"JUST IN TIME"? TRACING TEMPOR(E)ALITIES IN THE AGE OF MEDIA MOBILITY

[Related to keynote lecture on occasion of the symposium *Tracing Mobility – Cartography and Migration in Networked Space*, November 26, 2011, Haus der Kulturen der Welt (Berlin)]

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Media-epistemological foundation: the electro-magnetic "field"

Movement is predominantly associated with linear migrations and non-linear dislocations in space. The notion of mobility, in cultural analysis, is frequently taken in its discursive meanings, in the sense of "cultures of mobility".[1] Is "mobility" at risk of degenerating into a pure metaphor? But even the most exact analysis of mobility seems literally bound to metaphors - with *metaphora* being the Greek term for public transport such as buses.

In contrast to this let us discover the media-epistemological ground behind the surface figures of mobility. This first of all concerns the physical nature of "motion"[2] and its secondary re-entry in techno-cultural emanations.

According to an early script by Marshall McLuhan on the "Grammars of Media" around 1960, electricity and electronic devices create rooms without walls[3] and a "media field"[4]. Looking through the media-archaeological magnifying glass, under the surface effects of social mobility, we detect the migration of electrons in cables and in micro-chips.

1   "Mobilität wird damit weit gefaßt": Annunciation text of *Berliner Atlas paradoxaler Mobilität.* ed. by Friedrich von Borries in cooperation with the initiative ÜBER LEBENSKUNST, a project of Kulturstiftung des Bundes in cooperation with Haus der Kulturen er Welt, Berlin (Merve) 2011

2   "Bewegung ist Aenderung der räumlichen Verhältnisse <...> wenigstens zweier materieller Körper gegeneinander" : Hermann Helmholtz, Abhandlungen zur Thermodynamik, ihg. v. Max Planck = Ostwalds Klassiker der exakten Wisenschacten, Bd. 124, Leipzig 1902, 6

3   Marshall McLuhan, manuscript entitled "Grammars of Media", NAEB Papers (University of Wisconsin), Box 66, Folder 9, as quoted in: Josh Shepperd, Medien Miss-Verstehen. Marshall McLuhan und die National Association of Educational Proadcasters, 1958-1960, in: Zeitschrift für Medienwissenschaft Vol. 5, no. 2 / 2011, 25-43 (40)

4   Marshall McLuhan in a letter to the NAEB director Harry Skornia, December 16, 1958, quoted ibid. (41)

Electronic speed in wireless communication does not rely on mechanical vehicles any more; it moves even within the vacuum - be it the Thermionic Tube or the empty space of the universe. Electro-magnetic waves (the literal meaning of "radio") are being propagated almost unbound to matter or energy.[5] Inspired by this media-epistemological insight, the notion of a temporal "field" ("Zeitfeld", as expressed by Edmund Husserl's phenomenology) has replaced the mechanical idea of linear time by cloud-like temporal figurations.

In H. D. Wells' scientific fiction *The Time Machine* from around 1900, travelling between past and future still takes place in terms of mobility, with a chrono-mobile vehicle moving *within* (endophysical) time. Nowadays, time itself is being moved within the mediasphere. This new way of being-in-time started with the invention of photography fixing and preserving a unique moment in time, and continued with phonography which can re-play voices of the dead, escalating with kinematography which allows for the reversal of the entropical, thermodynamically defined arrow of time and stimulating slow respectively fast motion. Time became electronically manipulable by the audio and video recording on magnetic tape and phase shifting as known from electronic music (Stockhausen "... wie die Zeit vergeht"). Today, computational time generates new temporal figures - a true techno-poetical chrono-mobility based on non-human agencies of delayed memories and dynamic intermediary storage.

Significantly, in digital technology the term "field" which derived from the analogous, steady movements within electro-magnetism itself transforms into the description of a discrete configuration, as expressed f. e. in the "Field Programmable Gate Array" (FPGA) for re-configurable hardware in micro-processors. The dynamic field becomes a digital matrix, transforming "mobiity" into addressability.

With digitally coded radio transmission, waves are being replaced by impulses (samples) which can then mathematically be pre-calculated. In Pulse Code Modulation, the spaces inbetween pulses can then be filled by delayed bit streams. Thus interpolation replaces mobility. In "tele"communication, all of the sudden, spatial distance (the *a priori* of mobility as transfer) does not count any more, since it is being replaced by the temporal act of calculation. Analog frequency multiplexing and digital time multiplexing as forms of multiple use of communication channels are based on the time-critical interlacing of signals.[6]

The video artist Bill Viola in his essay on the "sound" of electronic images pointed out "the current shift from analogue's

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5   W. T. Runge, Elektronische Geschwindigkeit ist keine Hexerei, in: radio-tv-service Nr. 77/78 (1967), 2895-2899 (2895)

6   See H. Raabe, Untersuchungen an der wechselzeitigen Mehrfachübertragung (Multiplexübertragung), in: Elektrische Nachrichtentechnik Bd. 16, Heft 8 (1939), 213-228 (213)

sequential waves to digital's recombinant codes" in technology.[7] The equivalent in computing is the concept of *time sharing* as developed by Douglas Engelbart.

Today, the idea of the central computer with remote shared access turns upside down by the concept of "cloud computing". The Internet is not restricted to being an extension of interconnected central computers ("servers") which are being accessed from immobile homes, but mobile communication devices themselves have become small computers to be connected to network access points and areas. The "Internet of things" and ubiquitous computing result in a re-entry of mobility as a secondary effect of a topologically "immobile" grid.

Ubiquitous computing (with the device being close to the body) leads to what Ray Hammond predicts in his vision of *The World in 2030*: "always on, always connected, everyone to everyone, everything to everything, always and everywhere"[8] - which has not only a spatial but as well a temporal dimension. The user is connected to a chrono-sphere defined by the (meta-)medium and is allowed to jump in temporal layers provided by the online archive.

Archives in motion[9] and the katechontic counter-impulse

Instead of going to the archive (research mobility) in previsous times, we can now move within the archive not only at home (without moving) but at any place.

Permanent up-dating (or up-dating in permanence) has been the temporal aestetics of modernism already. This corresponded with the shift of emphasis from the final archive to temporary, literally inter-mediary storage.[10] This becomes evident if we look at museums for a moment, the keeper of material cultural memory. More and more, the traditional permanent exhibition (*Dauerausstellung* as *Schausammlung*) is being replaced by temporary exhibitions *(Wechselausstellung)*; temporal endurance is being replaced by frequency.[11]

Navigation within topological space (or rather networks) might still be called "mobility", but its nature has transformed completely from physical space to mathematically immediate relations: from tele-communication to computational mobility (even

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7   Bill Viola, The Sound of One Line Scanning, in: Dan Lander / Micah Lexier (Hg.), Sound by Artists, Toronto / Banff (Art Metropole & Walter Phillips Gallery), 1990, 39-54 (47)

8   Ray Hammond, *The World in 2030*, Paris (Editions Yago) 2007, 66. See the M.A. thesis (media studies, Humboldt University, Berlin, October 2011) of Yana Boeva, *"Augmenting Human Intellect": Evolution of the Internet and New Media as Logical "Extension of Man"*

9   See Eivind Rossaak (ed.), The Archive in Motion, xxx

10 See W. E., xxx, in: Beatrice von Bismarck (ed.), Interarchiv, xxx, xxx-xxx

11 On April 7/8, the Museumsakademie (Universalmuseum Joanneum, Graz, Austria) organized a museological conference in Linz (Austria) on the subject appropriately entitled *Zeitgemäß! Ideen zur Aktualisierung von bestehenden Dauerausstellungen*

if wireless communication is technically still "radio"-based).

The Internet is not an archive but a Protean dynamism, characterized by change rather than endurance.

Computational mobility ultimately leeds to ephemeral tempor(e)ality which is characteristic of current e-commerce trading; the financial market is defined with radical time-critical indexicality, since it is permanently online, thus immediately vulnerable to incoming information.

"Mobility" - a term of modernism

Mobility has been the essence (*trait essentiel*, with Lacan) of the 20th century modernist paradigm. Already with the 18th century "Querelle des Anciens et Moderns" the stable, metahistorical reference to classical antiquity in the humanities was replaced by dynamic change - the signature of (literally) "modern times" (as temporalization and acceleration of knowledge and aesthetics).

With the mobilization of formerly symbolically ordered time, a temporal horizon called historicity opened where the forthcoming future could be anticipated as "future in the past" already. Martin Heidegger in 1934 identified the temporalization of time itself "Zeitigung der Zeit" instead of reducing it to the parametrical "Faktor *t*" <Heidegger 1934/1998: 101>. Within that frame of perception, two temporal figures dominate the scheme of movement: the trajectory and the discontinuous jump.

In sociological perspective, the mobilization of social energy (such as migration) corresponds with the technical mobilization (physical transport with the appropriately called auto-mobile) and the mobilization of communication by almost immaterial signals on the electronic level. Material mobility starts with the steam-engine based railway, and immaterial mobility with telegraphy as currently presented in the exhibition *Car Culture*, appropriately sub-titled: *Medien der Mobilität.* at ZKM Medienmuseum Karlsruhe (June 2011 until January 2012). "Waren bisher die Telefone der einzelnen Teilnehmer mittels elektrischer Leitungen mit dem <...> sogennanten 'Festnetz', verbunden, so führten die neu geschafenen Informationstechnologien zu mobilen Telefonen <...> die miteinander verbunden werden."[12]

Within that analysis, the notion of "mobility" rather belongs to the discourse of modernity; in a famous analysis on occasion of a new railway line connecting Paris to another Franch city Heinrich Heine once remarked (just like Paul Virilio's dromology later) that space is killed by speed.

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12 Franz Pichler, Mobile Kommunikation per Funk. Von Heinrich Hertz zum handy Netz des Mobilfunks, Linz (Universtiästverlag Rudolf Trauner) 2011, 1

Physical mobilization like railway traffic has been accompanied by the parallel mobilization of symbolical communication embodied in electronic "tele"communication media (Samuel Morse's telegraphy in 1844, killing distance both in space ("tele") and in time "live") - telecommunication, "live" transmission.

But in the age of digitized broadcasting and digital communication engineering, the term for the current end-user device, the literal "mobile" phone, itself becomes a nostalgic metaphor.

Synchronization has been the technical essence of success in modernist communication between sender and receiver. But today, reception is anticipated by the sender.

The immediacy of "live" transmission is being replaced by "streaming media" which is based on asynchronous transmission, buffering data signals in micro-memories, thus causing minimal delays (due to calculation) even if it is not noticable by slow human senses any more.

What Jacques Derrida once claimed as *différance* for writing (i. e. the sequentially discrete order of the alphabet), here turns techno-mathematical. Coded time itself becomes an "artefact".[13]

The so-called delay time (caused by the inertia of matter) and run time *(alias "*dead time") is the temporal interval between a system input and its response at the output. As transport time, this refers to micro-mobility on the media-archaeological ground level of electronic circuitry. "The time it takes for material to travel from one point to another can add dead time to a loop. <...> The distance may only be an arm's length, but a low enough flow velocity can translate into a meaningful delay."[14] This form of a temporal *inbetween* is central to the notion of media itself. Aristotle once discovered in the echo phenomenon the resistance of the transmission channel air to sound, which he coined *to metaxy* – a term whose Latin translation by scholastics in medieval times turned into the *medium*. Time in communication itself is "medium" in Claude Shannon's functional definition of the channel of transmission.

It was Norbert Wiener who stated that within mathematical cybernetics, the teleological, goal- and target-orientated trajectory (mobility) is replaced by statistical probabilities. With digitally coded transmission, the trajectory (*telos*) of "tele"communication is being effaced in favour of a mathematical (chrono-topological) immediacy - which makes all the difference between "live" transmission and "realtime" calculation, leading to a new proximity instead of mobility as energetic movement. What is being transmissed are symbolical machines - algorithmic "Apps".

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13 Jacques Derrida / Bernard Stiegler, Echographien. Fernsehgespräche, ed. by Peter Engelmann, Vienna (Passagen) 2006, 13

14 Doug Cooper, Dead Time Is The "How Much Delay" Variable; *online* unter: http://www.controlguru.com/wp/p51.html

Tracing mobility in (a)synchronous communication

Let us face the title of this exhibition and symposium closely:
"Tracing mobility", taken literally, recalls the methods of
technical observation and mathematical calculation of movements.
On a micro-level, such mobility has been traced with the detection
of the "Brownean Motion" in nineteenth century. But this tracing
is not cartographic any more (which still adheres to iconic
perception), but with mathematically averaging myriads of
elementary movements of particles (like the electrons in the
Thermionic tube). Norbert Wiener described such motion as
"ergodic" - which is invariant across a temporal trajectory in its
stistical behavious. Within such stochastic analysis, the singule
individual particle does not count any more - just like in
information/communication/entertainment spheres the mobile subject
is surveilled as non-located address. A bio-cognitive gap opens:
While human bodies undoubtedly still move in space and time in
mobile ways (the everyday experience), connected to digital media
humans are coupled with another, media-inherent time and space.
here, techno-logical adressability replaces physical or biological
identity.

Technical media record such movements, while mathematics
(statistical and/or stochastic analysis) tries to make sense of
apparently random movements. Notions like phase shifting, well
known as tool of time axis manipulation since kinematography (slow
motion / fast forward) and later in early electronic music[15], both
in technical engineering and aesthetics performed micro-temporal
figures of migration.

This analog time-shifting is being challenged by non-linear
navigation.

In so-called *cognitive radio* "time hopping" means the intelligent
use of short-time vacancies and time slots.[16]

Such time-discrete operations replace the traditional analog
signal transfer (electronic mobiliy) in the broadcasting world.
Analog radio signal reception differs from the dis-locational
positioning in data-based "mobile" communication which is logical
addressing ("URL") instead of analog broadcasting.

Classic radio mobility once culminated in the technoculture of so-
called "World Receivers"; at almost any point on the earth, a
German could receive the German-speaking program of Deutsche
Welle. Now this access is being replaced by the *online* service of
Deutsche Welle which is no wave ("Welle") any more but streaming

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15 See Karlheinz Stockhausen, ... wie die Zeit vergeht, in: xxx
16 http://de.wikipedia.org/wiki/Time_Hopping

data *via* Internet access by cable or by wireless LAN.[17] Advertising for that dramatic change in radio culture, the Deutsche Welle service claims that in the Internet radio information can be multi-medially coupled. Behind that phenomenological, user-interface-based aesthetics, the hypertextual link reigns - a structure completely different from classical electro-magnetic braodcasting. The current director of Deutsche Welle (Bettermann) in his farewell-speech to the analog German-speaking program on October 29th 2011 advertised for the "radio" portal www.dw-world.de: "Bitte bleiben Sie uns verbunden, suche Sie neue Zugangswege". This is already the language of the World Wide Web (non-linear connectivity) - a self-betrayal, since that implies: Radio already has gone. Radio "on demand" and as download by Podcasting is not tuning (mobility) between radio frequency channels any more (bandwiths) but rather between temporal channels even if declared "live stream"; the physically and temporally authentic analog "live" signal is being replaced by realtime calculation) - deconstructing linear time. Digitalization (that is: mathematization) indeed introduces a discrete time-hopping, discontinuous mobility, moments instead of trajectories. Algorithmically pre-calculated transmission actually swallows the time of transmission itself,

just like in the macro-temporal sphere the culturally emphatic notion of "tradition" is currently being re-placed by a synchronous, even historistic "immediate" (Leopold von Ranke) access to the archivised past(s).

The elementary scheme of communication is not transmission from point A to point B any more, but rather the modification of a temporal (momentary) configuration.[18]

Decades ago, the Sony "Walkman" has been a symbol of mobility in carrying around recorded sound individually, as a kind of *temporally mobile* independence from music reception by transistor radio. The cassette has been succeeded by the mp3 player (the I-pod), but the current shift towards cloud computing replaces this mobility by dynamic access to the (media) archive: Smart devices access sound files stored in local networks (moving and navigating *within* the archive).[19]

Time hopping. Time "travelling" (in) the World Wide Web

"Dating" communication (known from postal letters in previous time

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17 The regular German-speaking program of the German world-wide radio Deutsche Welle has been ending as "linear broadcasting" (analog short wave) on the night from 29 to 30 October 2011.

18 Pierre Lévy, Die Metapher des Hypertextes, in: Claus Pias / Joseph Vogl / Lorenz Engell et al. (Hg.), Kursbuch Medienkultur, Stuttgart (DVA) 1999, 529 [Les Technologies de l´intelligence. L´avenir de la pensée à l´ère informatique, Paris 1990, 78-82]

19 See the final passage in: Gerrit Papenburg, Hörgeräte. Technisierung der Wahrnehmung durch Rock- und Popmusik, Dissertation zur Erlangung des akademischen Grades doctor philosophiae an der Philosophischen Fakultät III der Humboldt-Universität zu Berlin (2011), 345

on a calendar day basis, now escalates into "dating" the message down to the minute), f. e.: "On Monday, 23.05.2011, 00:26 +0200 wrote N. N. ...".

A bizarre off-spring of this discourse is the term and practice of "speed dating", cutting short the temporal intervall which is integrated into what the now call "realtime".

"Flow" und "streaming" replace the monument. Knowledge has always been in motion, but now it becomes time-critical. Chronology becomes ephemeral; short-time finality is taken into account from the beginning. Para-textual temporal remarks like "last modified" and "accessed" in the online encyclopedia Wikipedia indicate the replacement of traditional long-time assumption of knowledge spaces by time-critical hetero-chronotopies.[20]

Liberating tempor(e)alities from "time"

The classical definition of time (by Aristotle) is explicitly bound to the perception of movement (mobility). Speed has been calculated since antiquity; acceleration and dynamics become analyzable by the Leibnizean differential calculus.

Here, time is still understood in its scientific sense as an external physical parameter.

Today the traditional notion of vehicular transfer is being replaced by the mathematically calculated tunneling of the channel (Claude Shannon), short-cutting distance - rather teleportation than telecommunication.

Eigenzeit takes over (time)

Mobility is traditionally understood as happening *within* the grid (or frame, or Cartesian coordinates) of time and space. But from a different, micro-temporal perspective, a variety of *Eigenzeit* figures appears - times endogenic to subsystems, to media as well as to organisms.

The experience of modernity is an acceleration of delay or speed as explosions of temporal experience. But this experience is still conveniently framed by the parameter time (*t*) which is experienced phenomenologically (Husserl, Bergson) and related to media like phonograph and kinematograph. Being measured by clocks (Martin

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20 See Foucault 1990

Heidegger's "vulgar time"), this is "mathematical" time (Henri
Bergson). But in the age of active digital calculation, this
mathemaical time itself becomes operative, resulting in a de-
coupling of tempor(e)alities from the despotic signifier "time".
This requires different terms to nominate these temporal
kaleidoskope (requiring "chronopoetics"[21]).

Jean Baudrillard identified the current implosion of history as
discourse; Bernard Stiegler names it ekstasis of time.[22]

Harold Innis directed our attention in analyzing cultural and
imperial power to the media-induced "bias" of communication which
is either space- or time-enhancing; thus the counter-part matching
spatial mobility is chrono-mobility. This mobility within time has
now transformed into chrono-logical mobility.

Dis-locations

The structural essence of mobile digital communication and the
World Wide Web is not primarily the transmission of documents (the
"moblity") but its hypertextual and hypermedia link structure – a
dynamic topology rather than a static cartographic topography.[23]

The physical location of texts or books at a certain place (the
referential basis of mobility) is being re-placed by topological
space. Instead of imposing library-orientated terminology, the
analysis of the dynamics of the World Wide Web has to adapt to the
dynamism of the medium. Within that dynamic context, algorithmic
orientation (such as the search enginge "Google") is not about
mobility but about statisitcs, vectors and graphs.

Today, suspended mobility is the true luxury in today's temporal
economy

- the katechontic impulse. Instead of setting "the archive in
motion", moments and locations of resisting "change" (in
permanence) is retro-effectively being asked for.

**Short-cutting the channel: Diagram and topology instead of
"mobility"**

Non-linear time is part of the mathematical geometrization of time
(as opposed to entropic physical time).

21 See W. E., Chronopoetik. Zeitweisen und Zeitgaben technischer Medien, Berlin (Kulturverlag Kadmos), Berlin (Kulturverlag Kadmos) 2011
22 Bernard Stiegler, Denken bis an die Grenzen der Maschine, ed. Erich Hörl, Berlin / Zürich (diaphanes) 2009, 69
23 See W. E., <cartographies / ZKM>

In the "digital" present times, we are rather confronted with heterochronotopies (in allusion to Michail Bachtin's term "chronotope"),

Networked locations which can be addressed with the speed of electricity replace the still energetically biased notion of "mobile" transfer.

The real-time web is a set of technologies "which enable users to receive information as soon as it is published <...>, rather than requiring that they or their software check a source periodically for updates."[24] Dazu gehört die Kommunikationsform *instant messaging*.

Real-time computing <...> is <...> subject to a "real-time constraint"—i.e., operational deadlines from event to system response. By contrast, a *non-real-time system* is one for which there is no deadline, even if fast response or high performance is desired or preferred.[25]

A real time system is "mission critical" <ibid.>. Within that delicate micro-temporal context, the time of transmission itself becomes decisive.

When the time of transport becomes a cluster of technically calculabel numbers, mobility itself dissolves from Newtonean into Cartesian space - or rather into data clouds which are closer to Iannis Xenakis' stochastic music in its temporality than to conventional space in visual culture.

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24 http://en.wikipedia.org/wiki/Real-time_web
25 http://en.wikipedia.org/wiki/Real-time_computing