

# Hacking Urban Space: The Agency of the Open Source City

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## **INTRODUCTION**

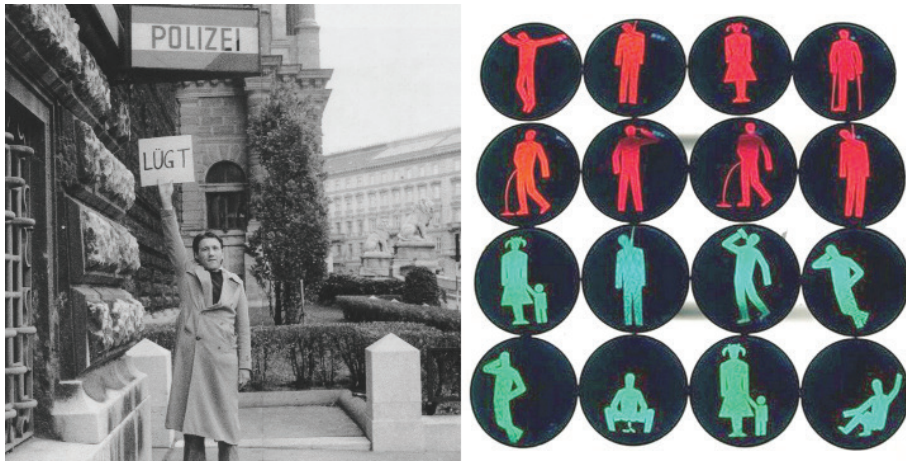
Hacking is increasingly becoming a tactic used by many spatial practitioners who operate at the intersection of digital media and urban space. Information technology that has recently expanded urban systems has initiated new opportunities to hack the city. These opportunities—if recognized by the individual citizen—provide a powerful tool for change through questioning, altering, or subverting an existing system. Rather than waiting for city officials or private developers to take action, hacking could empower every citizen to participate in the construction of public space. As hacking has recently become a tool for a number of projects and organizations that speculate on the development of public spaces such as “Civic Hackathons,” one can assume that hacking will increasingly develop as a strategy to empower the individual citizen to intervene in urban environments. It suggests a new form for the citizen to navigate the city, to understand it, and to interact with it in new and meaningful ways. This will not only change the urban environment but also challenge urban planners, architects, and city officials to rethink the current instruments and methods used to shape our cities.

## **HACKING AS METHOD**

The term “hacking” became popular in the digital subculture of the 1960s. The motive of the hacker is generally understood as gaining unauthorized access to a computer system to destroy data, to access information for personal purposes, or to use the gained access as platform to distribute messages with social, ideological, or political content. As such, hacking is often a small action that emerges from a slight manipulation of a complex system that can lead to a great consequences. In the 1980s the term was popularized by movies such as Blade Runner, Tron or WarGames. In WarGames for example, high school student David first hacks into the school district’s computer system to change his grade and later accidentally hacks into an automated missile strikes system at NORAD and almost causes a nuclear war.

Movies like WarGames have contributed considerably to a common understanding of hacking as a criminal or highly dangerous action usually executed by an individual and targeted against a large and powerful entity. Since 2001 the War on Terror has changed the perception of hacking. Now

large and powerful government organizations commonly hack into the space of an individual. The U.S. National Security Agency hacks into security systems, Internet, and telephone systems all over the world, and similar activities are executed by other powerful nations that sometimes control activities within these systems. “Public space” is a victim of the method. In many places, closed-circuit television cameras hack into the public space and follow, record, and analyze every step of the individual occupying it. It is the individual hero, such as Jason Bourne, who knows how to navigate such a system to stay invisible. Who should hack, and for what reason are the issues at stake. The topic of this chapter refers to how the act of hacking can support and transform public space.



1

Hacking need not carry a negative connotation. Indeed, computer programmers often use the term in a positive way. Exploratory programming workshops—called Hackthons—see software developers team up with communities to develop open source solutions to problems using publicly released data. Looking at the act of hacking in the context of public space, it is suggested to leave the immediate associations with the term behind in order to reintroduce hacking as a tactic in a broader sense. In that way, “hacking” means gaining access to a system in order to manipulate it. This definition creates a framework for a body of work from individuals, artists, and organizations operating within these parameters.

In the 1960s, Peter Weibel’s manipulation of visual urban systems and language can be considered as an early form of hacking into public urban spaces. In one memorable instance, he held up the words “is lying” next to the “Police” sign on a station, intentionally trying to provoke a reaction from passers-by. (Fig.1) Such very minimal events can be understood as a precursor of actions that make alternatives evident by subversion. In the 1970s many artists and architects followed Weibel’s vision in transcending the gallery space and hacking into public space.

Haus-Rucker-Co, a group of Vienna artists, is another example of positive hacking. Their designs for inflatable structures, prosthetic devices, and interventions to hack into public spaces were prototypes installed in the urban space to promote social change, an experiential theory of space, and the destruction of public space and private space for a new environment. Their temporary installations were called “provisional structures” to hide them within the legal system. Their ideas—often seemingly impossible—drew them to use materials considered strange, new, and unusual at the time. One of these provisional structures was a huge Perspex ball that was cantilevered from the window of a 19th century building. (Fig.2). The Perspex ball extended the private space of the building into the public space, forming an almost personal oasis suspended 10 meters above the ground.

Figure 1: Peter Weibel, Vienna (left)  
Ztohoven, Prague (right)

Other projects by Haus-Rucker-Co included “Mind Expanders” which enabled people to sit together in a public space and at the same time being completely isolated from the outside world. Another project was titled “Fly head Environmental Transformer,” a bottle green Perspex double bubble head piece with its own power pack for people to wear in public spaces. This head piece not only provided people with a fly’s eye perspective on the space they occupied, but it was also designed to completely change the relationship between the wearer and his surrounding environment. In the context of the current debate on how digital information technology might change the experience of public space, it is no wonder 1960s artists such as Haus-Rucker-Co have been rediscovered and celebrated in contemporary exhibitions. Today artists are manipulating digital information technology systems to bring our attention to our everyday accepted norms in public space. The artist often performing a small change in the system that has a large impact on the perception of public space.



2

In June 2007 the art group Ztohoven hacked a camera used for a live broadcast on CT2 of Czech Television. Ztohoven piped a video of a nuclear explosion and a mushroom cloud onto a live panoramic view of the Krkonose Mountains, a well-known tourist destination. The project causing calls from a worried TV audience and led to legal action against the artists. Charged with public gullibility, scaremongering, and spreading false information, the artists faced prison sentences of up to three years. After the judge dismissed charges against them citing “public amusement rather than public unrest,” Ztohoven received a prize for Media Reality from the National Gallery of Prague. Its president Milan Knizak commented: “Ztohoven left the gallery space entering the public space where they provoke society.” The project shows that even the slightest intrusion can appeal to the intellect of citizens as reminder that there is a difference between reality and mediated reality and that there is a need to question the trueness and credibility of media.

Ztohoven recently hacked into Prague’s urban infrastructure, replacing 48 ampelmaennchen (symbols of a standing or walking person commonly used as pedestrian signals) with their own figures shown in situations such as drinking, urinating, or being hanged. The artist was drawing attention to the way pedestrians unquestioningly obey these figures as they navigate the city streets daily. (Fig.1). The artist’s new variations of ampelmaennchen could be only seen for one day before the city changed them back. The project was experienced by the public as great fun. The artist was sentenced to one month in prison.

Even the slightest manipulation of public space can put the individual in conflict with the legal system. Artists have, therefore, developed different attitudes about how to navigate legal boundaries. This is for example demonstrated by the group The Surveillance Camera Players. By performing, pointing, and even appearing to pray to surveillance cameras in

Figure 2: Haus-Rucker-Co

public spaces, the group critiques the authority that spies on people in public space but manages to do so without breaking any laws. In contrast, public space hackers who play the games Camover and Killcap in Germany clearly run afoul of the law and would face sanctions if caught destroying government-placed cameras in public spaces. These gamers film themselves destroying the spy cams and upload their footage onto a website where they earn points for each destructive act.

After 2010, hacking urban spaces, usually for political or social reasons, became increasingly widespread as an artistic practice. In that year “Hacking the City” was the title of a project in Essen, Germany, to celebrate the city’s election as the European Capital of Culture. The intention of the hacking endeavor was to react to the city’s changing structures of public space, mobility, and communication by reprogramming and alienating urban spaces. One artist who contributed to the project was Peter Bux who staged an apartment move by piling up boxes and furniture at the sidewalk that over time grew into walls and blocked traffic. Other contributions included a guerrilla gardening project by Richard Reynolds and toilet seats displayed in public spaces by Stefanie Trojan.



3

All these projects temporarily physically disrupted urban systems in Essen, which raises the question of whether hacking can lead to long-term change. In 2007, the artist Natalie Jeremijenko transformed the “dead” street spaces around fire hydrants into tiny parks to absorb road-born pollutants and storm-water runoff. The parks were designed to allow access for the firefighters making them legally possible. A year before she dropped sixteen tall buoys into the East River. The buoys were fitted with submersible sensors to monitor water quality and sensors to track fish swarms that caused lighting effects. In this way the Australian artist—who holds a PhD in computer science—wanted to draw awareness to the existing ecosystems close to the city in “facilitating interactions between humans and non-humans.” Three years later, the buoys were integrated as a permanent installation at a much larger scale in the \$160 million East River Waterfront Esplanade development project scheduled to be complete in 2016. The project that was first tested as a guerrilla art installation proves that hacking can lead to long-term change.

Other artists see themselves as facilitators for the citizen to act. Architect Santiago Cirugeda interventions hack into the city’s hardware by subverting regulations and laws to improve the everyday urban space. In his call for action titled “Building yourself an urban reserve” (Fig.3) citizens are asked to review, reinterpret, and to reuse the Seville General Urban Zoning Plan Ordinance that governs the placement of temporary scaffolding. Citizens then are asked to use the regulations to their advantage in expanding their buildings using scaffolding installed on the public space in front of their property. The intention is to form a temporary room

Figure 3: Santiago Cirugeda, Seville

connected to the houses' interior but also accessible from the public space of the street, as it is required by the law. His practice of appropriation and occupation of urban space understands people as the creators of urban space, questioning the notion of authorship and control. Most of his projects are open source. His "Urban Prescriptions" website offers a user's manual that enables others to replicate his system.

A growing integration of wireless tools and infrastructure into the everyday life of a city can lead to an increase of possibilities to hack into these networks by the individual citizen, carrying fundamental consequences for the public realm. To enable individuals to hack into the urban space to appropriate, manipulate, reevaluate, and reinvent it, will require making public space hack-able for everyone. An open source strategy as provided by Santiago Cirugeda will then enact hacking as instrument to improve urban space.

#### **OPEN DEVICE AND CODE**

The urban environment is both a generator of data and the product of an urban information ecology. Transparency and accessibility of urban information can lead to catalyze strategies for open source urbanism. Digital devices are used to access cities' information ecology but can also become a tool for hacking actions.

Pervasive networks allow the city to become the generator of information. Sensor systems applied to the urban scale--able to monitor weather, traffic, or temperature—function as independent systems that operate relatively free from human interaction. This artificial ecosystem monitors, processes, and manages information. The data produced by it can be used to inform other systems in real time. The collection and exchange of data is based upon the communication from device to device.

Organized in what Marshall McLuhan calls a "galaxy of machines," this "electrical environment," forms an extended nervous system that is both invisible and pervasive. He refers to this hidden and unseen artificial eco-system as an "environment of services." The future will be a "world of connected machines" that function autonomously, "talking to other machines on behalf of people." Such a degree of automation effectively enables machines to "read and write by themselves." This condition of simultaneity, instantaneity, intelligence, and interrelations resonates with Marcel Mauss's definition of "savage telepathy," a scene in which "the whole social body comes alive with the same movement." The play of instant machine correspondence suggests an "intelligence" of exchange where anticipation and event coalesce in the savage communication of machines. These continuous communications facilitate the city's ecologies that regulate its rhythm.

Information technology devices for surveillance or automation are assembled into an intelligent communication ecology, a "new sensorium" regulated by the communication of devices, without taking into account human intervention. The city continuously sends back signals to itself to regulate itself. The temperature is 70 degrees, the wind is blowing from east, the traffic is flowing slowly, and the noise level is too high, therefore the traffic will be rerouted. All this data quantified, measured, and integrated into a system that mutually influences itself allows the city to be interpreted as a self-regulating organism. The senses and the brain of the organism are in a continuous dialogue even without conscious activity. Phenomena are the data that feed the device, and the device sends signals to regulate the city's internal system. As Paul Virilio argues, the electronic communication changed the physical fabric of the city. The surge of communication through the electronic ether gives rise to a city devoid of spatial dimensions but inscribed in the singular temporality of an instantaneous diffusion. "The city is overexposed: it exists all at once." If we know that the temperature is 70 degrees, the wind is blowing from east, the traffic is flowing slowly, and the noise level is too high, the challenge is to use this information to increase spatial quality and not just performance of function.

The city functions can adapt to information technology much faster than the space. Its process of instantaneity reconfigures the relation between space and time. Stephen Graham asks us to “imagine the ‘real-time’ city” so we can account for the ways in which telecommunications reconfigure our notions of urban space and time. Sensors and mobile devices, and their machine-to-machine communication, reconfigure urban ecologies. Increasingly instant and automated, urban space circulates through the transitory and traffic monitored circuits of the web cameras, surveillance systems, timers, and traffic motors.

Citizens can certainly benefit from this real-time data. A simple example is the display of time left for the next bus to arrive. Citizens are usually seen as the end user in this scenario unless they become active agents, gain access to the city’s data, and reconstruct what defines public space. In this scenario, hacking strategies become an operational tool to act and to transform the information urban eco-system.

### **OPEN SOURCE CITY**

Making system of hardware and software more accessible in recent years led to citizen initiatives transforming urban space. Open source concepts allowed for initiatives to realize urban gardens, community spaces, shared Wi-Fi (WLAN) zones, or projects concerned about environmental monitoring. “Open source urbanism” develops where citizens gain access to the information that shapes urban space and turns them into agents. Open source systems provide the individual with new possibilities to hack and manipulate those systems to directly inform the urban space.

The idea of open source is associated with free computer programs that can be shared, adapted, and further developed by any user. Applying this idea to urban space means that all systems that make up urban space are accessible to everyone and are connected to all other systems. It is a concept of horizontality and distributed network. Saskia Sassen argues that the city is in a state of incompleteness and that the concept of “intelligent cities,” as it is only taking into account hardware, will be soon obsolete. Open source urbanism that is grounded in the software of social practices allows for bottom-up interventions that will continue to emerge. Every day opportunities for events will occur by the individual instrumentation of information technology of urban space. This increase of individual agency will shift our attention from the global to the local network. To do that, it will be important to recognize that technology is not only about the devices but also about the instrumentation of the device.

As information technology is pervasive and ubiquitous, local technology activists experiment with the construction of new tools to rethink the relationship between citizens, their governments, and communities. These actions in an open source urban environment of civic technology build on our already networked culture and promote a more efficient system of collaboration between entities that produce the city. The opportunity for an individual to make an app that has a large impact has exploded; of course, a financial motivation drives this industry as well. This growth has also created new communities of citizens, software developers, and entrepreneurs who meet for Hackathon workshops.

In June 2013 during the first National Day of Civic Hacking more than 90 Hackathon workshops were organized simultaneously across the United States with the goal to motivate citizens to contribute in changing their community through open source, open data, entrepreneurship, and code development. The event brought together citizens, software developers, and entrepreneurs from all over the nation to collaboratively create, build, and invent new solutions using publicly-released data, codes, and technology to solve challenges related to individual neighborhoods, cities, states, and the country. In each city the event addressed different issues depending on local needs. Projects included apps to predict commute times and apps that help users make financial decisions. Another app would assist

urban farmers in enhancing the experience of farmers markets or in creating remote and local user interfaces for data of plants. During the event, expert technologists encouraged anybody interested to use publicly available data sets to imagine solutions that benefit the everyday life of the citizens. During the Hackathon, the White House posted on its blog: “This is an opportunity for citizens in every town and city across the nation to roll up their sleeves, get involved, and work together to improve our society by cultivating an ecosystem for innovation and change.” The challenge set up by Hackathon was to liberate and democratize open data to support problem solving in every community.



4

This goal includes the vision of increasing collaboration and facilitates methods of sharing. Code for America, an organization involved in the development of technologies that change the conversation between citizens and government, proposed the following “10 Ways Civic Hacking is good for Cities.” The goals were to create space for innovation, engage digital citizens in the process of governance and creative problem solving, spur economic opportunity, provide insight into government decision making, enable community service by technology, teach important new tech skills, create a broad network of civic hackers, help citizens serve themselves, help government manage expectations around technology, connect technology and non-technology groups together. By open source code these suggestions propose a vision of a city that is able to create a strong connection between the citizens, the government, and future urban scenarios. Anthony Townsend states in “Smart Cities: Big Data, Civic Hackers, and the Quest for a New Utopia” that we live in a world defined by urbanization and digital ubiquity, where mobile broadband connections outnumber fixed ones, machines dominate a new internet of things, and more people live in cities than in the countryside. Cities worldwide are deploying technology to address both the timeless challenges of government and the mounting problems posed by human settlements of previously unimaginable size and complexity.

Anthony Townsend talks about the strong potential of open source data as an option for future urban management and the act of hacking as a step towards more efficient, more resilient, more democratic cities. The “Smart Citizen” is the empowered citizen who proposes solutions rather than waiting for the government to resolve problems.

Air Quality Egg (Fig. 4), a community-led network of sensors, is just one of many examples of civic empowerment. Using the web and a sensor system-kit, anyone can report on the air quality outside of the home. In this example, individual citizens are participating in the production of global data and at the same time creating a debate about it.

Figure 4: Air Quality Egg

Another project, called “Smart Citizen” (Fig.5), proposes a “do-it-yourself kit” that enables

citizens to be part of mass environmental monitoring. In another project a guerrilla group of citizen-scientists installed sensors in local sewers in New York City to alert citizens when storm water runoff overwhelms the system, dumping waste into local waterways.

These types of projects, leveraging from democratized technology and open data, enable the individual citizen to step forward and deploy solutions for improving communities. In regard to the process and time for these actions to take place, Anthony Townsend says, “We need a lot more sustained energy, cohesion and leadership in the civic tech movement for it to have a real long-term impact, and to deliver the innovation potential that is there. Kickstarter projects are a good place to start, but what gets me excited is seeing industrial giants like Intel embrace Arduino (an open-source hardware and software). They see the future in an Internet of Things that people build themselves, and parallels to the PC revolution in the 1970s.” The key will be to dramatically increase the number of hackers from a small group of artists to the larger citizenry. “I really think it is the key to a more bottom-up, urban design-driven vision of a smart city—not as a place enabled by big smart infrastructure, but one that accumulates organically from thousands and millions of tiny little installations.”

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