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**Modes of Address and  
Ontologies of Disconnection:  
Towards a Media Archaeology  
of Mobile Networks**

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**Abstract**

In contemporary mobile networks, addresses are allotted by a host of different technologies. As a technical principle, motion itself makes possible the location of devices as elements of the network. With a short overview of media archaeological approaches to cellular networks, the paper explores the introduction of an ontology in which the position of every object is constantly registered. In such spaces of address, the politics of remembrance and forgetting have to be rethought, because only that which is not part of the network can be forgotten. The arbitrariness of addresses and the difference between bodies and devices offer a chance to stand still while not being forgotten.

**Keywords**

Mobile Media, Media Archaeology, Cellular Triangulation, Address, Localization

When we move through the world and the surrounding technical infrastructures with a smartphone in our hands, we are constantly on the call and reachable, wherever the device can be addressed. The coverage of networks is obviously limited by the finitude of infrastructures, but when devices move through surrounding spaces, they rarely lose connection. Contemporary spaces of address are continuous and reach as far as the infrastructure extends. The following short remarks offer a few preliminary perspectives for a media archaeology of such spaces of address. They attempt to describe the ontologies that define the constitution of these spaces and the existence or non-existence of actors within them. A historically and archaeologically grounded

theory of addressing is central for this discussion, because in the context of digital cultures, addresses foster the relation of positions and devices. At the same time, addresses emerge as the condition of the possibility of the movement of these devices through space without the loss of connection. Without the specific technologies of addressing described in this article, mobility in cellular mobile networks such as GSM (Global System for Communications), UMTS (Universal Mobile Telecommunications System), or LTE (Long Term Evolution) would be impossible. This, respectively, implies an ontology for which only addressable units exist.

The smartness of portable gadgets lies not only in their advanced computing capabilities or their intelligent interfaces, but also in the fact that they combine a multiplicity of addresses and process information about the places of these addresses in the respective networks, even if their geographical position constantly changes. In this context, availability means that a device is a point of receiving and sending data. Consequently, it becomes an address at which transmissions can be directed. Addressing is a function of transmission. Localization is a process in which addresses are correlated with positions and movements. Reception means that something is transmitted and travels from A to B. The address of A is where it feeds into the network. The address of B is where it is received. In a mobile network, A and B are bound to geographical space in a new way: they are addressable, have to be localizable, but can move. Whereas transmitting ships, satellite phones, or walkie-talkies likewise communicate while in motion, smartphones go beyond this by registering their location by their very motion.

By taking into account different technologies of addressing, it becomes possible to outline the conditions under which such devices gain access to networks in movements that are no longer bound to specific geographical locations. In cellular mobile networks, connection itself has become an effect of movement. In contrast to older network topologies that are bound to geographic locations, the movement of devices constitutes the topology of cellular mobile networks. In this sense, the following remarks opt for a media archaeology of the constant possibility of connectivity. In the current situation, we witness a becoming-mobile of addresses

that we should try to analyze in order to understand what is at stake when these environments become ubiquitous and endless. That devices are constantly addressable implies that mobile networks know no outside, even if all movement stands still.

Different modes of addressing are included in the multifaceted technologies of mobile networks. A regular smartphone has a whole register of addresses: the geographical coordinates on the surface of the earth (Global Positioning System), the assigned IP address (Internet Protocol), the device's individual MAC address (Media Access Control), the IMSI address (International Mobile Subscriber Identity) stored on its SIM card and needed to log in to the network, the device's unique IMEI address (International Mobile Equipment Identity), and finally the number with which it can be called (Mobile Subscriber Integrated Services Digital Network Number). As participants of mobile networks with the current standards GSM (Global System for Mobile Communications), UMTS (Universal Mobile Telecommunications System) and LTE (Long Term Evolution), devices require the last three addresses.<sup>1</sup> Information about these addresses and their relations localizes the device – and consequently its user, though the relation of body and device is arbitrary – in the networks of our time. These networks constitute a geospatial order that is different from the virtual registers of technical systems of addressing, because it constitutes an environment in which the positions of addresses relate to each other. In this context, the places of addresses are no longer bound to geographical places – rather, they are as mobile as the devices whose applications they define. But what does it mean for our understanding of the technological dimension of the constitution of space that addresses move with devices, that the positions of our addresses become mobile, and that the automated documentation of these procedures emerges as a condition of their execution?

In a mediahistorical change that has so far not elucidated the interest that it deserves, these technical procedures of mobility differ from the postal address arrangements that are still present in every smartphone's list of contacts. What distinguishes these *dispositifs* is (i) the coupling of the two acts of addressing and localizing with movements in space, (ii) the self-registration of this movement which captures data about the movement in the act of motion, and (iii) the communication between

moving objects that this enables. In the context of mobile media, addresses guarantee the correlation of devices and positions, while at the same time assuring that devices can move from one place to the other without losing connectivity. To engage with these developments, it is helpful to explore the media archaeology of addressing, although this short article can only hint at the topics and objects of such an investigation.

In this regard, addresses are basic operators of digital cultures. They are elemental technical components of a society whose coherence is constituted by transmissions: our social connections can no longer be distinguished from technical networks. If technical and social networks converge – if, that is, technical possibilities of connecting come to overtake existing social connections, and new social connections are created by means of technical connections, as we are able to observe all around us today – then it will hardly still be possible to think about social relations in the absence of technical networks of communication. The traditional division between the social and the technical becomes obsolete, and this makes a media archaeological approach to processes of addressing more and more pressing. Today, knowledge about our sociality depends on the networks of its distribution. Accordingly, we should ask under which technological conditions the possibility of being addressed everywhere and at any time (that means, constantly carrying a mobile device) has become a condition of participation in society. We witness and practice a transition from addressability into a mode of being addressed permanently.

From a media archaeological perspective, the coupling of addressing and localization is central to this development: in the networks described here, a device is only addressable insofar as its position is identified. The distinctive feature of cellular mobile networks is that the device's movement through space constitutes the network. To be addressable, that means to be part of the network; the device's position in the network must be monitored constantly. The technology of cellular triangulation, developed for this purpose since the 1950s at Bell Labs and Motorola, rests on the fact that the movement of the device through the space of the network assures its localization<sup>2</sup>. To use the cellular networks of GSM-, UMTS-, or LTE-networks, a smartphone needs to be connected to at least three proximate antennae.

In this process, the distance of a device is constantly measured in relation to at least three radio towers in order to determine, by overlapping the three areas of transmission, its location within the honeycombed, hexagonal mobile network. In such a way, it is possible for the device to move in space and lose contact with individual towers without being separated from the network. As a technology without interruptions, the mobile network creates reachability by enabling a constant reception – even when no-one is on the phone. Reachability implies seamless connectivity.

In the words of Erhard Schüttpelz (2016), mobile telephone services imply that “interaction is a resource of telecommunication and vice versa; production is a resource of reception and vice versa; and bodily location and situatedness are part of the information and vice versa.”<sup>3</sup> Because a mobile phone constantly monitors the signal strength of the surrounding towers and switches to the strongest – usually the closest – the network provider can locate a smartphone with an accuracy of two to five meters.<sup>4</sup> Cellular mobile networks need this information in order to optimize reception and to define the tower that transmits data to the smartphone in question and to switch between towers if the device moves.

In this regard, present technologies of mobile addressing are characterized by the fact that localization is not just an additional feature of addressing, which can be integrated into applications, but a precondition of the participation in different communication networks. Additional to cellular triangulation, a commercial smartphone – the most common mobile device – integrates three further options of localization: first, the embedded gyroscope, compass and movement sensors determine the position of the device and are important for its touch-sensitive interface. Second, most of the devices feature an integrated GPS system, which is able to determine the geographic coordinates relative to satellites with an accuracy of a few meters. This service is limited by walls, canyons and high buildings in the surrounding area.

Third, location-based services such as those offered by Google’s Android or Apple’s iOS are based upon the datasets of worldwide wifi networks that Apple, Google or Microsoft built during their cartographic projects. While taking pictures for the Street

View service, Google's cars registered the position of all available networks. Combined with maps, a cartography of wifi-networks was available. Consequently, these datasets include information about the location of local wifi networks, which makes it possible to determine the position of a device that is in reach of such a network, even if it is not connected.<sup>5</sup> Wifi-mapping, as this procedure is called, is much more efficient and energy-saving than GPS. It does not refer to the individual provider. Instead, it uses the information provided by the manufacturers of operating systems or apps. Especially in urban surroundings, mobile devices constantly receive signals from multiple wifi networks that belong to private parties, businesses or institutions. By collecting this information, Apple, Google and lesser-known companies such as Combain Positioning Solutions constantly enlarge their databases. Google, for example, routinely collects updated, anonymized data about wifi networks from Android devices in order to improve the Google Location Service with user-generated data – even if the user explicitly turned off location-based services<sup>6</sup>. Until 2010, Apple used a similar system by the company, Skyhook Wireless, but since then has built up its own database.<sup>7</sup> Combain Positioning Solutions stated on their homepage in 2016 that their database contains more than 79 million cell towers and 1.1 billion wifi networks.<sup>8</sup> In a similar way, the NSA uses the location data of mobile devices to register the movement of suspects or populations.<sup>9</sup>

Mobile communication networks exist because our devices constantly document their position and carry addresses that move with them to capture their movement. The mobility that is the consequence of these technologies can be seen as an element of usability, a continuation of global logistics, and a self-fulfilling condition of location services. In this context, mobile addressing is deeply embedded in the technical, political, epistemological, and economic tensions of the present. The unambiguous addressing by means of capture allows for spatial and temporal tracking, a balanced index of traversed paths, and thus the ability to collect data that can be used to optimize processes or to create profiles.<sup>10</sup> Additionally, this addressing of all mobile devices gives birth to an ontology for which existence is a matter of being addressable and connected. The environments in which mobile networked devices have since been able to move around (to various extents) have all been calculated and calculating spaces in which every object has an unambiguous address

with which it can be located. Every moving object that is networked in this way has to be monitored on an ongoing basis or at least at regular intervals in order to maintain the functionality of this calculating space. The resulting question is if objects can be lost in this space in which nothing exists without connection.

In the last decade, logistical technologies have seen drastic changes; the daily use of mobile media has transformed the diffusion of private and public, leading to a multidimensional politics of space. Our understanding of media environments is challenged by the constant renegotiation of the borders between inside and outside. This development leads to a redefinition of spaces of address and, in consequence, of positioning. In these spaces, objects are not only constantly awarded with addresses, but are localized in a network of positions of other objects, which themselves act as actors of mediation. To be addressable, consequently, is a technical mode of existence – what cannot be addressed does not exist in the networks of transmission, because it does not have a place and cannot move. In this sense, we should ask what it means to disconnect and to disappear. If this network has no outside, then quitting and getting off the grid is not an option of resistance against the network. Rather, we should take advantage of the arbitrariness of addresses and the difference between bodies and devices. The objects of capture are always addressed devices but not the bodies of users. The movement of bodies does not necessarily coincide with the movement of devices. Perhaps to stand still while not being forgotten is the only possible movement in mobile networks and their memories.

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## Notes

- <sup>1</sup> For an overview of these technologies see Michael & Clarke (2013a)
- <sup>2</sup> Chaphuis & Joel (2005)
- <sup>3</sup> Schüttpelz (2016: 10)
- <sup>4</sup> See Varshavsky et al. (2006)
- <sup>5</sup> See Michael & Clarke (2013b) For Googles data collection see Barreneche & Wilken (2015) For the juristical situation see Burdon & McKillop (2014)
- <sup>6</sup> See Frith (2015: S. 30)
- <sup>7</sup> <http://www.skyhookwireless.com>
- <sup>8</sup> <http://www.combain.com>
- <sup>9</sup> See Gellman & Soltani (2013)
- <sup>10</sup> Referring to Googles *Location Based Services*, Carlos Barreneche (2012) has shown how user participate in the production of data about space by moving through space.

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