

## The art of mobility: how transdisciplinary artists' projects are testing the boundaries of mobile media design

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Locative media emerged over the last half decade as a response to the de-corporealized, screen-based experience of net art, claiming the world beyond either gallery or computer screen as its territory. Initially coined as a title for a workshop hosted by RIXC, an electronic art and media center in Latvia during 2002, the term is derived from the 'locative' noun case in the Latvian language, which indicates location and vaguely corresponds to the English prepositions 'in', 'on', 'at', and 'by'.<sup>1</sup>

### Abstract

This paper will examine and critically align a number of projects using mobile and pervasive technologies, which have challenged the design and delivery of mobile services from around the world, as documented on the author's weblog and forthcoming book *Mobile Audience*. The examined range of artist's work in locative media also raises key questions on the underlying conceptual frameworks necessary for an effective locative experience.

**Keywords:** locative, pervasive, media, art, design

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<sup>1</sup> Tuters, Marc and Varnelis, Kazys, "Beyond Locative Media"  
[http://networkedpublics.org/locative\\_media/beyond\\_locative\\_media](http://networkedpublics.org/locative_media/beyond_locative_media) accessed 12/03/08

## Space and place

Screen cultures to date have been dominated both by narrative and by its modes of framing. Dispersed modes of interaction raise a series of questions about emergent new media art forms, particularly in relation to an audience's changing modes of participation and reception. The convergence of mobile technologies and pervasive computing methods are creating a world where information-rich layers can be mapped directly onto urban topologies. This opens up a series of interrogations around changing concepts of space and place and new perceptions of urban space for a wide range of traditional disciplines from art and architecture to cultural studies. The blurring of the boundaries between physical and virtual demands a new theory-base to explain our changing concepts of the 'real', and, with the growth of hybrid environments, the concomitant changes in sociability and communication patterns.

The nature of audience interaction is responding to a socio-cultural dynamic that, although yet far from being quantified, demonstrates both a desire for a greater degree of 'participation' (evidenced in popular broadcast television e.g. Big Brother and its interactive outlets) and in the meteoric expansion of social networking on sites such as MySpace and Facebook. Where both these participatory and networking imperatives meet with pervasive media, an emergent art practice is developing, which is pushing at the boundaries of these technologies.

What therefore is the potential for the emergence new visual and auditory languages and strategies of narrative in the new paradigm of locative and pervasive media? Analysing and redefining the emergent visual and auditory languages required to enable the realisation of effective interactive narrative and art forms in urban and site-specific environments is a huge challenge. But only through such an understanding of the new and radical forms of experiment, can we attempt to map changes in sociability and communication patterns and new forms of collaboration.

How can this extension of interactive technology from fixed installation to real urban geographies radically alter the modes of audience participation and reception? If the physical space overlaps the space of diegesis, can this emergent space for art and performance create new perceptions of space and place in an audience? We appear to need a redefinition of the concept of physical space (including hybrid environments), since through such technologies a new perception of urban space is emerging which is not visual, but conceptual.

Much reflection on Locative media art has been premature, for as Drew Hemment observes:

It is too early to offer a topology of locative media arts, however, or to tie the field down with strict definitions or borders. While artists such as Masaki Fujihata (JP), Teri Rueb (CN) and Stefan Schemat (DE) have been producing work in this area for many years, more widely there have been only a handful of fully realised locative art works, with many projects remaining in the beta-stage, if not still on the drawing board. We have not yet reached the point at which the technology disappears - all too often the tendency is to focus on the technology and tools rather than the art or content.<sup>2</sup>

The waters have been further muddied by the convenient way in which artists' projects have often aligned with the consumer research interests of the mobile phone companies, where yesterday's locative project becomes tomorrow's 'killer app':

Mike Liebhold of the Institute for the Future (IFF) regards 'geohackers, locative media artists, and psychogeographers' as key players in developing the 'geospatial web', where the web becomes tagged with geospatial information, a development that he sees as having 'enormous unharvested business opportunities', and believes that this context-aware computing 'will emerge as the third great wave of modern digital technology'.<sup>3</sup>

Locative artworks, based on digital mobile technologies are a relatively new phenomenon. Yet art practice based on site-specific works and nomadic strategies is not just old, but ancient. Locative Art, by its very nature, trespasses into the realm of Public Art, but by its interaction with the public, transforms our notions of site-specific and ambulant practices, defined over the last three decades by artists such as Richard Long, Hamish Fulton, Vito Acconci and Sophie Calle. The history of located and nomadic art is a very long one indeed - stretching back beyond Robert Smithson and Richard Long to Aboriginal Songlines and spatialised religious rituals. I pose here the question whether, by similarly rooting locative practice in

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<sup>2</sup> see [http://www.drewhement.com/2004/locative\\_arts.html](http://www.drewhement.com/2004/locative_arts.html)

<sup>3</sup> Quoted in "Beyond Locative Media" by Marc Tutters and Kazys Varnelis. See also "The Geospatial Web: A Call to Action - What We Still Need to Build for an Insanely Cool Open Geospatial Web" by Mike Liebhold, Senior Researcher, The Institute for the Future  
< <http://lists.burri.to/pipermail/geowanking/2005-May/001536.html> > (accessed 12/03/08)

profound cultural and psychological structures, locative work can gain greater artistic resonance. Respect for place and space has long gone from our social uses of location-based technologies and may only be reclaimed by artists.

While the tagging of urban space is a process enabled by the commercial concerns of big software players such as Microsoft and Google, it will probably only be when that process meets the next generation of GPS enabled mobiles that the really interesting art works will begin to emerge, possibly on individual issues of sustainable lifestyles - as in Katherine Moriwaki's *Inside Outside* pollution-sensing handbag.<sup>4</sup> Social uses of technology are always beyond prediction. Christian Nold for example has definitely found a new way to exploit the personal context of the technology with his emotion mapping and bio-sensing in relation to location.<sup>5</sup> I am sure such hybridity combined with the collective construction and augmentation of site-specific knowledge through wiki-like interfaces is an evolving future for locative art.

Which bring me to a further question relating to the art itself. Much of what is named 'Locative Art' is not really art, but rather games-based work or spatial documentary or simply advanced toolsets that happen to use this technology. I think the potential is there, but art has a different function to these uses and when it is truly present you can smell and see it from afar. This brings us back to my earlier question about the pleasures and modes of user experience and how we can distinguish these from other media art forms or genres of work?

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<sup>4</sup> <http://www.kakirine.com/> (accessed 12/03/08)

<sup>5</sup> <http://www.biomapping.net/> (accessed 12/03/08)



Figure 1. GPS tracking of referee's movements in a match (Jeff Knight, DMU)

In defining the pleasures of the medium the *Mobile Bristol* project made an attempt to identify these through a seminar series in 2005, where for example, it was discovered that the accidental overlapping of ambient environmental sound and augmented sound with in a locative work created delicious ambiguity and extra resonance for an audience.<sup>6</sup> What is needed most I think is to understand both the social context of these new artworks and the pleasures of their reception and use. These are dependent on haptic and spatial senses such as *proprioception*, which are little understood by artists.

### A gendered form

The political and economic shape of society ultimately forms contemporary modes of narrative. The contradictory pressures of neo-liberal economics, which drive the growth of personalised and peer-to-peer media and the interpenetration of workspace and private space, also seem to offer a unique opportunity to break Mulvey's determinist 'male' control of narrative vision, which dominated narrative in

<sup>6</sup> <http://www.mobilebristol.co.uk/NewSeminarsLanguage.html> (accessed 12/03/08)

the 19th and 20th centuries, and, to promote a more de-centred and subtle mapping.<sup>7</sup>

Feminist critics have often raised alternative strategies to break the negatives of a culture of male 'control'. Not surprisingly, some interesting female locative practice explores precisely this area. Teri Rueb's *Drift*<sup>8</sup>, for example, tied a sound landscape to the movements of the tide on a north European beach. The installation covered a 2 km x 2 km region on the Wadden sea that is filled with areas of interactive sound. The piece creates a space of flows consisting of sounds and words that travel like particles on simulated air and water currents loosely based on actual oceanographic and meteorological data. The audience had either to give itself up to the primal cycles of nature or risk terminal confusion and data loss.

### **Performance or game-play?**

Mobile devices already appear performative in their nature, with public space interpenetrating our private concerns, so that any conversation has its willing or unwilling eavesdroppers. Add to this the potential for social interaction, crudely demonstrated by *Flashmobs*, and in more sophisticated ways by mobile gaming, you have a case of new technology creating adaptive social behaviours, which contain strong performative elements:

The mobile games industry has long been the poor relation of the PC and console markets, but a combination of new technology, services and investment is fuelling optimism that mainstream adoption is not too far off. Ask anyone to name a mobile phone game and the most common response will be Snake or Tetris. And while the classic Russian puzzler is the world's most played and downloaded mobile game it is not an accurate reflection of the industry.<sup>9</sup>

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<sup>7</sup> Mulvey, Laura Visual and "Other Pleasures" (Theories of Representation and Difference)

<sup>8</sup> <http://www.terirueb.net/drift/index.html> (accessed 12/03/08)

<sup>9</sup> "How mobile got its game on" by Darren Waters

Technology editor, BBC News website, San Francisco

<http://news.bbc.co.uk/1/hi/technology/7254123.stm> (accessed 12/03/08)

Far more demanding games are already being played using mobile technologies such as *Catchbob*<sup>10</sup> and Blast Theory's *Uncle Roy All Around You*, which combine Internet and mobile technologies, where the city and the Internet were regarded as related stages on which we play, regardless of the specific context. Steve Benford of Nottingham University now talks of 'seamful' media where players have learnt to exploit GPS 'shadows' (where tall buildings block satellite triangulation) to their own advantage during game play, describing how such unforeseen effects of the technology encouraged new kinds of movement through the city.<sup>11</sup>

The failure of such works is often in terms of misapplied contextual practice: I once tested Valentina Niisi's *Media Portrait of the Liberties* in Dublin before the demise of MIT's EuroLab.<sup>12</sup> We had gone about a block when the local youths began stoning us. The technology was certainly impressive, but this new form of public art was alien even to the children of the collective contributors to the artwork. When participating in Blast Theory's *Uncle Roy All Around You*, I reflected on how the game's format had reduced the richness of the city to a few textual clues and a dangerous process of frantic searching, with users crossing roads with even less awareness than the average iPod listener.

### **Spatial annotation**

Spatial annotation has emerged in the last three years as a major Internet phenomenon, particularly with the growth of Google Maps and social photosharing sites such as Flickr. In spatial annotation projects like *Yellow Arrow*<sup>13</sup> and *Neighbornode*<sup>14</sup> and in my own *Starshed*<sup>15</sup> (Fig. 2) for *Electric Pavilion*, cities are increasingly being treated as surfaces on which individuals can inscribe annotation, and which will ultimately become repositories of collective memory. Such story-telling projects allow for new social and cultural readings of space, allowing private narratives to become public and subject to reinterpretation.

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<sup>10</sup> <http://craftwww.epfl.ch/research/catchbob/>

<sup>11</sup> "Performing Space" Arts and Humanities Research Council Seminar at Nottingham Trent University, February 2008

<sup>12</sup> <http://www.valentinanisi.com/liberties.html> (accessed 12/03/08)

<sup>13</sup> <http://yellowarrow.net/index2.php> (accessed 12/03/08)

<sup>14</sup> <http://www.neighbornode.net/> (accessed 12/03/08)

<sup>15</sup> <http://www.electricpavilion.org/content/roots/starshed/index.html> (accessed 12/03/08)

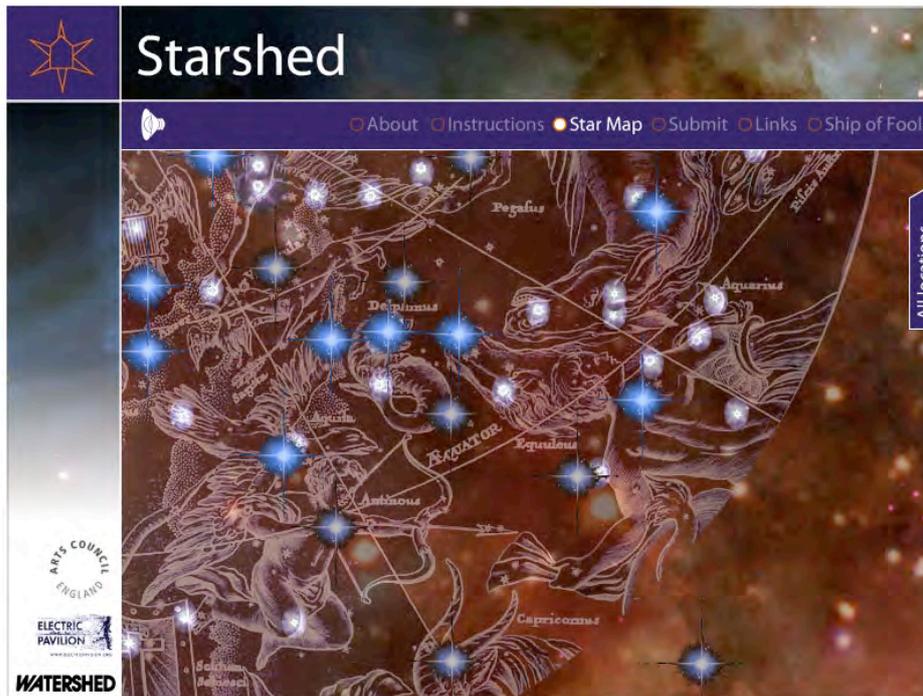


Figure 2. *Starshed* (Martin Rieser / SOF)

Satnav systems tend to reduce our world to roads between A and B. The specific tagging potential of the locative can certainly overlay this reductive idea of space with all the richness of personal experience, but that depends on the framework provided and the context set by the artist, and in many projects this is so loosely drawn that we simply achieve a kind of public palimpsest.

In their project *34n 118w*, Jeffrey Knowlton, Naomi Spellman, and Jeremy Hight had users take Tablet PCs with Global Positioning Devices and headphones onto a former railway yard in downtown Los Angeles. As participants walked around the site, they could hear fictional statements recounting the history of the place. To quote Hight:

The story world becomes one of juxtaposition, of overlap, of layers appearing and falling away. Place becomes a multi-tiered and malleable concept.<sup>16</sup>

There are other contemporary narratives resonant with the reinforcement of site and story. *Riot1831!* from Mobile Bristol depicted the Bristol Riots of 1831.<sup>17</sup> This first

<sup>16</sup> <http://34n118w.net/> (accessed 12/03/08)

<sup>17</sup> See: <http://www.cs.bris.ac.uk/Publications/Papers/2000261.pdf>.

GPS-enabled locative drama was an immersive and powerful experience, engaging with the immediate spaces of history, mapped onto a Georgian square where the original events took place.

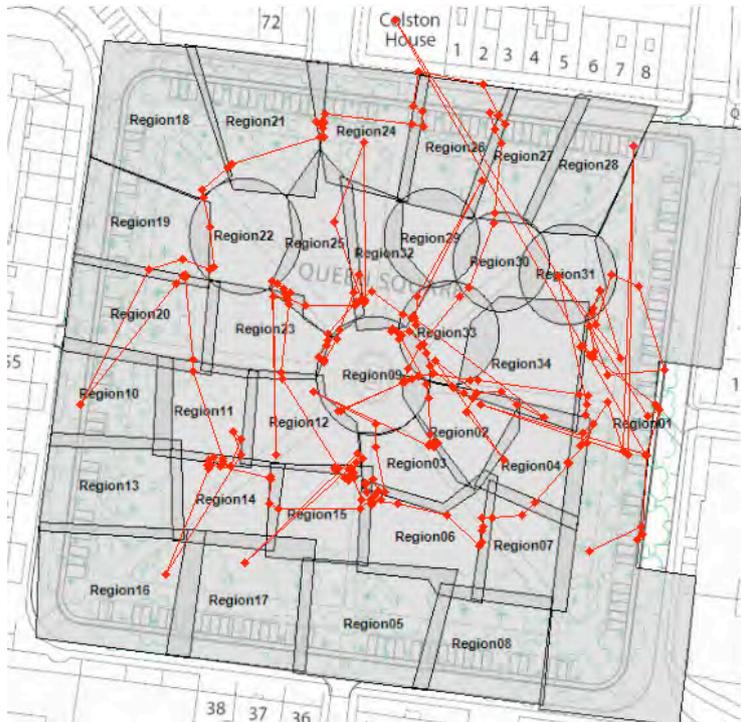


Figure 3. *Riot!*: user tracks in Queens Square showing audio zones



Figure 4. *Riot!* users in the Square

At first sight it seems contradictory that such engaging locative works tend to deal with an historical past rather than the lived present. After all, Paul Virilio identified new media as promoting the change from considered diegesis to continuous and automatic present, the user creating the narratives both as subject and object; the visual subject becoming transferred to a technical effect, which forms a sort of 'pan-cinema', turning our most ordinary acts into movie action. However where these locative works succeed, they seem to overlap the user's enactment of a continuous present with the user's immediate perception of a contiguous past.

The ever increasing technologising and enclosure of urban and public spaces is a phenomenon associated with the growth of 'Herzian' Space and what Mark Augé<sup>18</sup> has termed the growth of 'no place' (the anonymous motorway or mall). Stephen Graham points to how:

... places [are] becoming increasingly constructed through consumer decisions which, in turn, are influenced through the ... surveillance, and sorting, of cities.<sup>19</sup>

Such cities, increasingly 'sorted' through the software and networking, point to a related political question about the embedding of previous relations of power, class and ownership in the new infrastructures, and, whether this perpetuates ancient divisions or raises further questions related to the potential for community and individual empowerment.

### **Mapping as critique**

Apart from the arguments that the technology is intrusive and very commercial and is being 'sold' to us via arts projects, there are those about the role of Situationist ideology in locative media (something about which I am personally deeply sceptical, mainly because so few artworks succeed in the 'Detournment' of the original movement). The GPS mapping practice of modern psychogeographers, (see <http://www.gpsdrawing.com> and <http://socialfiction.org>) are seemingly related to the

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<sup>18</sup> 3 Augé, Marc, *Non-Places: Introduction to an anthropology of supermodernity*, Verso, 1995

<sup>19</sup> S. Graham, "The Software-Sorted City: Rethinking the 'Digital Divide'", in S. Graham (ed.), *The Cybercities Reader*, London: Routledge, 2004: 324-331.

writings of Guy Debord and his practice of the 'Dérive'<sup>20</sup>, but in reality seldom appear to achieve anything identifiably subversive. To quote one cultural critic:

Locative media is: Psychogeography without the critique. Algorithmic psychogeography, the term used by <http://socialfiction.org> to describe their rule-based derives through the city, is not just a development, but actually a fundamental reversal of the critical use of this Situationist tool.<sup>21</sup>

The 'Dérive' or 'drift' was a method for subversion; of remapping the world with 'uncontrolled' clarity, for identifying the secret flows of money and power below the surface of the city. However, one strategy Debord does cite: 'the introduction of alterations such as more or less arbitrarily transposing maps of two different regions', has been successfully adapted in several locative works. Jen Southern and Jen Hamilton in *Distance Made Good*<sup>22</sup> used parallel mirrored journeys on two continents; in *Shadows from Another Place*<sup>23</sup> Paula Levine creates a hybrid space between Baghdad and San Francisco composed of the superimposition of their city centres. A mapping of the initial US attack on Baghdad is superimposed upon downtown San Francisco. The longitude and latitude of each bombsite is marked in San Francisco using a GPS device. C5 in *The Other Path*<sup>24</sup> set out on a month long Great Wall trek, starting in the northwest desert of China and following the Wall eastward to where it runs to the edge of the Yellow Sea. GPS data collected during

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<sup>20</sup> "The Dérive (with its flow of acts, its gestures, its strolls, its encounters) was to the totality exactly what psychoanalysis (in the best sense) is to language. Let yourself go with the flow of words, says the psychoanalyst. He listens, until the moment when he rejects or modifies (one could say detourns) a word, an expression or a definition. The dérive is certainly a technique, almost a therapeutic one. But just as analysis unaccompanied with anything else is almost always contraindicated, so continual dérivings is dangerous to the extent that the individual, having gone too far (not without bases, but...) without defenses, is threatened with explosion, dissolution, dissociation, disintegration. And thence the relapse into what is termed 'ordinary life,' that is to say, in reality, into 'petrified life.' In this regard I now repudiate my Formulary's propaganda for a continuous dérive. It could be continuous like the poker game in Las Vegas, but only for a certain period, limited to a weekend for some people, to a week as a good average; a month is really pushing it. In 1953-1954 we dérivé for three or four months straight. That's the extreme limit. It's a miracle it didn't kill us" (Ivan Chtcheglov, excerpt from a 1963 letter to Michèle Bernstein and Guy Debord, reprinted in *Internationale Situationniste* #9, p. 38).

<sup>21</sup> Saul Albert <[www.twentiethcentury.com](http://www.twentiethcentury.com)> (message dated Tue Apr 27 2004)

<sup>22</sup> Jen Southern and Jen Hamilton "Unfeasible Symmetry" *Artists Newsletter Magazine* (October 2003) article on *Distance Made Good* shown at The Gallery, Stratford-upon-Avon, UK. July 2002 <http://www.theportable.tv/dmg/index.html> (accessed 12/03/08)

<sup>23</sup> Paula Levine, *Shadows from Another Place* (2003)  
Levine builds upon this link, creating Hybrid space between Baghdad and San Francisco composed of the transposition of Baghdad and San Francisco.

<sup>24</sup> C5: *The Other Path* (April 2004) <<http://www.c5corp.com/projects/otherpath/index.shtml>>

this trek was used to develop a pattern matching search procedure for locating the most similar data model in the most similar terrain in California.

Mark Tutters has perceptively identified how such annotation and tracing fits into the legacy of Situationism, which Locative Media has claimed as a philosophical base from its inception:

Roughly, these two types of locative media, Annotative and Tracing, correspond to two archetypal poles winding their way through late 20th century art, critical art and phenomenology, perhaps otherwise figured as the twin Situationist practices of detournement and the derive.<sup>25</sup>

Situationism in Locative media resists easy definition, but may best be represented says Tutters, by one of Deleuze and Guattari's maps which distinguish between annotation and tracing:

The map is open, connectable in all its dimensions, and capable of being dismantled; it is reversible, and susceptible to constant modification. It can be torn, reversed, adapted to montages of every kind, taken in hand by an individual, a group or a social formation. It can be drawn on a wall, conceived of as a work of art, constructed as a political action or as a meditation ... Contrary to a tracing, which always returns to the 'same', a map has multiple Entrances.<sup>26</sup>

Blast Theory, a locative media group composed of several London-based avant-garde theatre artists have gained renown for projects such as *Can You See Me Now* (2001), *Uncle Roy All Around You* (2003), and *I Like Frank* (2004), in which they used location-aware mobile mapping devices to coordinate interactions of audience and performers in both real and virtual space. *Uncle Roy All Around You* is one of the most lauded recent locative works, yet it appears an uneasy mix of performance and game, its full narrative only accessible to those who successfully complete their quest. The real and virtual sit in an uncomfortable relationship with the environment, which is only valued as a source of directional clues - and any

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<sup>25</sup> "Beyond Locative Media" by Marc Tutters and Kazys Varnelis

<sup>26</sup> G. Deleuze and F. Guattari, *On the Line*, New York: Semiotext(e), 1983: 25-26.

casual bystander remains largely mystified and excluded. The charge levelled at Blast Theory at a conference was that of complacently and uncritically adapting new practice for the games industry, thus unwittingly acting as fashionable agents for intrusive and suspect technologies. For the flip side of ubiquitous communication and augmented location is the ability to track the audience: so a whiff of the totalitarian always haunts the liberating potential of the technologies. Matt Adams has rebutted this critique in interview, pointing to the collaborative co-dependency explored by the work.<sup>27</sup>

Their performances and installations have been supported through corporate sponsorship, public arts funding, and through a six-year collaboration with the Mixed Reality Laboratory at the University of Nottingham. The group's own web site claims:

Blast Theory has a history of working with corporate clients to deliver innovative marketing strategies, 'thereby creating' commercial projects that draw global audiences to compelling, high adrenaline interactive experiences. The team of artists and scientists has worked with blue chip clients in the television, apparel and telecoms sectors to launch products, build profile, inspire staff and engage customers.

An early locative project, which epitomized its emergent qualities was *MILK*, winner of a Golden Nica at Ars Electronica. With *MILK*, the artists, Esther Polak and Leva Auzina, used GPS to trace routes to create a form of landscape art for a network society. *MILK* was based, in part, on a project by Polak and the Waag Society, *Real Time Amsterdam*, in which GPS transponders mapped cyclists in Amsterdam on their traffic routes by the aggregation of their travel measured over a period of weeks. *MILK* suggested a god-like vision of locative technologies that allowed the tracking of freighted foodstuffs. In this case with heavy irony, since the dairy-rich Netherlands import their milk from Latvia making visible the contradictions and excess of a networked society.

The increasing importance of maps in defining space within these projects should not blind us to the fact that mapping is not a neutral process, but always has been a highly selective and subjective one, in which can be embedded various (invisible)

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<sup>27</sup> See Rieser, Martin *The Mobile Audience*, Rodopi, 2009

ideological assumptions. Many GPS mapping projects tend to forget this and even revel in the act of remapping without context.

Media artist Coco Fusco also launched a headlong attack on new media practices associated with networks and mapping, declaring:

It is as if more than four decades of postmodern critique of the Cartesian subject had suddenly evaporated ... In the name of a politics of global connectedness, artists and activists too often substitute an abstract 'connectedness' for any real engagement with people in other places or even in their own locale.<sup>28</sup>

### **Exploration of tangible objects**

We are entering into a society based on ubiquitous networked objects or Bruce Sterling's *Spimes*.<sup>29</sup> Soon, objects will be the most frequent users of the Internet, as fridge talks to oven and RFID tags note the progress of stock to central computers. But what the ITU has termed the 'Internet of Things' means far more than just tracked objects, as Tuters observes:

Things' are controversial assemblages of entangled issues, and not simply objects sitting apart from our political passions. The entanglements of things and politics engage activists, artists, politicians, and intellectuals. To assemble this parliament, rhetoric is not enough and nor is eloquence; it requires the use of all the technologies, especially information technology, and the possibility for the arts to re-present anew what are the common stakes.

The pervasive and context aware object will partner a far more physical engagement with mobile devices. The Wii has fermented a revolution in indoor gaming. Devices such as those of the US firm Gesturetek, has developed software to use a phone's camera to interpret how the phone is being moved; translating gestures into action

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<sup>28</sup> Coco Fusco, "Questioning the Frame: Thoughts about maps and spatial logic in the global present" <http://www.inthesetimes.com/article/1750/> (accessed 12/03/08)

<sup>29</sup> "Ascendancies: The Best of Bruce Sterling by Bruce Sterling" (Author), Jonathan Strahan (Editor) and also <http://www.wordspy.com/words/spime.asp> (accessed 12/03/08)

and will promote the use of body actions in street level mobile gaming, but as John Vincent, president and founder of the firm, said:

Being able to do natural movements, not just hand but also full body movement is the way forward.

The technology is embedded in phones released by NTT Docomo in Japan and allows gamers to move the phone, forward and backward, shake it, and roll the device to control action on the screen.<sup>30</sup>

### **Surveillance and sousveillance**<sup>31</sup>

In a C-Theory article entitled 'Operational Media'<sup>32</sup> Jordan Crandall spoke of the 'resurgence of temporal and locational specificity witnessed in new surveillance and location-aware navigational technologies' and Stephen Graham has warned of the invisibility of such tools and the embedding of discriminatory and selective process in such things as network server logic. Steve Mann caught on to this process very early in 1998 and labelled its subversion as 'Sousveillance' or 'Surveilling the Surveillers'. Specifically he refers to Reflectionism as being especially related to 'detournement': the tactic of appropriating tools of social controllers and resituating these tools in a disorienting manner.

Fears of surveillance are undoubtedly real and relate to the imperative of the State in an age of counter-terrorism, to quote Manovitch 'to make the map equal the territory'. Of course this technology is a double-edged sword, but then it is also made democratic by its distributive nature and is now in many hands. Artists who have questioned the vulnerability of the individual to tracking include Drew Hemment through his *Loca* project,<sup>33</sup> and Jonah Brucker Cohen with his *WiFi Hog*<sup>34</sup> has challenged the enclosure of *Hertzian* space.

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<sup>30</sup> How mobile got its game on By Darren Waters Technology editor, BBC News website, San Francisco <http://news.bbc.co.uk/1/hi/technology/7254123.stm> (accessed 12/03/08)

<sup>31</sup> Steve Mann, Jason Nolan and Barry Wellman, "Sousveillance: Inventing and Using Wearable Computing Devices for Data Collection in Surveillance Environments" in *Surveillance & Society* 1(3): 331-355 <http://www.surveillance-and-society.org>

<sup>32</sup> Crandall, Jacob 'Operational Media' CTheory Articles: a148 Date Published: 1/6/2005 <http://www.ctheory.net/articles.aspx?id=441>

<sup>33</sup> See <http://leoalmanac.org/gallery/locative/loca/index.htm> (accessed 12/03/08)

In the face of new enclosures of public electronic space, through surveillance and border control, biometrics and consumer tracking technologies, as Crandell puts it:

The challenge is not only to endeavor to understand this operational construct, but to understand the forms of opposition to it that are emerging in the globalized world. For the operational is only one 'window' onto reality. There are other orientations that counter it, and for which, by its very nature, it is unable to account. It is powerless to envision terms of engagement that do not operate according to its logics. It can only assign them to the realm of the barbaric or irrational: that which lies outside of its license on reason.<sup>35</sup>

The compromised publics can choose to respond through collective action, violence or the through the 'reflective' intelligence.

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<sup>34</sup> See: <http://www.coin-operated.com/projects/wifihog.html> (accessed 12/03/08)

<sup>35</sup> Ibid CTheory