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## **Images of the City in the Making: Participatory Mapping, Dynamic Data Processing and Collective Knowledge**

**Abstract:** The article focuses on the practices relevant for digital mapping based on dynamic data processing and GIS. I argue that participatory mapping can be seen as a form of data driven activism and as such it is first and foremost the example of the collective knowledge. Hence, the primary function of the images (e.g. maps) produced in the process is not so much the representation of the city as rather it is the role they play in the dynamic operations of knowledge production on a grassroots level. Given that the computing technology and data processing saturate the social relations of the contemporary urban environments to the considerable extent, certain shift in the scope of analysis is required: the focus on how the images emerge and how they act in the world seems to be more relevant than the traditional analysis of the city's visual representation.

**Key words:** geomedial, urban computing, participatory mapping, data-driven activism, Ushahidi, Crowdmap

One of the most widespread types of images related to urban landscapes today is digital mapping in various forms. It appears almost ubiquitous: the users of mobile devices increasingly rely on geolocating applications to find their way across the seemingly chaotic urban jungle. The recent case of the widely discussed and highly controversial 2012 decision of Apple to develop its own mapping app for iOS6 while discontinuing its longstanding fruitful cooperation with Google Maps (introduced as part of iOS in 2007) seems particularly significant with this regard. It has instigated a strong wave of anger and frustration from their users as well as a massive flurry of media debates on the motivation behind introducing a service which proved to be peppered with minor and not-so-minor flaws. One of the journalists has quite straightforwardly called this new application “moronic”,<sup>1</sup> stressing at the same time the fact that “in today's [mobile devices] market, good maps are the must-have”.<sup>2</sup>

<sup>1</sup> M. Wright, *Apple's Moronic New Maps: This Is Turning into a Disaster*, “The Telegraph”, 21.09.2012, <http://blogs.telegraph.co.uk/technology/micwright/100007771/apple-moronic-new-maps-this-is-turning-into-a-disaster/> (access: 14.09.2013). The whole thread in the media debate concerned all kinds of lists with “the most...” (ridiculous, serious, stupid, etc.) mistakes spotted in the new app. cf. B. Fitzgerald, *Apple Map Fails: 19 Ridiculous Glitches Spotted in Apple iOS6 Anti-Google App.*, “Huffington Post”, 20.09.2012, [http://www.huffingtonpost.com/2012/09/20/apple-map-fails-ios-6-maps\\_n\\_1901599.html](http://www.huffingtonpost.com/2012/09/20/apple-map-fails-ios-6-maps_n_1901599.html) (access: 15.09.2013).

<sup>2</sup> *Ibidem*.

The plethora of infamous geographic mistakes plaguing Apple's mapping app has become the subject of the blog bearing the tell-it-all title "The Amazing iOS6 Maps",<sup>3</sup> the sarcastic undertones of which couldn't escape anyone who has had the possibility to compare actual experience with the company's marketing slogan. To those who did not get the specific sense of humour, however, the author offered the clarifying undertitle: *The Apple iOS Maps are amazing. Not.* In some cases the flaws were much more than just a joke: the spotted glitches became even a matter of life and death when the Australian police officially warned users to steer away from this popular iOS feature, given the specificity of the vast spaces across the Australian continent.<sup>4</sup> Nevertheless, there also came those people who assumed the glitches incorporated in the 3D mapping feature available for iPhone4 were a work of art in their own right. One of them is a Swedish engineer specializing in developing the graphic software, Peder Norrby, who has started collecting the glitches, reworking them with popular digital tools and finally presenting the whole collection as a Mapglitch set on Flickr,<sup>5</sup> continuing the long tradition of seeking in cartography the heart of creative inspiration.<sup>6</sup>

In my article I would like to focus mostly on the changing nature of such digital imagery, available throughout urban environments imbued as they are with networked information, which itself is undergoing a significant technological shift toward what some researchers see as the new paradigm of computing technology. Such images are not so much a representation of the city as they rather are symptomatic of the processes of collective knowledge formation, often leading to a data-driven activism. Both post-desktop computing based on the heavy use of various forms of mobile media and the growing role of M2M communication (which contributes to a nascent phase of the internet-of-things or the internet-of-things-and-human,<sup>7</sup> based on RFID technology) seem to considerably influence the whole communication environment of contemporary cities, with the most notable cases coming from either the systems of management based on the idea and corporate software designed with the concept of the "smart city" in mind (for example IBM's campaign Smarter Cities, a part of the wider

<sup>3</sup> *The Amazing iOS6 Maps*, <http://theamazingios6maps.tumblr.com/> (access: 14.09.2013).

<sup>4</sup> C. Thompson, *Australian Police Warn of Apple Maps' Life-threatening Flaws*, CNBC, Global Post, 11.12.2012, <http://www.globalpost.com/dispatch/news/business/technology/121211/australia-police-apple-maps-dangerous-iphone-5> (access: 14.09.2012).

<sup>5</sup> <http://www.flickr.com/photos/pedernorrby/sets/72157632277119513/> (access: 16.09.2013). Cf. K. Vanhemert, *Beautifully Warped Landscapes from Apple's Glitchy Maps App*, Wired.com, 7.01.2013, <http://www.wired.com/design/2013/07/beautifully-warped-landscapes-from-apples-glitch-prone-maps-app/> (access: 10.09.2013).

<sup>6</sup> Cf. N. Thompson, Independent Curators International (eds.), *Experimental Geography: Radical Approaches to Landscape, Cartography and Urbanism*, Melville House Books, New York 2009; L. Mogel, A. Bhagat (eds.), *An Atlas of Radical Cartography*, "Journal of Aesthetics and Protest Press", New York 2008; K. Harmon, G. Clemans, *The Map as Art: Contemporary Artists Explore Geography*, Princeton Architectural Press, Princeton 2010.

<sup>7</sup> Cf. R. van Kranenburg, *The Internet of Things: A Critique of Ambient Technology and the All-Seeing Network of RFID*, Institute of Network Cultures, Amsterdam 2008.

Smarter Planet<sup>8</sup> program, or Oracle's Smart City Platform Solution<sup>9</sup>) or from the process of the "datafication" of the public transport use (in the vein of London's Oyster Card). The idea of ubiquitous (or pervasive) computing, outlined by Mark Weiser back in the late eighties and early nineties,<sup>10</sup> is quickly becoming an everyday reality for urban dwellers, not (just) a futurological dream or phantasy. According to Ulrik Ekman (who draws upon the inspiration from Lev Manovich's 2006 essay on the "Poetics of Augmented Space"<sup>11</sup>), the 2000s "are arguably preoccupied with physical space filled with electronic and visual information".<sup>12</sup> The conceptualization of the latter, however, seems more problematic than ever – on the surface, we live in a society overflowed with digital imagery (the sheer amount of data related to visual content shared across the internet today is simply breathtaking). Yet, as Ekman insightfully points out, "the visuality of a ubicomp culture, if any, is still a rather open question".<sup>13</sup> The feeling that the current phase of digital culture is developing beyond visuality and undergoing a crisis of representation is shared knowledge among those who pay closer attention to urban informatics and collective mapping. According to Roger Malina, "The ability to toggle between the bird's eye view and the «street view», and the ability to view maps that have multiple layers simultaneously are driving artists and others to develop new forms of representation".<sup>14</sup> What should be noted as well is the fact that, to a growing extent, such imagery is the product of collective knowledge sharing, which makes its own operation visible through many procedures of dynamic data processing in real time. Therefore, I would like to call for a certain shift in interpretation: to break the tendency of treating the particular images, i.e. digital participatory maps, which often are the outcome of such processes, primarily or exclusively as digital "objects" in their own right and to read them more as practices and processes instead.

<sup>8</sup> IBM official website, <http://www.ibm.com/smarterplanet/uk/en/overview/ideas/index.html> (access: 23.09.2013).

<sup>9</sup> Oracle's official website, <http://www.oracle.com/us/industries/public-sector/national-local-government/city-platform/index.html> (access: 14.09.2013).

<sup>10</sup> M. Weiser, *The Computer for the 21<sup>st</sup> Century*, "Scientific American", September 1991; Cf. P. Dourish, *Where the Action Is: The Foundations of Embodied Interaction*, The MIT Press, Cambridge–London 2001; M. McCullough, *Digital Ground: Architecture, Pervasive Computing, and Environmental Knowing*, The MIT Press, Cambridge–London 2004; G. Bell, P. Dourish, *Divining a Digital Future: Mess and Mythology in Ubiquitous Computing*, The MIT Press, Cambridge 2011.

<sup>11</sup> L. Manovich, *The Poetics of Augmented Space*, "Visual Communication" 2006, no. 5.

<sup>12</sup> U. Ekman, *Introduction*, [in:] U. Ekman (ed.), *Throughout: Art and Culture Emerging with Ubiquitous Computing*, The MIT Press, Cambridge 2013, p. 12.

<sup>13</sup> *Ibidem*, p. 3.

<sup>14</sup> L. Bird, *Hybrid Cities: Interviewing Roger Malina, Mariateresa Sartori and Bryan Connell*, *Furtherfield*, 15.05.2013, <http://www.furtherfield.org/features/interviews/hybrid-cities-interviewing-roger-malina-mariateresa-sartori-and-bryan-connell> (access: 29.09.2013).

## Mapping in the hybrid space

It is of little doubt today that the concepts of a hybrid and augmented space maintain more validity with regard to our everyday experience with networked information technologies than the idea of virtual reality, so dear to cybercultural theorizations in the nineties. In 2006 Adriana de Souza e Silva introduced the useful term of hybrid space<sup>15</sup>, understood as “mobile spaces, created by the constant movement of users who carry portable devices continuously connected to the Internet and to other users”<sup>16</sup>. It develops, according to de Souza e Silva, both through social interactions between users and their simultaneous connection to the Internet. However, back then most of the case studies analyzed by the researcher came from Asian countries (mainly Japan, where 3G technology was introduced as early as in 1998 and where 3 years later it became commercially available) as well as from Scandinavia (which again was the first region in Europe with 3G technology implemented commercially in 2002). It wasn't until Apple's iPhone had been introduced and became an instant hit among its users that we could have a glimpse of the world where “devices possess both communication and computing capabilities and are therefore more than mobile telephones”<sup>17</sup> on a mass scale.<sup>18</sup> Only then did it become clear that hybrid space not only merges virtual and physical space but it also has a strong social component and that this new type of device indeed constitutes a new kind of interface as well. What in 2006 (the date of the publishing of the seminal articles on the changing relations between physical space and networked media both by Adriana de Souza e Silva and Lev Manovich) looked like the tip of the iceberg, in 2011 could be observed quite clearly in its full swing: as de Souza e Silva and Gordon notice in their preface to the book on “net locality”, the mobile phones that would be “only [a] phone” by then had become a rarity.<sup>19</sup> Most devices are equipped now with GPS functionality and a sophisticated operating system (be it iOS, Android, or Windows), which enables it to run the applications that determine how the device can be used in the first place.

What becomes pretty obvious as well is the fact that the spaces we move across today are filled with all kinds of data, hence our everyday activity strongly relies on massive data

<sup>15</sup> A. de Souza e Silva, *From Cyber to Hybrid: Mobile Technologies as Interfaces of Hybrid Spaces*, “Space and Culture” 2006, vol. 9.

<sup>16</sup> *Ibidem*, p. 262.

<sup>17</sup> *Ibidem*, p. 263.

<sup>18</sup> iPhone wasn't the first device of this sort – a number of models of Nokia (9000, N series and E series), HTC, Kyocera and BlackBerry could be counted among its predecessors but none of them gained such popular acclaim, let alone created the specific media ecology organized around a particular device (with AppStore giving the impulse for the development of the whole universe of distinctive apps dedicated to various fields of users' activity, including location and other forms of relations with geographical space). It is also noteworthy that since then some considerable critique has been applied to the strategies employed by Apple which apparently lead to the creation of the complicated and rich, albeit closed system consisting of hardware (computers, tablets and smartphones), software (operating system and applications) as well as retail platforms (iTunes and App Store) and data cloud (me.com transformed in 2011 into iCloud).

<sup>19</sup> A. de Souza e Silva, E. Gordon, *Net Locality: Why Location Matters in a Networked World*, Wiley-Blackwell, Malden–Oxford 2011.

processing – to which more often than not we contribute unwillingly or even unknowingly (with the advent of ambient informatics, intelligent architecture and data-driven urban management systems). More concepts of a similar sort soon followed, which was signalled by the rise of the related terminology, albeit most of it was concerned more with a shift in technology design than with sociocultural patterns, like “urban computing”,<sup>20</sup> “ambient informatics”<sup>21</sup> or “everyware”.<sup>22</sup> All of it – including the concept of augmented space – in 2006 still seemed to sway a bit on the brink of a futuristic imagination of cutting-edge, high-end technology, which now describes our everyday, most mundane realities with “physical space overlaid with dynamically changed information”.<sup>23</sup> Lev Manovich noticed the two-way mode of its functioning: a set of technologies thanks to which the augmented space comes into effect either deliver the data to the physical space (as, for example in the case of applications based on augmented reality or other screen-based forms of presentation in public) or extract them from the surrounding space (for example a number of monitoring technologies, including also the numerous cases of dataveillance). Manovich divided these technologies into three neatly designed categories (surveillance, cellspace, and electronic displays), focusing on the aspect of the augmentation of the physical space but at the same time highlighting the fact that it inevitably involves all kinds of monitoring of the activity of the users. The physical space becomes multidimensional in the process, but what is equally important, the spatial logics based solely on traditional geometry loses its grip, which leads Manovich to a reconfiguration of the Foucaultian model of a Panopticon drawn upon the “geometry of [the] visible”.<sup>24</sup> According to Manovich, there are symptoms of a broader cultural shift which gives rise to the logics in more of fields and functions replacing discourse based on the binary of visibility/invisibility. That itself would require some considerable theoretical work on the visual studies in the era of networked information, so strongly based on wireless communication.

This is precisely the kind of technology which probably in a most decisive way contributes to the process of undermining the existent, longstanding tradition of geometrical spatial order, as it works based rather on the strength of signals, fluctuations of the fields of energy, characteristics of the built environments (shapes of the buildings and quality of the materials used) and even on the meteorological conditions, rather than on any geometrical premise of solely distance from the source. The wireless communication functions for all post-desktop computing technology as the sort of glueing force that underlines the processes of connecting the whole plethora of devices into informational networks, enabling the visualization

<sup>20</sup> M. Shepard, A. Greenfield, *Urban Computing and Its Discontents: Situated Technologies Pamphlets 1*, The Architectural League of New York, New York 2007.

<sup>21</sup> *Ibidem*. Cf. A. Greenfield, *Everywhere: The Dawning Age of Ubiquitous Computing*, New Riders, Berkeley 2006; M. Shepard, *Sentient City: Ubiquitous Computing, Architecture and the Future of Urban Space*, The MIT Press, Cambridge–London 2011, Cf. also *Sentient City Survival Kit*, <http://survival.sentientcity.net> (access: 15.09.2013).

<sup>22</sup> A. Greenfield, *op. cit.*

<sup>23</sup> L. Manovich, *op. cit.*, p. 220.

<sup>24</sup> *Ibidem*, p. 224.

of geographical data (often in real time, as the subjects move through the city space). Even considering the range of the incongruent communications standards does not prevent one from noticing the growing cultural role of wireless technology in its many incarnations, from cellular, 3G and LTE through GPS, WiFi, Bluetooth and, finally, RFID technologies. Therefore, this fact alone would be enough to try to reformulate certain tenets of cultural studies focused on the ontology of visual objects. According to Adrian Mackenzie, who analyzes the technological components of wireless connectivity (like antennae, router and the topology of the service), wireless technology gives a major impulse toward the formation of a whole new media ecology, based on hybrid conjunctivity, where “We could think of wireless networks as prepositions (‘at’, ‘in’, ‘with’, ‘by’, ‘between’, ‘near’, etc.) in the grammar of contemporary media. Because of their pre-positional power to connect subjects and actions, wireless networks act conjunctively, they conjoin circumstances, events, persons and things”.<sup>25</sup> Invisible as it is, it should not vanish from the field of inquiry, especially while analyzing the current state of digital imagery, which for the most part consists of data visualization, including all forms of cybercartography based on the heavy use of GIS. Wireless communication not only plays a decisive role in the possibilities of blurring the lines between physical space and digital information but it also stimulates and forms the conditions of collective image production and massive data processing within urban space. It seems especially important with regard to collective, participative mapping, where the imagery is at the same time a form of knowledge gathering and dissemination. A few specific examples, ranging from Crowdmap, a collective online mapping tool, to some art projects informed by the premises of neogeography<sup>26</sup> should provide the necessary explanation.

## Crowd- and crismapping

When in late August of 2011 a strong tropical cyclone hit the East Coast of the United States, it became pretty obvious that the occurrence is so much stronger than the average summer storm. Named Irene, it proved to be one of the costliest and most devastating natural catastrophes that had so far affected the region along a coast that rarely happens to succumb to these kinds of events. The mayor of New York City declared the state of emergency, which was followed by parts of the city being mandatorily evacuated. The city of New York as well as the upper parts of the state were heavily affected by floods, sewage and electricity failures as well as communication and transportation outages. The next year brought yet another disaster of a similar sort – hurricane Sandy struck in October 2012, yet again wreaking havoc across much of the metropolis. In both cases the affected urban dwellers resorted to crisis mapping. Apart from Google Crisis Map, dedicated to damage assessment, informa-

<sup>25</sup> A. Mackenzie, *Wirelessness as the Experience of Transition*, “Fibreculture Journal” 2008, no. 13, <http://thirteen.fibreculturejournal.org/fcj-085-wirelessness-as-experience-of-transition/> (access: 26.09.2013).

<sup>26</sup> S. Rana, T. Joliveau, *NeoGeography: An Extension of Mainstream Geography for Everyone Made by Everyone?*, “Journal of Location Based Services” 2009, vol. 3, no. 2.

tion on power outages and possibilities of looking for suitable resources,<sup>27</sup> New Yorkers soon started self-organizing with the help of Crowdfmap (for example, the Watershed Post offered much needed information and advice to rural communities in the Catskill Mountains,<sup>28</sup> which got extensive coverage also in the national media).

The open source mapping tool implemented by the affected communities is an interesting example of a reverse technology transfer in its own right – it has evolved out of the services offered by Ushahidi, a Kenyan website developed since 2008 with the aim of assisting the people in need during the outbreak of political crisis, whose name in Swahili means “testimony” or “witness”<sup>29</sup>. When in 2008 the election process brought about a wave of violence and the information blockage effected by the then president-elect Mwai Kibaki, Ushahidi has been conceived by a group of civic-minded bloggers and social media enthusiasts as a means of help. During the political crisis in Kenya it served as the only legitimate source of information on acts of violence committed by the government forces, situations that required intervention and people who needed assistance. It has been designed in a way that would not preclude even the simplest tools of communication: the reports and data could be provided in text formats, as simple text messages operated from the average African user’s cellphone. Since 2008, Ushahidi has developed two important services: SwiftRiver allowing for data gathering which supports its other tools aimed at information visualization, and Crowdfmap, a customizable mapping platform. Recently Ushahidi has developed also a line of hardware aimed at connecting to the Internet even in the most difficult environment plagued with power outages or the lack of a reliable electric network – BRCK is a backup generator for the Internet.

Since its implementation in 2010, Crowdfmap has served a number of purposes, including such differentiated areas of practices as crisis management (the Occupy movement, post-Fukushima Japan and natural disasters around the globe with the most notable case of the recent earthquake in Haiti) on the one hand, and experiential marketing on the other. Ushahidi has grown out far beyond its initial goals of crisis reporting. According to the official blog, today among its clients one can find the World Bank, Al Jazeera and the United Nations.<sup>30</sup> The process of mainstreaming the solutions worked out by Ushahidi is illustrated by the fact that Ory Okolloh, one of the service’s initiators, in 2011 was invited to work at Google as a Policy Manager for Africa.<sup>31</sup> The visibly trending phenomenon of collaborative mapping has been spotted too in the digital art scene: in 2011 a few initiatives were awarded Honorary Mentions in the Digital Communities category at the Prix Ars Electronica in Linz. The awards went to Ushahidi, from the Humanitarian OpenStreetMap Team and Grassroots Mapping. Another initiative, Boskoi, the app allowing for finding edible resources out in the open and throughout cities, used the Ushahidi-based interface. Ushahidi has also gained

<sup>27</sup> Google Map Crisis Map, <http://google.org/crisismap/2012-sandy> (access: 20.09.2013).

<sup>28</sup> <http://www.watershedpost.com/sandy> (access: 20.09.2013).

<sup>29</sup> <http://www.ushahidi.com> (access: 20.09.2013).

<sup>30</sup> <http://ushahidi.com/services> (access: 20.09.2013).

<sup>31</sup> Ory Okolloh blog, Kenyan Pundit, <http://www.kenyanpundit.com/2010/12/23/stepping-down-as-ushahidi-executive-director/> (access: 22.09.2013).

a significant amount of attention and media coverage.<sup>32</sup> Even a quick look at the list of Crowdmap's deployments reveals that the majority of its users contributes with just a few reports, as if testing the service. Such a provisory conclusion is, however, supported by the in-depth quantitative analysis authored by the team at CrowdGlobe, which revealed that a stunning 93% of all uses available in 2011 had fewer than 10 reports.<sup>33</sup> At the same time, 61% used the default settings, which means that it has not been customized. What counts, however, is the relevance of the most visible deployments, which usually concern the local problems: usually seeking a solution for a specific problem (according to CrowdGlobe's report, 63% of the users had created the map to cover the events of processes in the city where they live).

Crowdmap quite often happens to be deployed as an efficient tool of participatory urban design. Good examples come from different places across the world:

- PragueWatch, <http://praguewatch.cz/> – a campaign to get citizens involved in the process of urban design through monitoring the urban development and revitalisation process, supported by the Open Society Fund Praha;
- Alerte.md, <http://www.alerte.md/> – a crowdsourced campaign created in cooperation with municipality to map the problems (from a high rate of criminal activity to the expensive entries to public parks) and suggest solutions in Chisinau in Moldova, with the majority of information in Romanian but also with a few discussions in Russian, also supported by the Open Society Fund;
- City of Melbourne Urban Forest Crowdmap, <https://melbourneurbanforest.crowdmap.com/> – a map where citizens can exchange the information on their favourite plants across the city and suggest solutions for effective greening of the city;
- React!/Reagiraj!, <http://www.reagiraj-bidibezbedna.mk/> – an initiative against violence toward girls and women in Skopje, which in its current situation often goes unnoticed and unreported – thanks to anonymity provided by the Crowdmap the data on such acts can be gathered and used as a strong case in favour of improvements in urban policy on public safety;
- DemocraCity, <http://thedemocracypoint.org/> – a grassroots initiative aimed at improving the public space and environment of Toronto; it also serves as a community forum where the users involved can share their ideas and suggest solutions;
- Territorios invisibles, <https://cordonindustrialrosario.crowdmap.com/> – a map of Rosario in Argentina documenting the environmental hazards in the industrial part of the city.

Yet the Kenyan platform – although well described, widely implemented and popular – is just one among many solutions typical for grassroots, data-driven map activism. There are also other tools and services enabling participatory, open-source and non-proprietary mapping, such as: OpenStreetMap, which has been designed and implemented in 2004 by

<sup>32</sup> A. Giridharadas, *Africa's Gift to Silicon Valley: How to Track a Crisis?*, "New York Times", 13.03.2010, [http://www.nytimes.com/2010/03/14/weekinreview/14giridharadas.html?\\_r=0](http://www.nytimes.com/2010/03/14/weekinreview/14giridharadas.html?_r=0) (access: 15.09.2013).

<sup>33</sup> *Mapping the Maps. A Meta-level Analysis of Ushahidi and Crowdmap*, A Report of the Internews Center for Innovation & Learning, May 2012, Washington DC, <http://crowdglobe.net/report> (access: 24.09.2013).



Steve Coast as an act of protest against proprietary mapping services (including geolocalized massive data sets, for example on transportation systems) widespread back then in the UK. OpenStreetMap is symptomatic of such a new type of imagining, based on crowd-sourced GIS, where the local knowledge of particular users matters – in the early days of the service, the main information on topography was provided by cyclists, which contributed to the different scale order, closer to the everyday activity and proprioceptive sensibility of humans than to the abstract operations of satellite imagery converted to a digital map. OpenStreetMap is often perceived as an open-source counterpart to the Google Maps and in fact some institutional actors have recently switched to this alternative format (among them Foursquare, Craigslist and, for a few months in 2012, Apple). The list of research projects based on OpenStreetMap<sup>34</sup> also shows how dynamically this field of inquiry and innovation has been developed over the last few years. Yet another significant platform for DIY geodata and crowdsource cybercartography, Grassroots Mapping,<sup>35</sup> a part of the Public Laboratory for Open Technology and Science,<sup>36</sup> operates in a similar area: providing geoimagery on a microscale, with a set of simple tools (like balloon or kite mapping) which can be easily made at home. Grassroots Mapping addresses the users posing a rhetorical question: “Do you disagree with the official version of your geography?”, which, however, presents a very rich meaning. Public Laboratory is first of all a platform of shared knowledge, offering all kinds of tutorials and information exchange on everything that concerns DIY geoimagery and the techniques of GIS: from the manual to build one’s own balloon mapping kit (it also sells one) to explaining data formats and the software needed.

In most cases the digital image is just the tip of the iceberg and functions as a surface covering the rich ecosystem of discussions on relevant social issues, and the negotiations of guidelines for urban design and civic activity. Following the proposition by Bruno Latour, Valerie November and Eduardo Camacho-Huebner, we could call for understanding this kind of a map as navigational (and as opposed to mimetic). While the latter establishes a simple relation of geometric and symmetric correspondence with the world based on the procedures of resemblance (asking how the map relates to the presented territory), the former seems much more interesting for my purpose. As the French authors argue: it “allows one to move away from it [territory] and deploy the whole chain of production that has always been associated with map making”.<sup>37</sup> The word “navigational” has, however, changed its meaning: in the age of online mapping platforms and services, it makes sense because “The users of the platforms are engaged in receiving and sending information to allow other agents to find their way through a maze of data”.<sup>38</sup> It also changes the cultural sense of mapping retroactively: the maps and their use is seen as the act of logging in “on

<sup>34</sup> <http://wiki.openstreetmap.org/wiki/Research> (access: 24.04.2013).

<sup>35</sup> <http://grassrootsmapping.org/> (access: 25.04.2013).

<sup>36</sup> <http://publiclab.org/> (access: 24.04.2013).

<sup>37</sup> V. November, E. Camacho-Huebner, B. Latour, *Entering the Risky Territory: Space in the Age of Digital Navigation*, “Environment and Planning D: Society and Space” 2010, vol. 28, p. 586.

<sup>38</sup> *Ibidem*.

those platforms in order to feed «databanks»”.<sup>39</sup> What enables a navigational use of maps is precisely the fact that the way they operate is not mimetic – it is rather based on a shared set of conventions, including data processing standards (for example latitude vs. longitude). According to Latour, the November and Camacho-Huebner digital technology gave the impulse towards a shift from the mimetic to the navigational interpretation of maps. This shift seems also to include a certain performative component as most of the participatory mapping is knowledge formation in the making, a process which thanks to real-time mapping is to a great extent self-reflexive – a point which will be best illustrated with some propositions in the field of digital art.

### The city as the arena of data-driven activism

Such developments in the field of participatory mapping as the aforementioned are accompanied by the art world's interest in neogeography, cybercartography and geomediality. At least since 2002–2003, when the term of “locative media” has been coined by the group of artists, curators and researchers gathered around the RIXC Center for New Media in Riga which started circulating in wider circles of the global art world, many art projects have employed the dynamic, technologically-enabled, real-time mapping as a method of experimentation with the new media.<sup>40</sup> Back in the beginning of the XXI century the technologies were still somewhat crude (compared to the current ubiquity of GPS-enabled mobile media), which invited the use of the imagination and contributed to the innovative combination of ad-hoc networked media. Although locative media art has a much longer genealogy (with its obvious points of reference: situationists and their psychogeographic drifts, land art, and the networked and performance art of conceptualists), the concept itself has been used in a wider context: as an umbrella term for the experimental combinations which invited discussions on the practice of mapping in the increasingly commodified and standardized augmented space, which, according to the already mentioned conclusions from Manovich (and others), was to a great extent based on tracking technology contributing to the post-panoptic regimes of the society of control. The whole new field of art has developed around the practices of map making and the main issues of cartography as a social practice, which was partly inspired by the new developments in human geography itself.<sup>41</sup> One of the significant art projects in this field is *BioMapping* by Christian Nold carried out since January 2004 in

<sup>39</sup> *Ibidem*.

<sup>40</sup> R. Smite, *Creative Networks in the Rearview Mirror of Eastern European History*, Theory on Demand #11, Institute of Network Cultures, Amsterdam 2012; L. Dudareva, *Potential of Locative Media in Practice of Landscape Architecture (2005–2008)*, [in:] J.M. Prada (ed.), *Inclusiva-net #2: Digital Networks and Physical Space*, Madrid 2009, [http://medialab-prado.es/article/documentacion\\_2\\_encuentro\\_inclusiva-net](http://medialab-prado.es/article/documentacion_2_encuentro_inclusiva-net) (access: 20.04.2013).

<sup>41</sup> N. Thompson (ed.), *Experimental Geography: Radical Approaches to Landscape, Cartography and Urbanism*, Melville House, New York 2009; A. Gordon et al., *An Atlas of Radical Cartography*, Journal of Aesthetics and Protest Press, Los Angeles 2010; K. Harmon, *The Map as Art: Contemporary Artists Explore Cartography*, Princeton Architectural Press, New York 2010. Cf. S. Rana, T. Joliveau, *NeoGeography...*, *op. cit.* There is

a few locations around the world, including Greenwich, Stockport and Fulham (UK), San Francisco (USA) and Paris (France) among others. The participants explore their urban environments wearing a special device designed by the artist which gathers data from their Galvanic Skin Response (their emotional arousal based on the temperature of the skin and heart beat rate) in conjunction with their geographical localisation (it is GPS and bio-sensor enabled). The groups involved in the project then analyse the data and annotate it into individual emotional tracks mapped with GPS during walks around the city. The outcome of the work is a special Emotional Map, which shows the experiential and affective city, yet from the intersubjective angle.<sup>42</sup>

All of the projects mentioned above reconfigure the regimes of knowledge production, especially in cartography, where the idea of an objective and de-personalised mode of data gathering has been crucial for the very idea of legitimate modern mapping.<sup>43</sup> Christian Nold has offered an interesting concept to grasp such instances of collective knowledge production: at a lecture during the *Sensing the Place – Placing the Sense* conference accompanying the Ars Electronica Festival in Linz in 2011, the artist-researcher has articulated the idea of an experimental community, drawing upon the British traditions of empiricism. According to Nold (but also to Shapin and Schaffer<sup>44</sup> as well as Haraway<sup>45</sup>) the collective experience of a circle of witnesses was crucial in validating the outcomes of the scientific experiment with Robert Boyle's air pump. Shapin and Schaffer described the XVII-th century laboratory where air-pumps operated a "restricted public space"<sup>46</sup> and "a disciplined space, where experimental, discursive, and social practices were collectively controlled by competent members".<sup>47</sup> According to Shapin and Schaffer, the domain of this "matter of facts" in early modernity has been established with three forms of technology: material (construction and functioning of the air-pump itself), literary (with it the outcomes of the experiments could be transmitted to everyone interested) and social (including conventions and rules informing and governing the philosophical dispute). All of them combined promoted Boyle's experimental method as the standard practice of the scientific order.

Christian Nold has come up with an interesting concept, based on the experiences derived from his project. To some extent, contemporary cybercartographic urban imagery could be seen as a kind of a similar laboratory of a new type of knowledge, where algorithmic procedures and codes are intertwined with the living space of city inhabitants. However,

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even a proposition to develop map studies which would "advance our understanding of the philosophical underpinnings of the map". M. Dodge, Ch. Perkins, R. Kitchin, *Mapping Modes...*, *op. cit.*, p. 220.

<sup>42</sup> Ch. Nold (ed.), *Emotional Cartography: Technologies of the Self*, <http://www.emotionalcartography.net> (access: 2.09.2013).

<sup>43</sup> Cf. J.W. Crampton, *Mapping: A Critical Introduction to Cartography and GIS*, Wiley-Blackwell, Oxford 2010.

<sup>44</sup> S. Shapin, S. Schaffer, *Leviathan and the Air-Pump: Hobbes, Boyle, and the Experimental Life*, Princeton University Press, New York 1985.

<sup>45</sup> D.J. Haraway, *Modest\_Witness@Second\_Millennium. FemaleMan©\_Meets\_OncoMouse™. Feminism and Technoscience*, Routledge, New York–London 1997.

<sup>46</sup> S. Shapin, S. Schaffer, *op. cit.*, p. 39.

<sup>47</sup> *Ibidem*.

the crowd-sourced modes of collective knowledge production act toward a greater openness of the process. According to Nold, the participants involved with BioMapping have been forming such experimental communities showing that the matter of facts (a map) and a matter of interpretations (subjective opinions) are never as far apart as modern science would like its followers to believe. The concept of experimental communities working through and with the cybercartographic imagery allows for frugal analyses of the participatory urban media production practice (including mapping), beyond the clichés and shortcomings of the Web 2.0 or participatory culture discourses. It is not only participation of the users but the modes of circulation of the knowledge production, including the semiotic technology of programming and software interfaces, that matters. Even the most mundane users' activities – like the simple act of “checking-in” at their favourite cafe with the Foursquare app – contributes to a database and improving the intelligent algorithms. Hence, the experimental communities and vernacular urbanism are organised according to principles of modularity/granularity: with the structure derived from projects of open-source. According to Usman Haque and Matthew:

Free software projects often have a clear hierarchy of involvement and ways of making a contribution that require different levels of skills, from the relative beginner to the high-level expert. (...) Modularity in this sense means arranging the development of a project in a way that allows productive involvement from large to small scales, from brief to long term periods, and that, in terms of expertise, encourages participation ranging from beginner to high-levels of sophistication.<sup>48</sup>

The image/map is in this context the element of a granularity which is constituted by the dynamic flows of data and bodily movements of urban citizens.

## Beyond representationalism

As we can see, merging digital and physical spaces through mobile communication networks contributes in consequence to a development of new forms of activity in urban space, defined by the ubiquity of the networked information, where participation in the life of the city increasingly means overlaying physical space with dynamic data processing (however, the plethora of stimuli that the modern city offers, as Georg Simmel and others noticed it, has always required from its inhabitants the highly complex skills of filtering out and processing the information). At the same time our location awareness has been undergoing significant changes, which Adriana de Souza e Silva and Eric Gordon describe employing the term “net locality” (“... where virtually everything is located or locatable”<sup>49</sup>). It is accompanied by the intricate process of image production, which heavily relies upon geolocation, data visualisation and cybercartography. I argue that the participatory mapping described earlier

<sup>48</sup> M. Fuller, U. Haque, *Urban Versioning System 1.0*, Situated Technologies Pamphlets 2, The Architectural League of New York, New York 2008, p. 38.

<sup>49</sup> E. Gordon, A. De Souza e Silva, *Net Locality: Why Location Matters in a Networked World*, Blackwell Publishing, Oxford 2011.

in the article contributes to – and at the same time is symptomatic of – the contemporary modes of collective knowledge production, which in many cases takes on the form of data driven activism. The images being produced in the process are not so much representations of the city, as they are a form of the knowledge formation, dynamic images in the making and instances of the temporary “sedimentation” or “ossification” of the computing processes permeating social relations in the current technological environments of hybrid space. A map in this case is a navigational platform and performative practice as well, which leads us towards a shift in the scope of analysis: instead of paying most of the attention to what the image represents, what seems more relevant is focusing on the complex processes of its emergence and the mode of its acting out in the world. Martin Dodge and Rob Kitchin put it as follows:

We are outlining what we believe is a significant conceptual shift in how to think about maps and cartography (and, by implication, what are commonly understood as other representational outputs and endeavours); that is a shift from ontology (how things are) to ontogenesis (how things become) – from (secure) representation to (unfolding) practice.<sup>50</sup>

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<sup>50</sup> R. Kitchin, M. Dodge, *Rethinking Maps*, “Progress in Human Geography” 2007, vol. 31, no. 3, p. 335.

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