse to postmodernity or modernity as such. In an article entitled, “The Idea of ‘Technology’ and Postmodern Pessimism,” Marx argues that the faith in technological progress and the social capital of the futurism narrative, which held such power in the eighteenth, nineteenth, and early twentieth centuries, began to decline post World War II in the wake of technological disasters such as Chernobyl, Three-Mile Island, and the Vietnam War. As a result, Marx contends that an ethos of technological pessimism rooted in a postmodern paradigm began to gain authority and acceptance in the West.

With its “endless reification” in the late nineteenth and early twentieth centuries, the newly refurbished concept of “technology” became invested with a “host of metaphysical properties and potencies” that invited a belief in it as an autonomous agent of social change. By mystifying technology and attributing to it powers that

bordered on idolatry, mid-twentieth century Americans set themselves up for a fall that prepared the “way for an increasingly pessimistic sense of the technological determinism of history (Marx, 1994, 237).

Marx, however, bifurcates the postmodern paradigm into two camps – the first of which, he argues, encompasses the mutually supportive positions of Lewis Mumford, Henry David Thoreau, and other writers and intellectuals opposed to a technocratic idea of progress (Marx, 1994, 254).²⁵ Lewis Mumford is cited by Marx as representing this pessimistic vein of postmodernism thought, in relation to technology and the future, which, through his objection to the, “tendency [of society] to bypass moral and political goals by treating advances in the technical means as ends in themselves” (Marx, 1994, 255), is presented as less dangerous. This is because, as Marx argues, “Mumford’s disapproval was not directed at technology in any narrow or intrinsic sense, not at the mere technical or artifactual aspect of modernity, but rather at the larger ideological context” (Marx, 1994, 254). On the other hand, the manifestation of postmodern pessimism Marx finds most troubling is that vein of postmodernity which fundamentally rejects progress, metanarratives, and history itself. Marx, in his delineation of the rise of technological mystification and its subsequent fall from favor, dismisses this particular category of postmodern pessimism since, through its popular focus on the role of communication technologies and the new knowledge-based economy, they redescribe reality in a manner which, “proves to be even more technocratic than the distorted Enlightenment ideology they reject” (Marx, 1994, 256).

Marx’s solution or alternative to the technological determinism, postmodern pessimism,

²⁵ Marx considers them postmodernists because of their technological skepticism.

and ethos of futurism indicative of modernity is found in another article he wrote soon after his essay on postmodern pessimism entitled, “The Domination of Nature and the Redefinition of Progress.” In it, Marx recommends a return to a version of progress comparable to that of Thomas Jefferson whose early opposition to the factorification of America prefigures what Marx argues, “was a significant alternative to what already was coming to be regarded as society’s one-the only possible-available route to modernity” (Marx, 1998, 213). For Jefferson, the concept of history in general and American history in particular, defined solely by progress, economic growth, and technological proliferation, was not acceptable. Rather, Jefferson believed that the American future should not be bound only by economic and technological factors but by the principles of ‘America’ itself:

[F]or the general operation of manufacture, let our work-shops remain in Europe. It is better to carry provisions and materials to workmen there, than bring them to the provisions and materials, and with them their manners and principles. The loss by transportation of commodities across the Atlantic will be made up in happiness and permanence of government. The mobs of great cities add just so much to the support of pure government as sores do to the strength of the human body. It is in the manners and spirit of a people which preserve a republic in vigour. A degeneracy in these is a canker which soon eats to the heart of its laws and constitution (Marx, citing Jefferson, 1998, 214).

Jefferson’s vision of social development thus proposes the institutionalization of limits to economic and technological progress based on social, ecological, and moral contingencies. What is most exciting about this view, according to Marx – with whom I concur – is the realization that a policy of limiting economic and technological growth is in fact not anathema to a commitment to the advancement of knowledge. This approach is further rationalized by rejecting economic criteria as sole measure of public policy and instead basing policy formation on “quality of life” indices including “drinkable water

and breathable air” (Marx, 1994, 216).

On another level, the Jeffersonian model of development also affirms “equitable efficiency” as the principal objective of technological development. Thus the Western, modern, and widely accepted indicators of development based on the wealth, power, and status of a country, measured by such markers as growth, Gross Domestic Product (GDP), technological proficiency, productivity, and consumption, are negated in place of a, “low-growth, steady-state economy. [Jefferson] willingly accepts...the possibility that a reduced level of collective productivity” (Marx, 1994, 218), may be well be worth the price of sustaining quality of life. A final point about Jefferson’s conceptualization of development as intimated by Marx is the emphasis he places on the need for society writ large to shape, construct, and adopt those institutions and practices which accommodate and work with the natural world. This pastoral ideal attempts to reconcile technological advance with the realities of the natural world which has the capacity to, “point toward a future society that could maintain life-long enhancing relations with the natural environment” (Marx, 1994, 218).

Overall, both Leo Marx and Douglas Kellner provide powerful and compelling alternatives to the paradigm of rapid technological growth, rationalized by a futurist mythology, which do not rely on an interpretation of postmodernity analogous to that of Hayles and Haraway. However, both Kellner’s egalitarian and Marx’s Jeffersonian visions of technological growth, when unpacked, appear to continue to build upon what are fundamentally modern and humanist conceptualizations of the social world in which

the myth of futurism still exists, as do other narratives, but in a more moderate and socially-just form. Therefore reason, freedom, equality, rights, consensus, progress, and development are able to retain both their cultural capital and social import. Moreover, modernization, as a social goal, as Thomas Misa argues, persists through the continued, “deterministic link between technology, industrial growth, desirable social and cultural change” (Misa, 2001, 6). This reaffirmation of the modern ideal then begs the question of whether either Marx or Kellner, or Haraway and Hayles for that matter, have anything to offer by way of an authentically radical and alternative vision of technology, the body, and the social world.

In response to the last comment, I would venture an affirmative rejoinder since the ecological and social ramifications of unsustainable growth; unnecessary waste resulting from obsolesced technologies like PC's – and even the Sony QRIO and Mobile Assistant V at some point –; wasted energy; and messy paradigm shifts in social structures and priorities, including the movement from modernity to postmodernity, warrant a discussion of this very issue. However, I would contend that, at present, a modern, humanist ethos of technological and economic growth, epitomized by the narratives of technological futurism, the sublime, progress, and religiosity, remain socially potent. However, what the future holds, even ten to twenty years from now, is unclear. Whether new technologies will be continue to be embraced as an ultimate social panacea or if our social and epistemological milieu decisively changes such that these artifacts become accepted as tools for social reformulation, agents of social revolution, or ultimately rejected as dehumanizing, remains to be seen.

Personally, however, of all of the post-modern (Marx, Kellner) and postmodern (Hayles, and Haraway) approaches to technology I have examined, the two paradigms which I find the most promising are those put forward by Katherine Hayles and Douglas Kellner, for several reasons. Notwithstanding the creative optimism of Marx and Haraway, I believe Hayles and Kellner offer the most feasible, pragmatic, and conceptually innovative alternatives to the narrative of technological futurism since both are able to propose a human-technology relationship which is simultaneously modern and postmodern. That is, modernity is never rejected in toto. Rather, it is critiqued, decentered, and stripped of its ontological cover by both Hayles and Kellner who alternatively refer to their paradigms, in relation to modernity, as either embodying a, “reflexive modernity” (Hayles & Marshall, 2004, 38), for Hayles, and, for Kellner, consists of a synthesis of modern and postmodern thought which,

Revives the egalitarian, democratic, and humanist norms that constituted the best of modern and progressive traditions...[and juxtaposes it with] a form of postmodernity that involves an encounter with experiences, ideas, and forms of life that contest accepted modes of thought and behavior, and provide new ways of seeing, writing, and living (Kellner & Best, 1997, 3).

Thus, the social goals of freedom, material fulfillment, prosperity, and justice as defined by futurism and other narratives remain important, but exist within a framework in which all four imperatives are defined locally, collectively, or not at all. “Teleology is replaced by emergence, objectivism by reflexive epistemology, autonomous will by distributed behaviour, the body as the supporting system of reason by embodiment, and the liberal humanist manifest of control over nature by the dynamic partnership between nature and

intelligent machinery” (Hayles, 1999, 35). I feel this very ethos of partnership between modernity and postmodernity is essential in transitioning out of our futurist world-view.

In addition, Hayles presents and outlines a technological paradigm which retains what I feel is a necessary element of social life – namely, the body or, more specifically, embodiment. This very element is missing in most of the advertisements of wearable computing which attempt to use the body to carry technological baggage for the most important organ – the brain. Embodiment refers to that feeling of really experiencing our sensations and emotions such that it becomes clear that, “thought is a much broader cognitive function depending for its specificities on the embodied form enacting it” (Hayles, 1999, 8). As such, according to Hayles, it is through embodiment, in opposition to just the body as a socially constructed and abstracted object of discourse, that the tension between the two (the body and embodiment) can foster what she calls incorporating practices which mediate arbitrary inscription and through which change, “is linked with new technologies that affect how people use their bodies and experience space and time” (Hayles, 1999, 205). Finally, it is Kellner’s attention to history and the interconnections between the various domains of social life, namely economics, politics, cultural traditions, and technological attitudes, which I find compelling. By pointing out the deficiencies of the modernity and postmodernity Kellner and Best’s paradigm of, “a politics of alliances...which combine micro-and macroperspectives and retain a salient place for critical rationality” (Kellner & Best, 1993, 291/2) is the most convincing of all alternatives to the futurist narrative I have delineated in this chapter.

The other projects I believe fall short for several reasons, a few of which I will briefly discuss. First, I find Haraway's project lacking because of her inattention to issues of embodiment and the body so well articulated by Hayles. I also think the utopianism of Haraway's socialist-feminist-technological world could potentially become just as dogmatic as modernity itself due predominately to the lack of attention paid to the individual subject who I would argue still has some agency. Leo Marx, I believe, also does not succeed in offering a truly revolutionary yet plausible alternative to technological futurism since his ecological project of rejected innovation requires what amounts to a step back for humanity I think few would accept. Marx's "ecological efficiency" paradigm, I feel, is excessively similar to several other environmental paradigms which have not been greeted with enthusiasm or acceptance by those interested in technological growth.

In conclusion then, I would argue that it is through Douglas Kellner's postmodern modernity and Katherine Hayles's embodied posthumanity that a truly novel approach to technology and the future can be constructed. These egalitarian, local, diffuse, and democratic models deal with and address the concerns of Badmington by refusing to announce the end of man, narratives, and humanism completely. The steps to reach such a state, I believe, are in place and it is with recognition of this very fact that fundamental change can and will occur.

Conclusion

In this thesis that I have attempted to address, unpack, and navigate through what I feel is one the most crucial technological and epistemological issues our present technological milieu. That is, the status of the relationship between technology and the future as seen through modern and postmodern thought. Within modern thought, the future is most often seen as a utopic place of social harmony and spiritual fulfillment facilitated by unquestioned technological growth, while in postmodern thought it is revolutionary, emancipatory, and egalitarian technological growth which is emphasized. Despite the theoretical messiness of discussions of this nature (in which few agree on what constitutes modernity versus the postmodern, not to mention the place of metanarratives) it would appear that at present we remain embedded in a modern epoch of grand metanarratives of which the narrative of technological futurism and its component mythologies of technological progress, the sublime and religiosity, are just one example. However, it would also appear that an ethos of postmodernity and its interpretation of the relationship between technology and the future is pervading popular culture since the development wearable computing itself, through its objective of bodily transcendence, is bridging on the postmodern as well. As such, I argue the two paradigms, modernity and postmodernity, exist in tension within these advertisements.

Moreover, I would also argue that the relevance and symbolic import of this modern narrative of futurism, and all other narratives like it, is in danger of collapsing amid the failure of technology and the myths of technology to deliver what they have promised.

Not only have the futurist, progressive, sublime, and religiosity narratives become unhinged as a result of actual events (Chernobyl, Bhopal etc.), but it is also slowly becoming acknowledged that, as Jean Baudrillard argues, our, “Technological society thrives on [this] tenacious myth, the myth of uninterrupted technical progress accompanied by a continuing moral 'backwardness' of man relative thereto,” which he further explains by saying that, “moral stagnation turns technical progress into the only certain value [and turns it into the decisive authority of our social world, thus implying that human beings are unable solve problems on their own], and at the same time the system of production is absolved of all responsibility” (Baudrillard, 1996, 123).

As such, it must then be asked that if we are in fact moving into a postmodern era of social life, however slowly this may be, how new formulations and approaches to technological development can and will transform our perspectives on humanity, technological innovation, the status of the future, and the stated need for technology to augment social life. Can we, as Leo Marx argues, “entertain the vision of a postmodern society dominated by immense, overlapping, quasi-autonomous technological systems” (Marx, 1994, 257), in which modern notions of progress, the sublime, and religion are rejected in favor of a vision of fluidity and diffuse power relations as envisioned by Katherine Hayles and, to a lesser extent, Douglas Kellner? Or has the narrative of technological futurism become so ossified, so reified that no such movement is possible? For Foucault, who takes a position with which I concur, discourses and metanarratives have, within them, spaces of opposition within then suggests that resistance is possible. Thus, it is only by, first, rejecting universal theories and focusing on personal and

historical contexts, and second, capitalizing upon the spaces of opposition made within solidified discourses themselves that the narrative of liberal humanism, along with its techno-futurist corollary, can be challenged. As Michael Tager notes, “This method of challenging abuses of power without seeking recourse to universal solutions can be seen as a postmodern response to the varied ways in which power exerts itself” (Tager, 1986, 627). What precise ramifications this will have for our social world and the relationship of technology and the future as we see it, remains to be seen.

Bibliography

- Badmington, N. (2000). Theorizing Posthumanism. *Posthuman Reader*. Edited by Neil Badmington. Palgrave: New York; pp. 2-4.
- Bajura, M. & U. Neumann (1995). Dynamic Registration and Correction in Augmented Reality Systems. *From the Virtual Reality Annual International Symposium*. IEEE Computer Society Press: Los Alamitos, CA; pp 189-196.
- Barthes, R. (1970). *Mythologies*. Seuil: Paris.
- Barthes, R. (1991). *The Grain of the Voice: Interviews, 1962-1980*. Trans. L. Coverdale. University of California Press: Berkeley, CA.
- Barthes, R. (2000). The Great Family of Man. *Posthuman Reader*. Edited by Neil Badmington. Palgrave: New York; pp. 33-37.
- Battersby, C. (1984). *Antimonies: Works by Evelyn Williams*. University of Warwick: Warwick.
- Baudrillard, J. (1996). *System of Objects*. Verso Books: New York.
- Berger, A. (1989). *Signs in Contemporary Culture*. Sheffield Publishing Company: USA.
- Besser, H. (1993). Education As Marketplace. *Computers in Education: Social, Historical, and Political Perspectives*. Edited by R. Muffoletto & N. Knupfer. Hampton Press: New Jersey; pp. 67-104.
- Blum, C.S. (Winter 1995). Transformations in the Futurist Technological Mythopoeia. *Philological Quarterly*. Vol. 74; pp. 77-97.
- Borgmann, A. (1992). *Crossing the Postmodern Divide*. University of Chicago Press: Chicago.
- Borsook, P. (2004). *Cyberselfish: A Critical Romp Through the Terribly Libertarian Culture of High Tech*. PublicAffairs: USA.
- Brooks, T. (September 1999). Hayles and the Posthuman. *SciTech Book News*. Vol. 4; pp. 4-9.
- Brotman, S. (2002). The Digital Manifest Destiny: Business Has a Role in Guiding Where Technology Takes Us. *Cosmos Journal*. Washington, DC; pp. 96-105.
- Burke, P. (1978). *Popular Culture in Early Modern Europe*. London: Harper and Row.

Burnham, D. & J. Fieser (2001). Descartes. The Internet Encyclopedia of Philosophy. Available at: [www.utm.edu/research/iep/d/descarte.htm].

Carey, J. (1989). *Communication as Culture*. Unwin Hyman: Boston.

Carey, J. (1992). *Communication As Culture: Essays on Media and Society*. Routledge: New York.

Carey, J. (1992). The Ideology of Technology. *Communication and Culture: Essays on Media and Society*. Edited by James Carey. Routledge: New York; pp. 44-72.

Carpentier, N. (2003). *Discourse Theory and Cultural Analysis*. Media, Arts and Literature. To be published in 2005 by University of Minnesota Press.

Caudell, T. & D. Mizell (1992). Augmented Reality: An Application of Heads-Up Display Technology to Manual Manufacturing Processes. From Proceedings of Hawaii International Conference on Systems Science. Vol. 2; pp. 659-669.

Champagne, R. (1992). *The Structuralists on Myth: An Introduction*. Garland Publishing Inc. New York: USA.

Churchman, C. (1968). *Challenge to Reason*. McGraw-Hill: New York.

Corn, J. and B. Corrigan (1984). *Yesterday's Tomorrows: Past Visions of the American Future*. Summit Books: New York.

Cullenberg, S. & I. Dasgupta, (2000). From Myth to Metaphor: A Semiological Analysis of the Cambridge Capital Controversy. University of Nottingham & University of California: Working Papers.

Davis, E. (1999). *Techgnosis: Myth, Magic and Mysticism in the Age of Information Serpent's Tail*: USA.

Deleuze, G. & F. Guattari (1987). Translated by B. Massumi. *A Thousand Plateaus: Capitalism and Schizophrenia*. University of Minnesota Press: Minneapolis.

Dery, M. (1996). *Escape Velocity: Cyberculture at the End of the Century*. Pub group West: NY.

Dewdney, C. (1998). *Last Flesh: Life in the Transhuman Era*. Harper Collins: Canada.

Dewey, J. (1990). Does Human Nature Change? Boydston, *The Later Works, 1925-1953*. Vol. 13; pp. 291-93.

Dooyeweerd H. (1955/1975), *A New Critique of Theoretical Thought*, Vol. I-IV. Paideia Press: Ontario.

- Eco, U. (1981). *The Role of the Reader*. Hutchinson: London.
- Ellul, J. (1964). *The Technological Society*. Vintage, USA.
- Ellul, J. (1985). *The Humiliation of the Word*. Translated by Joyce Main Hanks. Grand Rapids: William B. Eerdmans: Grand Rapids.
- Feenberg, A. (1991). *Critical Theory of Technology*. Oxford University Press: New York.
- Feenberg, A. (1999). *Questioning Technology*. Routledge: London/New York.
- Feenberg, A. (June, 2003). *What Is Philosophy of Technology?* Lecture for the Komaba undergraduates.
- Flyvbjerg, B. (1996). *The Dark Side of Planning: Rationality and Realrationalitat. Explorations in Planning Theory*. Edited by S. Mandelbaum, L. Mazza & C. Burchell. Center for Urban Policy Research; pp. 56-87.
- Forrest, T. (2000). *Nature, Technology, and Architecture*. Written for: American Studies at the University of Virginia.
- Foucault, M. (1994). *The Birth of the Clinic: An Archaeology of Medical Perception*. Vintage: USA.
- George, J. (1994). *Discourses of Global Politics*. Rienner: USA.
- Lista, G. (2001). *Futurism*. Edited by Pierre Terrail. Finest SA: Paris.
- Gordon, C. (1980). *Power/Knowledge: Selected Interviews and other Writings, 1972-1977*. Pantheon: New York.
- Gray, C. H. (1996). *Cyborgology: Constructing the Knowledge of Cybernetic Organisms/ Excerpt from The Cyborg Handbook*. Edited by C. Gray. Routledge: London; pp. 43-48.
- Gray, C. H. (2001). *Cyborg Citizen: Politics in the Posthuman Age*. Routledge: New York and London.
- Gore, A. (1995). *Forging a New Athenian Age of Democracy*. *Intermedia*. Vol. 22(2); pp 4.
- Hall, S. (1973/1980). *Encoding/decoding*. In Centre for Contemporary Cultural Studies, *Culture, Media, Language: Working Papers in Cultural Studies, 1972-79*. Hutchinson: London; pp. 128-38.

Hall, S. (1992). *The West and the Rest: Discourse and Power*. From S. Hall and B. Gieben, *Formations of Modernity*. Polity Press: USA; pp. 27-36.

Halling, S. (2000). David Noble on "The Religion of Technology." Lecture prepared for The Ernest Becker Foundation (EBF).

Haraway, D. (1991). *Simians, Cyborgs, and Women: The Reinvention of Nature*. Routledge: New York.

Haraway, D. (2000). *A Cyborg Manifesto: Science, Technology, and Socialist-Feminism in the Late Twentieth Century*. *Posthuman Reader*. Edited by Neil Badmington. Palgrave: London and New York; pp. 66-82.

Harsh, R. (2003). *Searching for the Self in the Natural World: Instinct, Intelligence and Identity*. *Self in Society*. Plattsburg State University: Sociology Department: New York.

Harvey, S. (1994). *Science, Technology, Culture & Coping*. Guilford College: North Carolina.

Hawthorn, G. (1992). *Myth and the Reconciliation of Opposites: Jung and Lévi-Strauss*. *Journal of the History of Ideas*. Vol. 42; pp. 471-488.

Hayles, K. & K. Marshall (2004). *Atomizing the Risk Technology*. *NanoCulture: The New Technoscience and its Implications for Literature, Art, and Society*. Edited by K. Marshall. Intellect Books: NY; pp. 102-116.

Hayles, K. (1999). *How We Became Posthuman: Virtual Bodies in Cybernetic Literature, and Informatics*. University of Chicago Press: Chicago.

Heylighen F. & D. T. Campbell (1995). *Selection of Organization at the Social Level: Obstacles and Facilitators of Metasystem Transitions*. *World Futures: the Journal of General Evolution*. Vol. 45; pp. 181- 212.

Holton, G. (1998). *Science and Progress Revisited. Progress: Fact Or Illusion*. Edited by L. Marx and B. Mazlish. University of Michigan Press: Ann Arbor; pp. 57-72.

Hoolgan, D. (November 2002). *Fact and Fantasy: The Body of Desire in the Age of Posthumanism*. *Journal of the History of Ideas*. Vol. 11(3); pp. 213-231.

Howarth, D. (2002). *An Archeology of Political Discourse? Evaluating Michel Foucault's Explanation and Critique of Ideology*. *Political Studies*. Vol. 50; pp. 117-135.

Hughes, J. (March, 2002). *The Politics of Transhumanism*. Presented at the 2001 Annual Meeting of the Society for Social Science. Cambridge: MA.

- Ihde, D. (1992). Image Technologies and Traditional Culture. *Inquiry* (Oslo), Vol. 35; pp. 378.
- Jastrow, R. (1981). *The Enchanted Loom: Mind in the Universe*. Simon & Schuster: New York.
- Jameson, F. (1991). *Postmodernism*. Verso Books: New York.
- Jaspers, C. (1973). *Philosophie*. Springer: Berlin.
- Jung, C. (1989). *Memories, Dreams and Reflections*. Vintage Books: New York.
- Kammen, M. (1993). *Mystic Chords of Memory: The Transformation of Tradition in American Culture*. Vintage Books: New York.
- Kanigel, R. (1991). *The One Best Way: Frederick Winslow Taylor and the Enigma of Efficiency*. Viking: New York.
- Jaspers, K. (1962). *The Great Philosophers, Vol. I*. Harcourt Brace Jovanovich: San Diego.
- Kasson, J. (1977). *Civilizing the Machine: Technology and Republican Values in America, 1776-1900*. Penguin Books: New York.
- Kellner, D. (April 1997a). Crossing the Postmodern Divide with Borgmann or Adventures in Cyberspace. Available at: [<http://www.gseis.ucla.edu/courses/ed253a/newDK/borg.htm>].
- Kellner, D. (Fall 1997b). Intellectuals, the New Public Spheres, and Technopolitics. *New Political Science*. Vol. 41-42; pp. 169-88.
- Kellner, D. (2000). New Technologies, TechnoCities, and the Prospects for Democratization. *Illuminations: The Critical Theory Website*. Available at: [<http://www.uta.edu/huma/illuminations/>].
- Kellner, D. (Spring 1999). The X-Files and the Aesthetics and Politics of Postmodern Pop. *The Journal of Aesthetics and Art Criticism*, Vol. 57(2); pp. 161-175.
- Kellner, D. & S. Best (1997). *The Postmodern Turn: Paradigm Shifts. Theory, Culture and Science*. The Guildford Press: New York; pp. 44-69.
- Kim, J. (1993). *Supervenience and Mind*. Cambridge University Press: New York.
- Lenk, H. (Fall 1998). Advances in the Philosophy of Technology: New Structural Characteristics of Technologies. *Journal of the Society for Philosophy and Technology: Techne*. Vol. 4(1); pp. 8-15.

Lista, G. (2001). *Futurism*. Edited by Pierre Terrail. Finest SA: Paris.

The Editors of *The New Atlantis* (Summer 2003). *Carried Away with Convergence*. *The New Atlantis*. Vol. 2; pp. 102-105.

Livingston, J. & I. Livingston (1995). *Posthuman Bodies*. Indiana University Press: Bloomington.

Lock, E. (2000). *On Flag Day Celebrate America's Core Values: Reason, Rights, and Science*. Ayn Rand Institute: California.

Liotard, J. F. (1979). *The Postmodern Condition*. Manchester University Press: London.

Manuel, F. (1956). *The New World of Henri Saint-Simon*. Cambridge, Mass.

Marcuse, Herbert (1964). *One-Dimensional Man*. Beacon Press: Boston.

Martin, R. (1988). Truth, power, self: An interview with Michel Foucault. In L. Martin, H. Gutman, & P. H. Hutton's, *Technologies of the Self*. Univ. of Massachusetts Press: Amherst, MA; pp. 9-15

Marx, L. (January 1987). Does Improved Technology Mean Progress? *Journal of Technology Review*. Vol. 4; pp. 33-41.

Marx, L. (1994). The Idea of Technology and Postmodern Pessimism. Does Technology Drive History? The Dilemma of Technological Determinism. Edited by L. Marx & M. R. Smith. MIT Press: New York; pp. 97-115.

Marx, L. (1992) Does Pastoralism Have a Future? *The Pastoral Landscape*. Dixon Hunt: Washington, D.C; pp. 10-24.

Marx, L. (1998). The Domination of Nature. Progress: Fact or Illusion? Edited by L. Marx & B. Mazlish. The University of Michigan Press: Ann Arbor; pp. 89-110.

Marx, L. (2000). *Machine in the Garden*. Oxford University Press.

Mauws, M. K. (1996). *Relationality*. Presented at the Academy of Management Meetings, 10-14 August 1996, Cincinnati, Ohio.

Meadows, D. A. & D. Meadows & L. Dennis & J. Randers (Summer 1992). The Limits to Growth. *Dancing Toward the Future*. Vol. 32; pp. 10-18.

McCorduck, P. (2004). *Machines Who Think*. AK Peters Ltd: USA.

Nye, R. (1996). *The American Technological Sublime*. MIT Press: Cambridge, MA.

- McDonald, H. (1996). Asceticism and the Electronic Media: Technophilia and Technophobia in the Perspective of Christian Philosophy. *McLuhan Studies*. Issue 4, Article 3. Available at: [http://www.chass.utoronto.ca/mcluhan-studies/v1_iss4/1_4art3.htm].
- McIntyre, A. (1997). *After Virtue: A Study in Moral Theory*. University of Notre Dame Press: Michigan.
- McRobbie, A. (1991). Clubs to Companies. In John Hartley's, *Creative Industries*. Blackwell: USA.
- McLuhan, M.(1964). *Understanding Media*. Mentor: New York.
- Mead, G.H. (1932). *The Philosophy of the Present*. University of Chicago Press: Chicago.
- Misa, Thomas J. (2001). *Technology and Modernity*. MIT Press: USA.
- Mitcham, C. (1994). *Thinking Through Technology: The path Between Engineering and Philosophy*. University of Chicago Press: Chicago.
- Moravec, H. (1999). *Robot: Mere Machine to Transcendent Mind*. Oxford Press: USA.
- Momen, M. (1999). *The Phenomenon of Religion: A Thematic Approach*. Oneworld Publications: USA.
- Mosco, V. (1996). *Policital Economy of Communication: Rethinking and Renewal*. Sage Publications: USA.
- Mumford, L. (1971): *The Pentagon of Power*. Secker & Warburg: London.
- Mumford, L. (2001). *Technics and Civilization*. Harvest Books: USA
- Nelson, J. J. (August, 2003). *Myth Scapes: Essays in Rhetorical Analysis*. Poroi. Vol. 2(1); pp. 120-125.
- Noble, D. (1999). *The Religion of Technology*. Penguin Books: USA.
- Nye, R. E (1996). *The American Technological Sublime*. MIT Press: Cambridge, MA.
- Pacey, A. (1992). *Meaning in Technology*. MIT Press: Cambridge, MA.
- Peters, J. D. (1999). *Speaking into the Air: A History of the Idea of Communication*. University of Chicago Press: London and Chicago.

Pinch, T. & W. Bijker (August, 1984) *The Social Construction of Facts and Artefacts: Or How the Sociology of Science and the Sociology of Technology Might Benefit Each Other*. *Social Studies of Science*, Vol. 14(3); pp 399-441.

Postman, N. (1993). *Technopolopoly: The Surrender of Culture to Technology*. Vintage Books: New York.

Pursell, C. (1994): *White Heat*. London: BBC.

Pursell, C. (1983). *The History of Technology and the Study of Material Culture*. *American Quarterly*. Vol. 35(3); pp. 304-315.

Quirk, John J. (1992a) *The History of the Future, in Communication and Culture: Essays on Media and Society*. Edited by J. Carey. Routledge: New York; pp. 23-48.

Quirk, John J. (1992b) *The Mythos of the Electronic Revolution, in Communication and Culture: Essays on Media and Society*. Edited by J. Carey. Routledge: New York; pp. 53-69.

Ritzer, G. & P. Gindoff (1992). *Methodological Relationism: Lessons for and from from Social Psychology*. *Social Psychology Quarterly*. Vol. 55(2); pp. 128-140.

Roe Smith, M. (1994). *Recourse to Empire. From, Does Technology Drive History? The Dilemma of Technological Determinism*. Edited by M. R. Smith & L. Marx. MIT: USA; pp. 102-121.

Romer, P. (1999). *It's All In Your Head*. *Hoover Digest*. Vol. 2(1); pp. 34-36.

Rosenau, P. M. (1992). *Post-Modernism and the Social Sciences: Insights, Inroads and Intrusions*. Princeton University Press: New Jersey.

Routledge Encyclopedia of Philosophy (2002). *Technology and Ethics*. Version 1.0: Routledge: London

Ruskin, J. (1979). *Genius of John Ruskin: Selections From His Writings*. Routledge Kegan & Paul: London.

Rutsky, R.L. (1999). *High Techne: Art and Technology from the Machine Aesthetic to the Posthuman*. U of Minnesota Press: Minneapolis and London.

Rylance, R. (1994). *Roland Barthes*. Harvester Wheatsheaf: USA.

Sampson, P. (1961). *Victim of Spin? Third Way*. In *Prediction and Optimal Decision* Prentice-Hall: Englewood Cliffs NJ.

Sawyer, K. R. (2002). Emergence in Psychology: Lessons from the History of Non-Reductionist Science. *Human Development*. Vol. 45; pp. 2-28.

Schatzberg, E. (April 2004). On Attempting to Construct Alternative Narratives. *Technology and Culture*. Vol. 45; pp. 406-412.

Shallis, M. (1984): *The Silicon Idol: The Micro Revolution and its Social Implications*. Oxford: Oxford University Press.

Slater, D. (2002). Capturing Markets from the Economists. *Cultural Economy: Cultural Analysis and Commercial Life*. Edited by P.D. Gay & M. Pryke. Sage: London; pp. 59-77.

Somerville, I. (1997). Actor-Network Theory: A Useful Paradigm for the Analysis of the UK Cable/Online Sociotechnical Ensemble? Department of Communication and Informatin Studies: Queen Margaret College, Edinburgh, Scotland.

Staudenmaier, J. M. (June, 1990). Recent Trends in the Hisory of Technology. *The American Historical Review*, Vol. (95)3; pp. 715-725.

Stein, R., S. Ferrero, M. Hetfield, A. Quinn, & M. Krichever (2003). Development of a Commercially Successful Wearable Data Collection System. Symbol Technologies Inc.: New York.

Stocking, G. W. Jr. (1994). Rousseau Redux, or Historical Reflections on Ambivalence to the Idea of Progress. Does Technology Drive History? The Dilemma of Technological Determinism. Edited by M. R. Smith and L. Marx. MIT: USA; pp. 65-78.

Stryker, S. (1980). *Symbolic Interactionism: A Social Structure Version*. Benjamin/Cummings: Menlo Park.

Surman, M. (1995). Drive Through Democracy. Available at: [<http://www.virtualschool.edu/mon/ElectronicFrontier/SurmanDriveThruDemoc.html>].

Tager, M. (October-December, 1986). Myth and Politics in the Works of Sorel and Barthes. *From, Journal of the History of Ideas*. Vol. 74(4); pp. 25-639.

Toolan, D. (2001). *At Home in the Cosmos*. Obis Books: USA.

Triantiafillou, P. (2000). Foucauldian Genealogy: Questions of Method. SLUSE: The Politics of Environment and Development Lecture.

UNESCO (1996). *Information and Communication Technologies in Development: A UNESCO Perspective / prepared by the UNESCO Secretariat*. – Paris; 42pp.

Warrick, P. H. (1984). *Machines that Think*. MIT Press: New York.

Wiman, B. (2000). Body Language. Spike Magazine. Available at:
[<http://www.spikemagazine.com/1199posthuman.php>].

World Medical Association (1999). Summary of the Icelandic Medical Association's Presentation on the Health Sector Database. Santiago, Chile. Available online:
[<http://www.mannvernd.is/greinar/IMAwma.htm>].

Young, J. (May 3, 2002). Self-Described Cyborg Reveals Promise and Danger of Wearable Computers. Chronicle of Higher Education: Washington.

Appendices

Figure One: Sony QRIO

Sony Dream Robot

QRIO

Throughout history, curiosity has been a source of inspiration, expanding the possibilities for the future. The fun of discovery; the joy of creation; technology that goes beyond "convenience" to touch the hearts - these have driven Sony since its founding.

Quest for Curiosity: QRIO.

QRIO embodies Sony's dreams and most advanced technologies in recognition, motion control, communications, IT and AI.

Through QRIO's continued growth and development, Sony will pursue the infinite possibilities of curiosity. The resulting technologies will be applied to a wide range of products and services, beyond robots, to enhance the fun and joy of life.

Let's discover the future together!

Nobuyuki Idei, Chairman & Group CEO

Easy Dream Robot

QRIO

QRIO'S STORY

►

From the concept to the future. An introduction to QRIO in 4 short movies.

VIDEOCLIP

►

Introduction of QRIO's video clips.

QRIO'S TECHNOLOGY

►

A detailed explanation of the technology behind QRIO.

QRIO'S ACTIVITIES

►

Details of QRIO's activities at events and shows around the world.

Long Dream Robot
QRIO

01
QRIO'S STORY

STORY 01

QRIO the concept.

It is the product of cutting edge artificial intelligence and dynamics technology.
An entertainment robot that lives with you, makes life fun, makes you happy.

Its name is QRIO.

QRIO can gather information and move around on its own accord.

QRIO not only walks on two legs, it can also manage uneven surfaces,
dance, recognize people's faces and voices, and carry on conversation.

QRIO is eager to be friends with people.

STORY 02

QRIO the capabilities.

Even among robots, QRIO's capabilities are unique.

As well as walking on two legs, if QRIO does lose its balance,
it reacts to protect itself against the impact.

And after it falls, QRIO checks front, back, left and right, and gets back up, by itself.

Its intellectual capabilities allow QRIO to distinguish people's faces and voices.

And QRIO can communicate with people based on its own judgments,
expressing its feelings through movements, conversation, and the use of its lights.

STORY 03

QRIO the genesis.

Until a decade ago, the word 'robot' was associated primarily with industry.

Having robots perform tasks in place of humans is 'helpful', but wouldn't it be 'fun' if people and robots could not only work together, but live together too?

SONY decided to create a 'partner' that talks to you, plays with you, encourages you.

And inside this small body, lives the same frontline technology and wealth of knowledge that fostered the development of SONY products like the HANDYCAM and WALKMAN.

STORY 04

QRIO the future.

QRIO's dreams are limitless. But one is clear to make your life fun and happy.

For example, QRIO uses body language and words to convey a feeling of intimacy; QRIO can connect to the Internet and share the kind of information you like to hear.

As the world becomes progressively more complex, we thought how wonderful it would be to have a navigator that gently changes with the times.

What is more, the results of such research on robots is sure to pave the way for Sony to create even more innovative IT-based products, and new concepts in the future

Tony Dream Robot
QRIO

02
QRIO'S TECHNOLOGY

Walking Independently on Two Feet / Adapting to Walking Surface

QRIO doesn't just walk on its own two feet. It dances fluidly with its entire body, and it expresses a full range of emotion. Behind this impressive ability is the Intelligent Servo Actuator (ISA), a drive system for the robot's joints and limbs that involves motors, gears, a computer, a multitude of sensors, as well as the technology that governs it all. Responding to the condition of the walking surface, it directs the robot's joints in real time, harmonizing their movement so that the entire body moves safely and sure-footedly.

01_Intelligent Servo Actuator (ISA)

+ FEATURE

QRIO can walk on two feet and dance dynamically. To make its arms and legs strong, and yet able to move fluidly, it was necessary to develop an entirely new joint actuator. The realization of this Intelligent Servo Actuator (ISA) made it possible to build a robot with compact body design that could move its body smoothly and dynamically.

[ISA - Actuator]

In order for QRIO to walk and dance so skillfully, an actuator was needed with the ability to produce varying levels of torque at varying rpm speeds, respond with quickness and agility, not be affected by outside forces -- and do all of this efficiently. We found a way to make a smaller actuator with broadly improved function and precision. In addition, QRIO's gears are precise, quiet, and highly dependable.

[ISA - Sensors]

QRIO's ISA system detects the current position of its joints and, based on the posture of QRIO's body, drives the joints to their calculated target position. In addition, it determines the maximum amount of torque applied to the actuators and calculates the corresponding rise in temperature to allow QRIO to move about safely.

[ISA - Controller]

QRIO's ISA has a built-in governing computer, through which it responds quickly to requests for control commands by the bipedal robot's actuators. We used the latest microchip and software technology to make the system as small as possible.

02_ Independent, Stable Bipedal Walking

+ FEATURE

QRIO moves with "dynamic walking". "Static walking" means the robot keeps its center of gravity within the zone of stability -- when the robot is standing on one foot, its center of gravity falls within the sole of that foot, and when it is standing on two feet it falls within a multi-sided shape created by those two feet -- causing it to walk relatively slowly. In "dynamic walking", on the other hand, the center of gravity is not limited to the zone of stability -- in fact it often moves outside of it as the robot walks. People move using "dynamic walking".

QRIO's underlying movement control method is based on the Zero Moment Point (ZMP), the point where the combined forces of gravity and inertia working on the robot intersect with the ground. The control system directs QRIO's movement so that its ZMP is always within its zone of stability. It also senses the pressure on the soles of the feet and the attitude of the robot's body to determine the condition of the walking surface, and adapt to changes in the surrounding environment. Using a holistic movement control system that controls the movement of the robot's body based on this data, QRIO is able to walk and move dynamically and stably.

03_ Responding to Changes in Walking Surface

+ FEATURE

How is QRIO able to walk on an uneven surface, or one whose slope suddenly changes? It is equipped with technology that uses a wide range of sensors to detect changes in the walking surface and respond accordingly. QRIO determines the condition of the walking surface using four pressure sensors in the sole of each foot to gather data on the amount of force being received from the walking surface.

For example, when the foot touches an uneven surface, the sensors detect the slope of the ground; the foot is placed down in accord with the slope; and the attitude of the body is adjusted using data from position sensors so that the robot maintains a stable position as it moves. It can adjust to disparities in elevation up to 1 cm, and slopes up to 10 degrees.

Figure Two: Mobile Assistant V

Mobile Assistant® V

Technology for the Task-at-Hand

Boost on-the-job productivity and quality of service with Mobile Assistant V (MA® V). This powerful, rugged, fully functional, super lightweight wearable computer goes anywhere your employees go to achieve the task-at-hand.

	Transportation/ Aerospace	Medical/ Education	Telecommuni- cations/Utility	Media/Public Safety	Travel and Leisure	Government/ Military
Inspection/Maintenance	•	•	•	•	•	•
Remote/Tele-maintenance	•	•	•	•	•	•
Queue Busting		•		•	•	
Inventory/Quality Control	•	•	•		•	•
Data Collection	•	•	•	•		•
Asset/Project Management	•	•	•	•	•	•
Training/Distance Learning	•	•	•	•		•
Manufacturing/Logistics	•		•			•

The Ultimate Productivity Tool

Wherever your employees do their work—in the office, underground, in the field, on the lift, or under the rig—with MA V they can communicate with each other, manage tasks, retrieve and send data, review plans, and even learn on-the-job. MA V keeps mobile workers connected with wireless, just-in-time access to data, to input and manage information from their point of activity. This means fewer interruptions and errors, reduced steps in the workflow and better teamwork. The result is productivity gains in the work force, improved quality of service for your customers and a measurable return on investment for your organization.

Empowering the Mobile Worker

MA V brings the power and functionality of a state-of-the-art desktop computer into the remote, rugged, and space-constrained environments that highly mobile workers experience everyday. It keeps them connected to information and expertise needed to tackle the task-at-hand.

A maintenance technician on a pole repairing a telecommunications line accesses detailed schematics and confirms a work order in real time to quickly restore phone service to customers.

A quality-control inspector with speech recognition software and diagnostic equipment instantly communicates defect information to an up-stream co-worker to correct a deficiency in the manufacturing line.

An aircraft mechanic instantly accesses maintenance schedules and reference diagrams without leaving the plane to reduce maintenance time and decrease flight delays.

A remote expert walks military field personnel through complex installation procedures with streaming video guidance from anywhere in the world.

An EMT wirelessly relays critical patient information at the scene and in route to the emergency room so that critical equipment and medical professionals are prepared to provide immediate treatment.

Using MA V means:

- Improved productivity and efficiency of your workforce
- Real-time communications and teamwork
- Full function computing when and where you need it
- Instant access to enterprise systems and task critical information
- Eliminating repetitive data entry resulting in reduced errors
- On-the-job training and learning
- Multimedia enhanced tele-maintenance

Skill-Extending Functionality

With a range of display, input, and wearability options, MA V meets the challenges of difficult work environments and allows users to personalize a configuration that works best with them to get the job done. This means workers can achieve new levels of efficiency, productivity, teamwork and job satisfaction.

Displays

MA V works with a range of displays that offer standard, full-color VGA or SVGA desktop resolution. Xybernaut's flat-panel displays are all-light readable, have touchpads for quick input and are built to handle rugged use. Xybernaut's Head Mounted Displays* (HMD) with integrated microphone and earphones facilitate continuous

hands-free use through speech recognition. They offer binocular or monocular viewing and are worn comfortably with hard hats and other protective gear.

Input

MA V addresses a broad range of needs for data input. Workers can input detailed information conveniently with the featherweight 60-key wrist-worn QWERTY keyboard that can be configured with key commands to quickly input repetitive commands. Additionally, standard third-party USB keyboards and input devices can be used with the MA V. Integrated speech recognition capabilities allow for continuous hands-free input with an attached microphone. Mobile

workers can receive and transmit captured still images and streaming video from standard cameras in real time for a full multimedia experience.

Wearable Technology

MA V is designed to fit securely and comfortably on the body using a complete range of Xybernaut-designed vests, belts and cases. Xybernaut has taken great care to consider key ergonomic, comfort and function issues for body placement, access, weight balance, materials, freedom of movement, hygiene and body support to ensure seamless human-computer interaction.

* See user's manual for proper operation of Head Mounted Displays

Computing without Compromise

The MA V is manufactured by IBM based on specifications developed by Xybernaut and its best-of-breed partners. The result is a robust, full-feature computer that integrates seamlessly with standard computing technology.

Powerful

A 500 MHz Intel® Mobile Celeron® computer provides state-of-the-art functionality with enough power to run enterprise applications. An integrated Digital Signal Processor (DSP) increases processing efficiency for calculation intensive applications, such as speech recognition. An ultra low-voltage, low-heat CPU, powered by rechargeable, hot-swappable Lithium-ion batteries allows users to stay on the job longer.

Windows® 2000, 98, XP and Linux compatibility allows seamless integration with legacy applications, networks and technical support infrastructures.

Connected

Integrated wireless and hard-wired communications through fixed and mobile LAN/WAN networks allow data, voice and video to flow through your organization.

Optional wearable holster provides additional dedicated Firewire, USB, PCMCIA and battery power with hot-swapping. The VGA port in the holster also allows the unit to be used as a docking-station for use in a standard desktop setup.

Technical Specifications

Processor

- 900 MHz Intel® Mobile Celeron®, 1.1 V Ultra Low Voltage

Memory and Storage

- 128 MB SDRAM, expandable to 256 MB
- 5 GB internal HDD, externally expandable to 40 GB
- 1 GB removable HDD through the use of a 1 GB Compact Flash card

Ports

- Compact Flash, USB, FireWire® (LINK®), DC-IN jack, User Interface Port (sup. ports: DMS and GVI), PDP (Power Docking Port) for connection to the MA-V Holster, Power switch, Hibernate switch

Audio/Video

- Video memory 8 MB SDRAM
- Built-in sound card, full-duplex, stereo I/O
- Integrated Digital Signal Processor (DSP), Texas Instruments TMS320C55P™

CPU Chassis

- Durable magnesium alloy case
- 5.9" x 3.5" x 2" (15 cm x 9 cm x 5 cm)
- Approx. 1 lb. (455 g)
- Worn with belt, vest, suspender, shoulder pack, or backpack
- Optional protective pouch

Holster

- CPU Module connects to the optional holster for extended connectivity and operation
- 1 Type II or III PCMCIA card slot
- USB, FireWire® (LINK®), VGA, and Power Docking port
- Holster doubles as desktop docking station

Xybernaut® Panel Digital Flat Panel Display

- 6.4" (16.3 cm) viewable, all-light readable display, 640 x 480 color VGA
- 8.4" (21.3 cm) viewable all-light readable display, 800 x 600 color SVGA
- Brightness control, up to 500 cd/m²
- Onscreen keyboard and built-in handwriting recognition

- Activation: voice, passive stylus, or touch-screen
- Optional: zippered protective pouch or flip-down carrying case

Xybernaut® View Head Mounted Displays

- VGA, SVGA, color direct view display
- Monocular or binocular view
- Transmissive or occluded viewing
- Left- or right-side wearable
- Integrated microphone and earpiece speaker for voice activation and voice communications
- Handhat models available

Battery

- Primary and Secondary Lithium-ion batteries
- Hot-swappable
- AC power adapter/battery charger with protective circuitry

Xybernaut® Key Wrist-worn Mini-Keyboard

- 60-key wrist-mounted, ruggedized QWERTY keyboard

Software

- Windows 2000, Windows® 98, Windows XP, or Linux
- CIGLOT Handwriting Recognition (with FPD)
- On-Screen Keyboard Software (with FPD)
- Other drivers appropriate with peripheral devices purchased from Xybernaut

About Xybernaut

We are Practical Visionaries

With over a decade of experience and know-how, Xybernaut® explores, invents and patents breakthrough concepts in wearable and mobile computing. Our ideas evolve the way we work and live with technology, setting new standards for what we can achieve.

We Develop Innovative Technology Products

Xybernaut works with best-of-breed companies to create products that empower users to achieve the task-at-hand. Our hardware and software solutions can afford productivity gains in your work force, improved quality of service for your customers and a measurable return on investment for your organization.

We Offer Complete Integrated Solutions Worldwide

Xybernaut works closely with customers to achieve effective, long-term success. Our subsidiaries offer consulting and training services that provide for successful implementation and support of complete technology systems.

Xybernaut Corporation Headquarters

12701 Fair Lakes Circle
Suite 550
Fairfax, Virginia 22033
Phone: 703.631.6925
Fax: 703.631.6734
www.xybernaut.com
E-mail Sales: sales@xybernaut.com

Xybernaut GmbH - EMEA

Otto-Lilienthal-Straße 36
D71034 Böblingen
Phone: +49.7031.714.850
Fax: +49.7031.714.849
E-mail: info@xybernaut.de
Member of Softwarezentrum
Böblingen/Sindelfingen e.V.

Xybernaut KK - Japan

Urban Square Yokohama Bldg. 10F
1-1 Sakae-cho, Kanagawa-ku
Yokohama-shi, Kanagawa
221-0052 Japan
Phone: +81.45.440.0950
Fax: +81.45.440.0957
E-mail: info@xybernaut.co.jp

Ask your Xybernaut representative

for more information or visit
www.xybernaut.com
Sales: 888.992.3777
Customer Support: 877.877.0297

This publication is for informational purposes only and not intended to be a complete statement of product specifications nor to present a warranty of product performance.

XY-PB100

Figure Three: WSS Technology

WSS 1040/WSS 1060

symbol

WEARABLE SCANNING SYSTEMS

Breakthrough Technology and Ergonomics Revolutionize Workplace Productivity

The WSS 1040 and WSS 1060 Scanning Systems from Symbol Technologies help users achieve new levels of productivity and accuracy while advanced ergonomics make them easy to use and comfortable to wear.

Scanning, portable computing and wireless networking can now be performed while the user's hands remain totally free. Plus, the WSS 1040 and WSS 1060 systems represent breakthroughs in miniaturization, performance and data transmission. These new capabilities can increase productivity and ease of use in warehousing, transportation/logistics, manufacturing, retailing and other industries including e-commerce.

Put a Scanner and Computer Between Your Index Finger and Forearm

The WSS 1040 and WSS 1060 systems comprise two components—a scanner and wearable wrist computer. The RS 1 Ring Scanner is worn on the index finger. It is activated by pointing the finger at the bar code while pressing the thumb against a trigger. The RS 1 Ring Scanner is the smallest wearable laser scanner in the world, weighing only 1.7 oz./48 gm and just 0.9 in./23 mm high. It is ideal for scanning bar codes at distances of up to 2 ft./0.6m. The WS 1000-LR long-range scanner is worn on the back of the hand and reads bar codes on pallets at distances of up to 25 ft./7.6 m.

The WWC 1040 and WWC 1060 computers are worn on the forearm and include a CPU, display, keyboard, battery pack and Spectrum24® wireless communications. The WWC 1040 uses Spectrum24 1 Mbps wireless LAN communications, enabling you to transmit and receive data wirelessly—extending your network reach to the point of activity. The WWC 1060 features Spectrum24 High Rate with 11 Mbps throughput. Designed to IEEE 802.11b interoperability standards for next-generation direct sequence wireless LANs, Spectrum24 High Rate delivers data transmissions of up to 11 Mbps—that's more than five times faster than standard wireless LANs. But Symbol didn't stop at defined standards: super-smart algorithms, advanced mobility and security features, and much more combine to bring you the best in high-speed wireless LAN technology and services.

No Compromising on Performance

Both the WSS 1040 and WSS 1060 Scanning Systems have been engineered to perform flawlessly. The RS 1 Ring Scanner features a rugged and reliable laser scanner that scans quickly and accurately—even if bar codes are damaged or poorly printed. Its tiny scan engine permits a low-profile design, allowing it to avoid most bumps and knocks—but it has a scratch-resistant coating on the window just in case.

The WWC 1040 and WWC 1060 wrist computers offer powerful information gathering, processing and communications performance, yet are easy to use. They feature a programmable keyboard and backlit display, both optimally positioned for effortless keypad input and viewing, even in dimly lit environments. They weigh just 11.3 oz./316 gm and are powered by a long-lasting lithium ion battery. The ring scanner and computer are connected via an unobtrusive, lightweight cable.

Symbol's design engineers thoroughly tested these Wearable Scanning Systems, putting them through more than 40,000 user test hours with active customer participation. The result is maximum comfort and flexibility plus proven performance.

The RS 1 Ring Scanner fits fingers of all sizes and is reversible, allowing it to adapt equally well for right- and left-handed users. The lightweight wearable wrist computers adapt to fit every wrist. Both the ring scanner and wrist computer mount to straps that stay with each operator, eliminating worries about hygiene. Safety is not a concern because the ring breaks away under 20 lbs./9kg of pressure.

For more information, call any of the locations listed on the back panel or visit us at www.symbol.com/wearable

Features	Benefits
Data management system worn on the index finger and forearm	User's hands are free to handle materials and perform other tasks
RS 1 Ring Scanner—the world's smallest wearable scanner	"Point-and-scan" data capture is comfortable and reliable
Ergonomically designed miniature computer with backlit display and programmable keypad	Powerful computing and communications capabilities can go anywhere—even dimly lit environments
11 Mbps direct sequence (DS) high data rate (WSS 1060)	A high-performance wireless network solution for wide-bandwidth applications

WSS 1040/WSS 1060 Wearable Scanning Systems Specification Highlights

WSS 1040 and WSS 1060 Wearable Wrist Computers

Physical Characteristics	
Weight:	11.3 oz./316 gm (12.3 oz./350 gm with short-range microradio)
Size:	4.8 in. W x 3.4 in. L x 2.9 in. H 122 mm W x 86 mm L x 74 mm H
Display:	4 line x 20 character or 8 line x 20 character backlit PSTN LCD
Keyboard:	27-key backlit membrane keyboard
Performance Characteristics	
Processor:	NEC V25 running at 16 MHz
Memory:	640 K RAM
Communication:	Short-range microradio (wireless printing)-optional
Software:	DR DOS
Cable Interface:	38.4K max baud rate in serial connection
Power	
Batteries:	Single cell lithium ion battery pack (1200 mAh)
Charge Time:	140 minutes
Backup Power:	Super capacitor yields 15 minutes backup time
User Environment	
Operating Temperature:	-4° to 122° F/-20° to 50° C
Storage Temperature:	-40° to 140° F/-40° to 60° C
Humidity:	5% to 85% noncondensing
Sealing:	MIL-STD-810D, 506.2, Procedure II-Drip
Altitude:	Operation at 0-10,000 ft./3,048 m Storage up to 50,000 ft./15,240 m for 34 hours
Drop Specification:	5 ft./1.5 m to concrete
Wireless Communications	
Network:	Spectrum 24 *
Data Rate:	WSS 1060: 11 Mbps WSS 1040: 1 Mbps
Spreading Technique:	WSS 1060: Direct Sequence
Spreading Code:	WSS 1040: Multiple, software-controlled
Antenna:	Internal, diversity
Frequency:	Country dependent, typically 2.4 to 2.5 GHz
Compliance:	FCC part 15 (for U.S. only), ETSI 300.328 (Europe), RCD STD-33 (Japan)

RS 1 Ring Scanner

Physical Characteristics	
Voltage:	5 Volts DC
Current:	120 mA nominal (both LEDs "on")
Weight:	1.7 oz./48 gm
Color:	Gray, yellow
Dimensions:	1.1 in. W x 1.7 in. L x 0.9 in. H 34 mm W x 52 mm L x 27 mm H
Performance Characteristics	
Light Source:	675 nm laser
Scan Rate:	36 ±3 scans per second
Yaw:	±60°
Roll (Slew):	±20°
Pitch Contract:	±55°
User Environment	
Ambient Light:	Up to 9,000 ft.-candle sunlight and 450 ft.-candle artificial light
Operating Temperature:	-4° to 122° F/-20° to 50° C
Storage Temperature:	-40° to 140° F/-40° to 60° C
Humidity:	5% to 80% noncondensing
Breakaway Factor:	20 lbs./9 kg of pressure
Drop Specifications:	5 ft./1.5 m to concrete
Regulatory	
Electrical Safety:	Certified to UL1950, CSA C22.2 No. 950, EN60950/IEC950
Laser Safety:	CDRH Class II, IEC Class 2
EMI/RFI:	FCC Part 15 Class A, ICES-003 Class A, European Union EMC Directive, Australian SMA

EN410 CE

Specifications are subject to change without notice.
All product and company names are trademarks, service marks or registered trademarks of their respective owners.

Part No AI 3/01 Printed in USA 2001 ©2001 Symbol Technologies, Inc.
Symbol is an ISO 9001 and ISO 14001 certified company, and ISO registered company, where applicable.

For options, product or service availability and specific information within your country please contact your local Symbol Technologies office or Business Partner.

Corporate Headquarters
Symbol Technologies, Inc.
One Symbol Place
Hempstead, NY 11549-1211
TEL: 1-844-711-4234/1-421-728-2400
FAX: 1-421-728-5990

For Asia Pacific Area
Symbol Technologies Asia, Inc.
(Singapore Branch)
Asia Pacific Division
230 Victoria Street #04-01
Raffles Hotel Corporate Tower
Singapore 188024
TEL: 65-227-1566
FAX: 65-227-1466

For Europe, Middle East and Africa
Symbol Technologies
EMEA Division
Symbol Place, Wetherby Triangle
Berkshire, England RG41 1TP
TEL: 44-118-9457000
FAX: 44-118-9457200

For North America, Latin America and Canada
Symbol Technologies
The Americas
One Symbol Place
Hempstead, NY 11549-1211
TEL: 1-844-722-4234/1-421-728-2400
FAX: 1-421-728-5990
Symbol World Wide Web Internet Site
For a complete list of Symbol subsidiaries and
Business Partners worldwide contact us at:
<http://www.symbol.com>
E-mail: western@symbol.com

symbol

Figure Four: SafetyPAD

Products

designed to accommodate now and into the future.

SafetyPAD™ for EMS

An innovative, comprehensive, pre-hospital information management solution.

There is a significant **problem** facing the vast majority of agencies today: How can you improve your efficiency, seamlessly collect, manage, and distribute information, possess critical outcome data to support your existence, not overburden medics and staff, enhance patient care, and still cut costs ? The **answer**: **SafetyPAD**.

SafetyPAD is the result of tireless research and extensive feedback from hundreds of EMS professionals like **you**. It has been designed from the ground up to effectively address the needs of every arm of EMS.

what is SafetyPAD? [click here for an overview](#)

SafetyPAD is a comprehensive, flexible, ease-to-use, Windows 9x, NT, 2000 computerized information management system that allows agencies to collect, reference, share, assimilate, and distribute call and patient emergency medical information. It's made up of two unique systems: **SafetyPADmobile** and **SafetyPADbase**.

paperless

handheld

voice

SafetyPADmobile. a part of you.

SafetyPADmobile's intuitive **pen** and **voice** enabled interface allows users with little or no previous computer experience to quickly and accurately generate **complete** electronic reports **real-time**. It helps guide medics through documenting and assessing various stages of a patient encounter, thereby vastly improving **compliance** to medical and procedural guidelines while enhancing **patient care**.

hands-free

touch

pen-based

wearable

mobile

wireless

tool

SafetyPAD_{mobile} is also the **first** system in the **world** to offer flexible, **wearable** computer technology and **hands-free**, voice-aware entry and referencing capabilities, all of which allow medics to **focus** on what they do best . . . **care for patients**. It does not only collect data, it assists people who help others.

SafetyPAD_{base}. linking it all together.

With SafetyPAD_{base}, you have the power to enhance the operations of your entire enterprise by easily and electronically **collecting** comprehensive data, **distributing** it to the appropriate organizations (such as billing, dispatch, state & local agencies, etc.), **analyzing** its content, and continually **managing** the way it's utilized. The information managed by SafetyPAD **empowers** everyone involved in EMS.

An open architecture and configurable design work together to form a system that gives you **unlimited** flexibility and capabilities.

Analyzing, distributing, and sharing information between various systems is just a 'click' away.

capture

reference

manage

analyze

share

communicate

interface

automate

**managing
information with
SafetyPAD**

Collect, gather, document, record, reference, analyze, assimilate, process, share, link, connect, access, interface, distribute, communicate, utilize, and use information. **Why limit your capabilities.** Do this and more with SafetyPAD.

[click here for more!](#)

billing

QA/QI

management

legal

paperless

standardize

automate

guide

interact

optimize

enhance

world's first

wearable

hands-free

technology

flexible

customizable

upgradeable

a few key features

A benefit for everyone.

SafetyPAD effectively manages and links precious information with every arm of EMS, (such as care providers, billing, dispatch, hospitals, quality assurance, medical control, government agencies, management, etc.) whether in the field or at any site.

Productivity gets a shot of adrenaline.

With *SafetyPAD*, you have the power to enhance the operations of your entire enterprise while reducing costs and resource requirements by easily and electronically collecting comprehensive incident data, distributing it to appropriate organizations, analyzing its content, and continually managing the way it's utilized.

Active Guidelines enhance patient care.

By using our powerful 'Active Guidelines' feature, agencies can specify the information being captured and the guidelines medics should follow for particular types of problems (i.e., cardiac, seizure, trauma, burns, etc.). As a result, medics can more effectively manage the multitude of factors they're exposed to in the field, while appropriateness of care is maximized.

World's FIRST wearable, hands-free EMS system.

SafetyPAD is the first system in the world to offer flexible, wearable computer technology and hands-free, voice-aware entry and referencing capabilities for field personnel, all of which allow medics to focus on what they do best, care for patients.

Flexibility is paramount.

SafetyPAD was designed with an emphasis on flexibility. Flexibility to collect and reference the information you need. Flexibility to customize the system the way you want it. Flexibility to easily interface with a wide variety of systems. Flexibility to upgrade to more advanced technologies and enhanced capabilities. Flexibility that emphasizes open standards and ease-of-use.

end-user	Continuous improvement. Easy upgrading.
listening	Continuous user input is the key in ensuring that we are on the right track in understanding what users need and how SafetyPAD can more effectively assist them. We never stand still looking for new ways to provide a better solution. When better ideas and solutions are created, refined software 'components' can be distributed to end-users electronically. This eliminates the risk of owning a system that quickly becomes outdated.
improve	
upgrade	
solution	
assist	
Win95/98/NT	Windows means compatibility.
advanced	These features and more make this 32-bit Windows 95, 98, NT, 2000 system unmatched in its ability to equip EMS services with the most comprehensive, advanced information management solution available.

Overview

innovation that works.

SafetyPAD design. What makes it tick.

Stations		Dial-in
CAD	SafetyPADbase	Internet
Billing		LAN / WAN
Hospital		Wireless
QA / QI		Infrared
Medical Control		Cellular
State/Local		RF
Others...		Pager
Handwriting		ODBC
Voice	Information	ActiveX
Keyboard		Text
Remote data		HTML
Local data		SQL
GPS/mapping		Wearable
Medical Device	SafetyPADmobile	Pen-based
Camera/Video		Notebook
Printer		Palm PC
PC card		PC

- Medics
(EMTs,
Paramedics,
First
Responders)
- Patients
- Administration
- QA / QI
- Billing / Insurance
- Medical Direction
- MD's,
RN's,
Specialists
- Dispatch / CAD
- Legal Representation
- Local, Regional, State, and National Agencies

People. The driving force.

Making *SafetyPAD* simple to use has always been a top **priority**. We've focused on ensuring that every aspect of *SafetyPAD*'s operation is user-friendly and intuitive. We've been able to accomplish this by **listening** closely to our customers. As a result, users of all computer skill levels require minimal training.

The data managed by *SafetyPAD* can empower **everyone** involved in EMS. **Medics** can focus on patient care with a non-intrusive tool to rapidly collect, reference, and communicate data. A **patient's** assessment, treatment, and the underlying care they receive can be enhanced. **Administrators** can manage resources and link information systems. **QA/QI** is provided with unlimited data analysis capabilities to detect trends and modify education. **Billing** is given complete, pre-coded information, reimbursement-critical data capture capabilities, and automated system interfacing options. **Medical direction** is provided with accurate, complete information with the data elements necessary to continually improving guidelines. **Doctors, nurses, and hospitals** receive legible, timely, wirelessly delivered reports. **Dispatch** can share run and patient information. **Legal arms** can decrease liability exposure. **Area agencies** can receive properly formatted, paperless run data.

SafetyPAD makes the possibilities endless.

- Call related information (times, call type, location, disposition, destination, signatures, etc.)
- Patient related information (demographic s, present/past Hx, findings, vitals, treatments, meds, cardiac details, narrative, images, signatures, events, etc.)
- Physiological information *manually and electronically captured* - (ABC's, vitals, cardiac monitor, etc.)
- Referencing information (guidelines, past Hx, mapping, language, medical, multimedia, etc.)
- Unlimited capabilities to collect much, much more.

Information. Not only data collection.

SafetyPAD was specifically designed not only to collected data, but to **manage information** pertaining to the entire patient encounter.

SafetyPADmobile is unmatched in its ability to provide medics with a **real-time** information management tool with powerful, **intuitive** data entry and accessing features such as optimized **handwriting** and **voice** recognition, a 'smart' popup **keyboard**, and numerous enhanced Windows 9x features. SafetyPADmobile has been fine '**tuned**' for users to collect and manage information easily on small, mobile, pen and voice entry devices.

Our revolutionary '**Active Guidelines**' feature offers the ability to literally **interact with medics** to accelerate **entry**, provide valuable **reference** information such as protocols, assure complete, accurate and rapid **reporting**, and enhance patient care.

An **Open architecture** and a **configurable** design work together to form a system that gives you **unlimited** capabilities to define the information that is collected, displayed, referenced, and shared. With our powerful data registry feature, you can define specifically what information you need to **collect**. Integrated referencing features such as mapping/GPS, standardized data lookups, patient information archives, foreign language converters, drug and protocol guides, and multimedia viewers provide medics with rapid **access** to critical information.

SafetyPADbase is the perfect tool to manage the wealth of information involved in EMS. Services can distribute information using a variety of formatting (text, HTML, ODBC) and connectivity (dial-up, Ethernet, TCP/IP, wireless) standards. Our non-proprietary design means open options for end-users.

Analyzing, distributing, and sharing information is just a 'click' away.

Communications. Linking it all together.

Information is more effectively utilized when it can be **easily** and **rapidly** accessed and distributed.

- Wired / Wireless network connectivity
- LAN / WAN
- Win9x, NT connectivity
- Internet / Intranet
- Infrared, RF (public & private)
- Secure dialup, wireless, or Ethernet
- Real-time or per your needs
- Ports (Infrared, serial, parallel, Ethernet, USB, PCMCIA)

Interfacing *SafetyPAD* with systems such as billing, dispatch, and hospital informatics can be accomplished through a wide variety of open, data sharing and connectivity standards such as **ODBC, ActiveX, HTML, and TCP/IP.**

Automated interfacing modules are continually being developed for *SafetyPAD* to further **simplify** this process.

The wired and **wireless** real-time connectivity capabilities of *SafetyPAD* give agencies a powerful tool to perform such tasks as look up patient records, send current findings, communicate with medical devices, and deliver time and mission **critical** patient information.

DEVICES

- Pen-based tablet or handheld computer
- Wearable computer
- Laptop, notebook, or PC workstation
- Digital camera / video
- Medical devices (12-lead, AED, monitors, etc.)
- Peripherals (PC & Smart Cards, printer, keyboard, CD-ROM, etc)
- GPS (global positioning system)

Devices. Technology that assists.

SafetyPAD was developed from the ground up to **assist** people and **solve** problems. We're very proud that ingenuity and dedicated, determined efforts have made *SafetyPADmobile* the **world's FIRST** system that gives medics a helpful and practical **hands-free** option. Our system has been tediously enhanced to operate optimally on pen-based and **wearable** devices. *SafetyPADmobile* teamed with wearable computer technology like the **ViA Wearable**, offers **complete** user mobility, **real-time** information accessibility, and optimize **ergonomics**. This synergy arms medics with an extremely powerful field solution, **unmatched** by any system available today.

SafetyPADmobile also effectively runs on a number of Pentium-class **pen-based** computers for agencies whose operations are better suited for tablet or handheld devices. These systems provide a small, portable, pen & paper metaphor option that allows medics to remain highly **mobile**. *SafetyPADmobile* can also operate on any Win9x laptop or notebook computer.

Our solution also seamlessly interfaces with other beneficial technology. **GPS / mapping** helps you easily find a scene. Multimedia displays instructional **video**. Digital cameras capture detailed **pictures** (which are sometimes worth a thousand words). Infrared allows users to '**beam**' information to other IR-enabled devices. **Wireless** modems provide untethered two-way connectivity. Advanced interfaces with a variety of **medical devices** and **defibrillation** products integrate critical physiological information into one, comprehensive system. And we'll continue to find better ways to provide you with the best **solution** available.

Features and Benefits

continuing to provide a better solution.

cut costs

"Electronically managing information can drastically lower costs associated with gathering, assembling, distributing, analyzing, and utilizing information. SafetyPAD is an effective electronic information management system that allows agencies to actualize significant cost savings."

- Eliminate inconvenience and expense of using paper.
- End redundant, delayed data entry and transcription errors into other systems.
- All entities utilizing patient data (billing, QA/QI, administration, etc.) will realize significant cost savings.
- Reduce time and resource requirements needed to enter and manage information.

+ revenue

"Patients and insurance companies are less likely to pay for services that are not well documented. SafetyPAD is an invaluable tool for agencies to capture all necessary information."

- Better determine level of care for maximum reimbursement.
- Guarantee the capture of current and future reimbursement-critical information.
- Maximize productivity and minimize down-time.

billing operation

"SafetyPAD insures that current and future billing requirements are met."

- Streamline billing activities.
- End redundant, delayed, inaccurate, and incomplete data entry.
- Timely access to run data allows agencies to rapidly process and distribute electronic billing information.
- Built-in assignment of billing codes (ICD-9, CPT, etc.).
- Automated modules provide one-touch, direct interface to popular billing systems.

legal protection

"A complete patient encounter record is pivotal to a strong defense. SafetyPAD solidifies protection of pre-hospital care providers from litigation by insuring comprehensive documentation."

- Content-sensitive guidelines to augment appropriateness of care.
- Insure regulatory compliance.
- Decrease liability exposure with comprehensive documentation of findings, rule-outs, etc.
- Confidential data protection and encryption capabilities.
- 'Active Guidelines' feature leads to accurate and complete reporting.
- Significantly reduce errors and omissions.

clinical & medical

"Information gathered in the field must be accurately communicated to those continuing patient care. SafetyPAD permits care providers to quickly and effortlessly distribute critical patient information to the appropriate agencies."

- Open architecture design gives agencies complete flexibility to define the information they gather and reference.
- Augment pathway management through 'Active Guidelines' features.
- Greatly enhance and automate statistical capabilities.
- Acquire key information that may not be available to hospital personnel (patient position in an MVA, trauma mechanism, etc.).
- Capture, store, and forward digital information such as vitals, images, medical device monitoring/event data, etc.).
- Expose medics to meaningful information for specific problems to enhance appropriateness of care.
- Provide and analyze information that assists QA/QI in taking steps to improve patient outcome.

gather information

"Acquiring accurate, legible, and complete call and patient information is critical for every arm of EMS care. SafetyPAD was designed to provide uncompromising flexibility and ease-of-use to match an agency's data needs. Information can be realistically gathered at a patient's side in most cases by using a variety of simple yet potent entry options."

- Powerful data registry allows agencies to define and display ONLY the data elements they require.
- Optimized for REAL-TIME usability to maximize information entry and access.
- Complies to NHTSA data set standard, with the flexibility to readily conform to other standards.
- Synergistic combination of pick / pull-down lists, handwriting and voice recognition, and enhanced on-screen virtual keyboard.
- Optimized real-time data acquisition features.
- Assure collection of required data.
- Easily collected digital data (signature, voice, images).

reference information

"SafetyPAD offers a number of rich features and tools to assist medics in the field. Critical information is one touch away."

- Local and remote access to information such as patient demographics, past history, and call details.
- Interactive guidelines augment appropriateness of care.
- Extensive multimedia features.
- Embedded mapping/GPS interface helps medics arrive at their destination quickly and without misdirection.
- One-touch referencing to detailed information such as allergies, medications, and guidelines.
- Foreign language referencing to key information such as consent, refusal and common complaints.

communicate & share information

"Having time and mission critical information readily available is extremely valuable in making informed decisions. SafetyPAD links data between other SafetyPAD products and a variety of common systems such as billing, CAD, hospitals, and medical and peripheral devices."

- Wired or wireless in-field connectivity capabilities makes critical information immediately accessible to other SafetyPAD systems, dispatch, hospitals, local, state or national agencies, medical devices, peripherals (printers, digital cameras & video), and other information systems.
- Share and communicate information by utilizing open standards (ODBC, SQL, ActiveX, TCP/IP, IrDA) or use an automated or customized module that fits your requirements.
- Open architecture allows direct communications using wired/wireless modems, infrared, internet, direct connection, or other Win9x, NT supported mechanisms.
- Significantly enhance patient care with the capability to wirelessly access and deliver valuable information REAL-TIME such as run details, past patient records, current findings, digital images, and more.

manage information

"Finding desperately needed answers to a multitude of questions is hopeless without a powerful mechanism to collect, analyze and share appropriate information. SafetyPAD gives agencies a robust yet ease-to-use solution to accomplish this."

- Unlimited array of collection, reporting and analyzing capabilities.
- Open architecture and design permits flexible data sharing, access, and interfacing.
- Manage your operations more effectively.

- Easily share local and remote data.
- Increase productivity.

customizable

"Everyone has special needs. SafetyPAD provides comprehensive features and the flexibility to accommodate unique requirements."

- Truly open architecture provides uncompromising flexibility in data collection and referencing, GUI interface, rule and validation definitions, communications, reporting, querying, and more.
- Screen contents and flow can be modified to maximize speed and appropriateness of data entry.
- Upgrades can be electronically distributed to end-users.
- ActiveX technology used to insure current and future open capabilities.

easy-to-use

"People are less apt to use a system that is an inconvenience or makes their job more difficult. SafetyPAD has been tediously shaped into a beneficial tool that can be comfortably used by personnel, regardless of their computer skill level."

- No previous computer experience necessary for most tasks.
- Extremely short learning curve.
- Pen and paper metaphor.
- Intuitive, graphical, user-friendly interface.
- Optimized for simple, rapid pen and voice entry.
- Mobile system designed for simple yet optimal field use.
- Hands-free operation options.

cutting-edge

"SafetyPAD's innovative, open design allows it to remain at the forefront of technology. System upgrades can simply be electronically delivered to end-users."

- Voice-recognition is optimized for real-time field use.
- Wearable computers are an option that provide maximum convenience and usability.
- Medical, digital and wireless device interface capabilities.
- Integrated mapping, GPS feature.
- Based on distributable ActiveX component architecture.
- 32-bit software is Win 95, 98, NT compliant.

hands-free

"Medics need freedom and mobility to provide effective patient care. SafetyPAD offers a helpful and practical hands-free option for medics."

- Documentation and information management becomes less intrusive and distractive.
- SafetyPAD can gather critical data, reference pertinent details, and communicate information all WITHOUT holding a clipboard.
- Enhanced device ergonomics lead to prioritized, hands-on patient care.
- A wearable computer gives medics complete mobility, won't be forgotten at a scene, is immediately accessible, and is less likely to be damaged.

Figure Five: XyberKids

**Assistive Technology empowering
students with disabilities**

XyberKids, a breakthrough in assistive technology, empowers students with communication challenges, bringing them the power of a desktop computer in a wearable package. The XyberKids solution has been developed around a functional, lightweight wearable computer, the Mobile Assistant® V (MA® V), designed to boost your student's rate of learning.

Computing that Grows with You

MA V brings the power and functionality of a state-of-the-art desktop computer from the back of the classroom to the student's backpack, by putting the tools they need within reach. XyberKids provides instant access to computing. The package includes a backpack, powerful speakers and the MA V with an all-light readable flat panel display. Various software programs allow the MA V to be customized for students' specific needs, allowing the product to grow with the students as they learn.

Flexibility for all Situations

Xybernaut® provides assistive technology that extends beyond the classroom and into the playground, the grocery store and anywhere students need the power of mobile computing. More than just a communication device, the XyberKids product brings the ability to do standard computing functions, such as calculations, multi-media, word processing and the accessibility of the internet to the students anywhere they take it. The specially designed XyberKids pack makes this discrete, lightweight and durable package easy for students to take with them from home to school and everywhere in between.

Learning without Compromise

Not all students benefit from traditional learning tools found in the classroom. To communicate and participate in classroom activities, many students benefit from having a full-function computer at their side to assist them. The XyberKids product is a multi-component solution for students who face the challenge of a disability, allowing them to have powerful computing with them everywhere they go.

Communication with the Power of Computing

Equipping students who face challenges from disabilities with XyberKids gives them a quantum leap beyond traditional assistive devices. No longer limited by the equipment's functionality and location, students are given the freedom and power of communication and learning in every facet of their lives.

Technology that Works with You™

Technical Specifications: XyberKids Pack

MA V

- 500 MHz Intel® Mobile Celeron®, 1.1 V Ultra Low Voltage
- 128 MB SDRAM expandable to 256 MB
- 5 GB Internal HDD, externally expandable to 40 GB
- 1 GB removable HDD through the use of a 1 GB Compact Flash Card
- Ports – Compact Flash, USB, Firewire®, DC-in Jack, User Interface Port (supports LVDS and GVIF), PDP (Power Docking Port), power switch, hibernate button
- 5.9" x 3.5" x 2" (15cm x 9cm x 5cm)
- Approx. 1 lb. (455g)

Back Pack

- Fully insulated mesh storage pouch with adjustable elastic strap
- Heavy duty polyester and rip stop nylon
- Adjustable waist strap with quick release clasp
- Padded shoulder straps
- Approx. 15" x 10" x 5" (38cm x 25.4cm x 12.7cm)

Xyber Panel Digital Flat Panel Display

- 8.4" viewable (21.3cm), all light readable display
- 800 x 600 color SVGA
- Brightness Control, up to 500 cd/m2
- Onscreen keyboard and built-in handwriting recognition

Order XyberKids today!

Call 800.878.6856 today, or visit our web site for more information on XyberKids at www.xybernaut.com

About Xybernaut

We are Practical Visionaries

With over a decade of experience and know-how, Xybernaut® explores, invents and patents breakthrough concepts in wearable and mobile computing. Our ideas evolve the way we work and live with technology, setting new standards for what we can achieve.

We Develop Innovative Technology Products

Xybernaut works with best-of-breed companies to create products that empower users to achieve the task-at-hand. Our hardware and software solutions can afford productivity gains in your work force, improved quality of service for your customers and a measurable return on investment for your organization.

We Offer Complete Integrated Solutions Worldwide

Xybernaut works closely with customers to achieve effective, long-term success. Our subsidiaries offer consulting and training services that provide for successful implementation and support of complete technology systems.

Xybernaut Solutions, Inc. - XSI/XGE
8618 Westwood Drive
Suite 450
Vienna, Virginia 22182
Phone: 800.878.6856
www.xybernautsolutions.com
E-mail Sales: XSI_info@xybernaut.com

Xybernaut Corporation Headquarters
12701 Fair Lakes Circle
Suite 550
Fairfax, Virginia 22033
Phone: 703.631.6925
Fax: 703.631.6734
www.xybernaut.com
E-mail Sales: sales@xybernaut.com

This publication is for informational purposes only and not intended to be a complete statement of product specifications nor to present a warranty of product performance.