

# Media's Mapping Impulse

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# ON AUTOPILOT: TOWARDS A FLAT ONTOLOGY OF VEHICULAR NAVIGATION

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The following chapter tackles the entrenched ontological divide between the map and the territory, both as a theoretical construct in (post-)modern philosophical thought and in its capacity to inform various cartographic endeavors. In this chapter, we wish to demonstrate how such a dichotomy is not necessary for, and might even be harmful to, our conceptualization of those two objects and the relations between them. We do so by turning to the ongoing convergence (JENKINS 2006) of driving and media practices, previously separate types of human activity that are becoming increasingly connected through two related phenomena: social driving and automated cars. The relation between driving and media consumption is not new. Winfried SCHULZ (2004), for example, uses listening to the radio while driving as an example of what he calls the amalgamating effect of media. According to SCHULZ, when media consumption becomes ubiquitous, previously separate activities habituate into new patterns. These change the structure and meaning of each: driving a car in silence might become strange to a commuter, for instance, or radio stations, previously an independent and dominant force in the media institutions landscape, become reliant on a particular kind of a driving listener, changing content and schedule to accommodate her or him.

The transformation we see in front of us, courtesy of the introduction of software and network-based media into the daily lives of users, also changes the way space is consumed and experienced (DE SOUZA E SILVA 2006; KITCHIN and DODGE 2011). For drivers, this change alters what Nigel THRIFT (2004a; 2004b), via Patricia T. CLOUGH (2000), has called the “technological unconscious.” The consolidation of digital screens, mapping software, and car manufacturing, in the same hand (ZILLMAN 2015), further changes the political economy of driving. Thus, we argue here that through the hybridization of media-aided navigation and actual movement, the map and the territory, or rather the *map-territory* occupy a single ontological plane. To explain our position, we first briefly chart the perceived ontological divide between map and territory envisioned by modern and postmodern theory. Then we suggest a solution that eliminates the need to bifurcate or prioritize either one by turning to the concept of flat ontology. Finally, we exemplify our vision through the discussion of recent developments in social navigation and automated driving.

## ONTOLOGICAL DIVIDE

“The map is not the territory” (KORZYBSKI 1994 [1933], 58), the semioticians’ famous maxim, inspired BAUDRILLARD’s rallying postmodernist claim on how “the territory no longer precedes the map, nor survives it.” (BAUDRILLARD 1995, 1). Within the fields of geography and cartography, particularly sensitive to the ontic realities of mapping, these totalizing metaphors, and straightforward map-territory translations, have been subject to sustained critical inquiry (CRAMPTON 2002). Theorizations of such have focused on historical discourses (HARLEY 1989), the divide between active and passive consumption of space (DE CERTEAU 2011), the role of narratives and habits (INGOLD 2000), “hidden” power agendas (WOOD 2010) and, perhaps more than anything else, the fluid, emergent properties of various maps in multiple contexts (DODGE et al. 2009). While many of these critical approaches follow DEL CASINO and HANNA’S (2006) reproach of reductive binaries (say, between map-makers and map readers), one stable distinction remains at the heart of the cartographic inquiry: the ontological divide between the map and its territory.

It is our contention that the map/territory divide will continue to exist but perhaps not for much longer. This “crisis of cartographic reason,” diagnosed by Franco FARINELLI (2003; 2009), is explored by Giorgio AVEZZÙ in his contribution to the current volume. In our chapter, we take such a crisis as a point of departure to argue that with the advent of the driverless car, we are beginning to see the outlines of a new world in which navigation and movement are subsumed into the vehicle such that map and territory are indistinguishable. Here, we take up Jörg BECKMANN’S (2004, 90) then-speculative need to “reconsider the notion of the car-driver hybrid” in light of its possible replacement by an “auto-pilot” in which navigation and movement are both automated. Yet, in order to make a case for an ontological combination, we must first detail this perceived divide abstracted from the case study of the automated vehicle.

For KORZYBSKI (1994, 58), “the map is not the territory” affirms that a relationship exists between one and the other, but mistaking one *for* the other inevitably results in practical if not epistemological problems. However, in full, the maxim reveals slightly more on the matter: “A map is not the territory it represents, but, if correct, it has a *similar structure* to the territory, which accounts for its usefulness” (KORZYBSKI 1994, 58). Thus, the utility of the map is drawn from its representational power, that is to say, from its structural similarity with the territory.

In practical terms, if this similarity did not exist it would result in a multitude of possible problems, as KORZYBSKI (1994, 58) notes in reference to an erroneous map of Europe:

If, speaking roughly, we should try, in our travels, to orient ourselves by such a map, we should find it misleading. It would lead us astray, and we might waste a great deal of unnecessary effort. In some cases, even, a map of wrong structure would bring actual suffering and disaster, as, for instance, in a war, or in the case of an urgent call for a physician.

Thus, in KORZYBSKI’S terms, putting undue faith in the (“incorrect”) map in order to navigate the (“correct”) territory would have deleterious effects.

But for BAUDRILLARD, the maxim should be understood historically as a statement on, and only for, the postmodern world. His inversion, suggesting that “The territory no longer precedes the map, nor survives it” (BAUDRILLARD 1995, 1) is one that signals the end of, in BAUDRILLARD’S mind, a modern conceptualization of territory in favor of a postmodern hyper-reality. As David B. CLARKE suggests in his contribution to this book, “Baudrillard offers a strategic reversal that serves as a poetic vehicle, mobilized to disarm any lingering faith in the rational kernel of the real.” Our aim here is to offer a contested view, one of amalgamation instead of dissolution. Challenging BAUDRILLARD’S diagnosis, we wish to pinpoint the symbiotic relations that territory and maps exhibit in the digital age.

In the supposed hyper-reality that BAUDRILLARD constructs, there is no such thing as territory, no world outside of the map. But as he also affirms: “Today abstraction is no longer that of the map, the double, the mirror, or the concept” (BAUDRILLARD 1995, 1). These various modes of abstraction, different in form, are all said to have been in relation to a “referential being” (BAUDRILLARD 1995, 1) such as territory to which the map or any other abstraction is in servitude.

Instead, we inhabit only a cartographic world of points, lines, and polygons. The conclusion of this argument, from an ontological perspective, is that there is no such remaining divide between map and territory because the territory is erased completely. BAUDRILLARD’S initial clause that “The territory no longer precedes the map” invites one to reason that he has simply spun KORZYBSKI’S maxim around, that instead, “the map precedes the territory.” In this, it is the map that assumes priority as the “referential being” rather than the territory.

Taken on its own, this would have left the territory intact, albeit switching its ontological status from being the map’s superior to being the map’s inferior. This view would postulate that a postmodern realignment of map and territory merely shifts “actual suffering and disaster” (KORZYBSKI 1994, 58) to the plane of the map. However, as is made clear in BAUDRILLARD’S second clause, the territory no longer “survives” the map. In BAUDRILLARD’S hyper-real battle to the death, it is the map that claims ultimate victory, not in reversing the ontological state between the two but in banishing it completely. In his work on hyper-reality, BAUDRILLARD treats the map as a sign without a referent. However, it is important to note that in his view this is a *recent* development, a result of a map-territory struggle and not an *a priori* ontological state. As he emphatically continues:

...if one must return to [Borges’s] fable, today it is the territory whose shreds slowly rot across the extent of the map. It is the real, and not the map, whose vestiges persist here and there in the deserts that are no longer those of the Empire, but ours. The desert of the real itself. (BAUDRILLARD 1995, 1)

The “real,” says BAUDRILLARD, is becoming (if it has not already become) deserted. Unlike in BORGES’S tale where the 1:1 scale map of the territory becomes torn, shredded, and unusable, it is the territory itself that is left to “rot across the extent of the map.” The territory, thus, is becoming obsolete. BAUDRILLARD’S crisis, needless to say, is not FARINELLI’S. Whilst AVEZZÙ, in his chapter of this book, suggests that the crisis identified by FARINELLI describes a world “withdrawn into a space... beyond representation,” we see BAUDRILLARD’S crisis as depicting a world entering

into a space *only of* representation. Each diagnoses the ailment, but prescribes a radically different cure. The debate carries the echoes of new media scholars' fascination with *remediation*, or the presupposition that newer forms of mediated expression are built upon and draw from previous media (BOLTER and GRUSIN, 2000). If BAUDRILLARD'S perspective is that the map is merely the remediation of territory, subsuming the essence of its previous form, then FARINELLI'S stance is closer to the provocation of Alexander GALLOWAY (2012, 21) to whom:

A computer might remediate text and image. But what about a computer crash? What is being remediated at that moment? It can't be text or image anymore, for they are not subject to crashes of this variety. So is a computer crash an example of non-media?"

Similarly, here we refute the notion of the map as an example of non-territory.

In an era of big data, this ontological dilemma has begun to rear its head again in a different guise. On this occasion, it is not the map that necessarily forms the centerpiece. Instead, it is data. In the preface to the fifth edition of KORZYBSKI'S book, *Science and Sanity*, Robert PULA suggests that "By 'maps' we should understand everything and anything that humans formulate" (KORZYBSKI 1994, xvii) and thus that KORZYBSKI'S original statement is designed to speak of knowledge production in general rather than cartography in the strictest sense. "*Languages, formula-tional [sic] systems etc.*" are, moreover, "*maps and only maps of what they purport to represent*" (KORZYBSKI 1994, xvii).

Thus, the "data revolution" (KITCHIN 2014) is of interest because of how the production of knowledge has radically changed in the last five years. The data produced through social media (Twitter, Instagram, Facebook), fitness trackers (Fitbit, Strava), digital platforms and devices (sat-navs, ridesharing apps), and heretofore "dumb" components (Nest thermostat) combine a mixture of active and passive forms of data generation. These call into play, like never before, what Emma UPRICHARD (2013, n.p.) calls the "four big Vs": velocity, variety, veracity, and volume. While much of this is actively provided by digital users in the form of social media 'updates' (tweets and posts, etc.), a significant proportion is also generated automatically by the devices themselves (sat-nav routes, thermostat temperature adjustments). In both cases, the data produced is used variously to update the technologies involved, to monitor and track user interaction, and to "add value" to and "capitalize on the Big Data sets already being generated" (THATCHER 2014, 1772) and that form omnipresent and never-ending "data fumes" (THATCHER 2014, 1770).

Critically, much of this data has a "geolocated" element to it consisting of actual coordinates, selectable place-names, or other such spatial characteristics and proxies (propinquity, orientation, etc.). Companies selling such devices understand the value of this "geodata" (LESZYCZYNSKI 2014) and the wider "geoweb" (CRAMP-TON et al. 2013). For instance, by examining the (often, very) personal use of self-tracking by enthusiastic communities, companies aim to extract and refine the types of data that will be most relevant to broader publics (NAFUS and SHERMAN 2014). Thus, whilst the suggestion is that data rather than maps form the continuing thrust of the ontological divide, this data is nonetheless cartographically-mediated and/or orientated. Due to the speed and 'liveness' of much of this data (velocity),

the breadth of data sources and types (variety), the perceived accuracy of geodata (veracity), and the sheer size of collected user data (volume), this emplacing of everyday activity matters.

It is also not to say that the map itself has been erased as a medium. In fact, it is very much alive. Nonetheless, it takes multiple *digital* forms. Of greatest significance is the rise in mobile mapping and navigation, whether in the form of sat-navs (TomTom), location-based games (Foursquare, Pokémon GO), or travel platforms (Uber, Citymapper). All are reliant upon mobile devices and the complex relations they create between bodies in space (FOXMAN 2014). As a result, the cartographic aspect of this knowledge production continues to be significant, not only in the world-at-large but also with respect to the ontological divide between map and territory. The shift made from being *on* the map to being *in* the map – courtesy of the GPS-generated “you are here” dot – is crucial, for example, in understanding how (digital) map and territory have become, through multiple ontological moves, even closer together in recent times (WILMOTT 2016; LAMMES 2018).

This is important for how we are to understand the rise of automated driving later in this chapter. Firstly, automated vehicles do not navigate in the way humans navigate using the kinds of maps imagined by KORZYBSKI and BAUDRILLARD. As such, understanding the role of ‘data’ more generally in this ontological debate is critical for how one considers the transformation we detail here. Secondly, “geodata” becomes critical for how one understands the enduring spatial, geographic, and cartographic elements of the relationship. In other words, how data acts in the world. Thirdly, mobile navigation has brought about a shift in the ontological relationship between the map user, the map, and the navigational act itself. In other words, that navigation itself has become fully-absorbed into the machine.

## FLAT ONTOLOGY

The problem with the ontological divide offered by KORZYBSKI (1994) is that it prioritizes and elevates the territory over and above the map, relegating the map to a lower order. Further, this lower order is only ontologically possible with reference to the “referential being” (BAUDRILLARD 1995, 1) that is the territory. In this, the territory becomes the referent with the map itself merely a representation of such.

Thus, following this logical thread, one would say that the “misleading” nature of an “incorrect map” that KORZYBSKI (1994) identifies, culminating in “actual suffering and disaster,” would only be possible on the territorial plane, that is to say, in the “actual” world far away from the ontological plane of the map. In this, the map is compartmentalized aside and beneath the world itself. By extension, any changes wrought in the “map world” rather than the “actual world” amount to nothing at all. Or, more accurately, any changes wrought in the map world result in “not-actual suffering.” In such a view, a child scribbling on a map (a change in the “map world”) would have no effect; unless the drawings hampered navigation to an “actual world” emergency.



Here, of course, is where we take issue with KORZYBSKI. Assuming a non-representational position (THRIFT 2007; ANDERSON and HARRISON 2010), expounded by DEL CASINO and HANNA (2006, 44), “it is better to theoretically consider maps and spaces are co-constitutive.” As they continue, “Maps that people simultaneously make and use mediate their experiences of space” (DEL CASINO and HANNA 2006, 44). Thus, in a digital world intensified by the rise of big data, this simultaneous process of both ‘making’ and using maps becomes one thoroughly imbricated with space and by extension, territory. Therefore, if the map is thoroughly constitutive of the “actual world,” then the kind of “actual suffering” supposed by KORZYBSKI similarly occurs across the plane of the map as well. Consider how GPS-enabled cartography has transformed warfare, and consequently, state practice in the late 21<sup>st</sup> century (GREGORY 2004; AMOORE 2009; GRAHAM 2010; RANKIN 2011), or the sprawling global network of crisis mapping, where professionals and volunteers use participatory geographic information systems (PGIS) to aid logistical decision-making in the aftermath of natural disasters and disease outbreaks (BITTNER ET AL. 2013).

Further, for KITCHIN and DODGE (2007), a cartographic object is a “set of points, lines and colors that takes form as, and is understood as, a map through *mapping practices*” (emphasis added). In other words, “maps are transitory and fleeting, being contingent, relational and context-dependent” (KITCHIN and DODGE 2011, 337). Moreover, in KITCHIN and DODGE’s continuing thesis, the map’s ontological security is never presumed or determined *a priori* but is “a co-constitutive production between inscription, individual and world; a production that is constantly in motion, always seeking to appear ontologically secure” (KITCHIN and DODGE 2007, 337). This echoing of the “co-constitutive” relationship between map and territory is critical for the non-representational position that implicitly rejects KORZYBSKI’s maxim. This “co-constitution,” as suggested by both DEL CASINO and HANNA and KITCHIN and DODGE, argues that both map and territory exist on the same ontological plane, contingent and in relation to the other.

BAUDRILLARD also provides us with another ontological riddle by suggesting that “it is no longer a question of either maps *or* territories” (1995, 1; emphasis added). Unlike KORZYBSKI, who suggests that suffering can only happen in the actual world *without* map, BAUDRILLARD inverts this: suffering can only happen in the cartographic “actual world” without *territory*. Here, we also take issue with BAUDRILLARD’s thoroughly post-modern claim. At no point does the world exist solely as a free-floating signifier, abstraction, or simulation. Nevertheless, BAUDRILLARD pre-empted DEL CASINO and HANNA’S (2006) call to go “beyond the ‘binaries’” by completely eradicating any semblance of reality beyond a hyper-form of such. BAUDRILLARD’S claim, therefore, rested on an intensification of artificiality and a triumph of human imagination – of the map over, and in the absence of, territory.

The non-representational position refutes such a move. Firstly, although the statement that “[t]he map...*emerges* through a set of iterative and citational practices” (KITCHIN and DODGE 2007, 337–38) might still stand in a BAUDRILLARDIAN hyper-reality, the same is equally true for territory itself. In other words, the terri-

tory similarly *emerges* through a set of iterative and citational practices (cf. Elden 2007, 2013). Secondly – and this is the distinctive feature that refutes BAUDRILLARD – the map and territory are resolutely “co-constitutive.” That is to say, therefore, that a) both exist, b) both exist in relation to each other, and c) both exist relationally to other possible objects. In other words, both map and territory express an emergent, but crucially, co-constitutive existence.

Having identified these flaws, we are now better placed to consider the possibility of a “flat ontology” (BRYANT 2010, 2011; DELANDA 2013) that neither denies the existence of either map or territory nor relegates either to a separate ontological plane. We intend here to put to work Sallie MARSTON et al.’s (2005, 424) call for “a flat alternative” to scalar geographical relations that prioritize both hierarchies (global to local, etc.) and binaries (map to territory, etc.).

For DELANDA, the original proponent of the flat ontological position, this means that everything in the world exists on the same plane with no entity existing above or below the other. Further, for DELANDA, there are only “individuals” in the world – human, non-human, organic, or inorganic. Thus, within this world, “atoms have no more reality than grain markets or sports franchises” (HARMAN 2008, 370). Nevertheless, this is not the same as supposing all entities have equal power in the world. Whilst there exists only a singular ontological plane across which all entities operate, they do not operate with equal force. As Ian BOGOST (2010, para. 6) eloquently puts it: “All things equally exist, *yet they do not exist equally.*” Some of these things exercise a power greater (or lesser) than others.

In BRYANT (2010), this urge to relegate or promote entities to lower or higher ontological levels or orders is explored a little further with the help of Graham HARMAN (2011a; 2011b). Both attend to the issue of either undermining or “overmining” objects that have a tendency to plague an object-oriented ontology they wish to explore. BRYANT (2010, para. 5) suggests that “a flat ontology is an ontology that refuses to undermine or overmine objects,” unlike either KORZYBSKI’s representational relegation or BAUDRILLARD’s hyper-real elevation. Thus, maintaining a commitment to neither undermining nor overmining an object is integral to advancing a flat ontology of vehicular navigation if one is to avoid slipping back into either position. As BRYANT (2010, para. 6) outlines: “Undermining is that operation by which the thinker attempts to dissolve the object in something *deeper* of which the object is said to be an unreal *effect*.” Or, in HARMAN’s words, “objects are unreal because they are derivative of something deeper” such that they become “too superficial to be the truth” (2011a, 24). In other words, the map, as a cartographic object, is reduced to being a mere representation, an “unreal effect,” or simply a “derivative” of the territory. Through this undermining, the map is not able to function as anything other than “bare epiphenomena” (BRYANT 2010, para. 6).

Whilst undermining objects is relatively straightforward, as BRYANT contends, “overmining” requires a little more thought. “Although undermining is obviously a more familiar English word,” HARMAN suggests, “overmining is a far more common philosophical strategy for dissolving objects” (2011a, 24). As HARMAN (2011a, 24) continues:

The other and more familiar option, anti-realist in character, is to say that objects are unreal because they are useless fictions compared with what is truly evident in them – whether this be qualities, events, actions, effects, or givenness to human access. Here objects are declared too falsely deep to be the truth.

Thus, by overmining an object one assumes that it possesses a near-infinite depth of resources readily conjurable *only* in relation to its possible effects as accessed empirically. Or, more plainly, an object is only determinable by and through this “human access.” A flat ontology, argues BRYANT (2010, para. 8), “refuses any overmining of objects that would treat objects as mere effects of actions, events, language games, intentions, signifiers, signs, sensations, economic forces, etc.” This is the position taken by BAUDRILLARD, who simultaneously eradicates the territory-as-object completely whilst dissolving the map-as-object into an object-less hyper-reality.

It is these twin acts of undermining and overmining that occur independently in both KORZYBSKI and BAUDRILLARD. In the former, it is the territory as an entity that is “*overmined*,” whilst the map, as another such entity, is *undermined*. In BAUDRILLARD, the territory is undermined to expulsion from the world entirely, whilst it is the map that is overmined to a hyper-real absurdity. Assuming neither position is necessary for describing the automated driving world coming into existence.

A flat ontology thus contends that neither map nor territory is elevated to a higher, more prestigious, ontological plane. Neither is the map-as-object in servitude to the territory-as-object, nor is the territory-as-object dissolved entirely into the map. This satisfies MARSTON et al.’s (2005, 424–425) criteria for a flat alternative as it does not “reproduce bordered zones that redirect critical gazes towards an ‘outside over there’ that, in turn, hails a ‘higher’ spatial category.” Instead, following DELANDA (2013), BRYANT (2010; 2011), and HARMAN (2011a), both the map and territory have the possibility of existing *equally* on the same plane. But further, following BOGOST (2010), even with this planar equality, each object still has the possibility of exerting different degrees of force. Consider again the child’s scribbles on the map. In a flat ontological world, they equally exist as the to-be navigated territory, but do not necessarily exert lesser or greater *a priori* force. This would depend on an evaluation of the scribbles; pencil, crayon or marker pen? In the margins or over contour lines? With creative fury or through absentminded boredom? These features determine the additive force of a cartographic element in the world.

In this chapter, however, we must go a step further by suggesting that not only do these two objects exist on the same ontological plane while still exerting different degrees of force, but that also, in the specific case of automated driving, both combine as one object: the map-territory. In supposing that this new conjunctive object that we call the “map-territory” exists, neither map nor territory continue to exist independently but instead operate as a wholly new phenomenon. This goes beyond MARSTON et al.’s (2005) call by proposing an entirely new entity.

What is important to note here, however, is that as a result of such a move, the possibility of under- or overmining either the map or the territory as independent objects is removed (with neither existing as such). Instead, the possibility of under-

or overmining the map-territory arises, existing as it does as an embryonic, conjunctive object. In other words, one does not lose the possibility of supposing that the map-territory exists as a mere representation, unreal effect, or derivative of another source object. Neither does the map-territory attain immunity from being treated as an effect of actions, events, or language games. If each case is proposed, the flat ontology of the map-territory is fatally compromised.

Moreover, this approach pushes the non-representational argument as offered by both DEL CASINO and HANNA (2006) and KITCHIN and DODGE (2007) even further, such that map and territory are no longer even “co-constitutive” but one and the same. Whilst the former supposes that both still exist as independent but wholly relational, symbiotic entities, the latter contends that there is now no distinction, only a novel constitution in the form of the map-territory. The significance of this is that it radically transforms our understanding of two activities. In the first instance, it changes our understanding of navigation into so-called “social navigation,” a term coined by the Waze start-up company, to be discussed shortly. Secondly, this approach dramatically alters our understanding of how the act of driving is performed. With the embryonic emergence of automated driving, the map and territory fuse together as map-territory. This is made possible by shifting navigational capacities from the human and into the car-machine.

In the next section, we detail the rise of social navigation and the work it has done in altering the public perception of driving from an individual to a collective activity. We focus on how, through the inscription of the software with both active and passive tracking affordance, Waze restructures the driving map to not merely reflect, but manifestly *transform*, the road. Through this assemblage of users, cars, and software the map-territory is updated in real time so that each action taken in physical or digital space has far-flung consequence to drivers within *and outside* the immediate Waze network.

Following this, we turn our focus to the nascent phenomenon of automated driving and self-driving cars. We examine how such cars further deepen the collapse of the map into the territory, and vice versa, by side-stepping human agency in the driving process. We argue that such restructuring occurs due to automated vehicles acting as sensors through which the map is generated while simultaneously using such maps – far more detailed to be useful to humans – as a necessary way through which to consume the territory.

## SOCIAL NAVIGATION

“To a certain extent, the rule of engagement is that you, as a driver, will show me yours, and I will show you everyone else’s”  
(LEVINE 2011)

Two years before it was purchased by Google for \$1.1 billion in June 2013, the then-president of Waze, Uri LEVINE, was presenting on a London stage to a crowd of like-minded tech entrepreneurs and press. In trying to explain Waze, a relatively anonymous Israeli start-up, he evoked an image of the likes of Wikipedia, Face-

book, and Twitter coming together in the automotive world. The promise, he said, was to convince mobile phone users to share their personal data, especially relating to critical parameters of speed and direction, in the hope of producing a combined dataset of total driving activity, that could optimize driving and, crucially, be monetized. Users of the platform would gain valuable insights about potential shortcuts and upcoming road issues, with Waze famously promising to “shav[e] five minutes off of [drivers’] regular commute by showing them new routes they never even knew about” (WAZE 2016a). LEVINE was keenly aware of the technological potential of his company: By that time, Waze had become a mainstay in Israel, gaining popularity to the extent that the Israeli military boasted about developing its own “version of Waze” that “displays traffic information on roadways... [and] can plan routes for officers and pinpoint hazards along the road for others. Enemy positions are highlighted in red, while friendlies are in blue” (Israel Defense Forces 2012).

A year after the Google-Waze purchase, one of the authors was conducting ethnographic work in Israel. During an interview with a sales agent for a mapping organization, the topic of Waze came up. After discussing the resistance of their clients’ worker union to implementing technologies that might track them, the agent likened it to the common reaction of Israeli taxi drivers to passengers’ requests to turn on Waze:

(Sales Director, Female, in her late 30s)

Those... taxi drivers... they always the ones who resist the most. [imitating a male voice] “Drop that Waze thing, I know best” – [in her normal voice] but they just blocked off the main street... [imitating the driver again] “Drop that Waze, I’ve been on the road for 20 years!” ... [talking regularly] But not everything is under your control, man, you know? I gave [control] up so gladly. I don’t go anywhere anymore without Waze.

This anecdotal exchange showcases the map-territory as a unified object. Here, combined, are the politics of driving, gendered perceptions of navigation, the threat to habituated practices by new technologies, and the shift in what it means to drive and be driven. On top of passive data collection, “social navigation” allows drivers to actively transform the driving world through various extended navigational acts such as reporting hazards, flagging issues, and altering traffic flow (HIND and GEKKER 2014). Waze has been continuously integrating driving-friendly (i.e. voice operated) ways to actively report real-time traffic information to fellow drivers. Moreover, from its inception, the app included certain aspects of social media that promote such practices. Namely, drivers can select an alias and choose from a set of avatars to be visualized to other users by on the app interface. Users can also see other users’ reports and leave them “thanks” (see Figure 1) that are quantified in a similar manner to Facebook’s “likes” or Twitter’s “favs,” generating attention feedback loops that prompt users to return time and again to the app (GROSSER 2014).

Each driver has the option of actively marking the road while driving to indicate various impediments. The uses vary from the convenient, such as indicating the location of speed traps or police checkpoints; to the life-threatening, by reporting major accidents or infrastructure damage. Some user updates are temporary: an incident leading to a closed lane, a vehicle stopping on the road shoulders; other

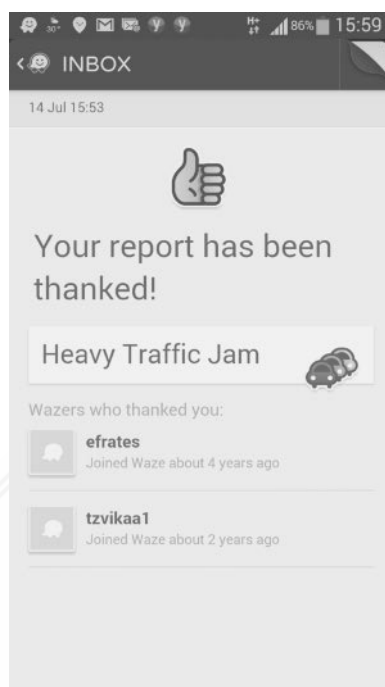


Figure 1: Waze “thanks” screenshot

contributions are permanent in nature, like the change of a street from one-way to two-way traffic. The app can predict planned impediments by tapping into the data streams of local municipalities and police agencies for forthcoming events, but its main benefit is the ability to harvest the collective “data fumes” (THATCHER 2014, 1770) of its user base in order to react – through rerouting – to cascading traffic changes arising from unprecedented situations.

When considering this merger of social and navigational practices through the digital map’s interface, the overmining or undermining of the territory becomes impossible. A marker left on a map by a Waze user is neither a signifier nor a referent. By passively and actively leaving traces on the map, the user progressively constructs social identity, activity, and relations on the platform. Altering the map on one’s mobile screen sends a signal that joins hundreds of other signals, ultimately resulting in a re-calculation of the traffic conditions in the area (as conceived by Waze servers and routing algorithms). It might result in the suggestion of another route for the next app user who queries a guidance on the map, effectively making the marker directly responsible for immanent territory change through software (THRIFT and FRENCH 2002; KITCHIN and DODGE 2011) Waze enlists its users into a different spatiotemporal state that habituates their minds and bodies to follow a certain economic rationale promoted by its developers.

These inscriptions also have an immediate effect on drivers *not* using the app, as its popularity and ubiquity in some geographic areas produces cascading spatial

effects beyond its user base. In other words, Waze has engendered “new forms of social action” (DANT 2004, 61) beyond the platform itself. A simple example would be the transformation of traffic conditions for non-app users, both short- and long-term. On a limited scale, a change in the map might create alternative directions for Waze drivers that, depending on their numbers within the regional driving populace, alters traffic congestion for others. Even more illustrative to our case, however, is the way Waze can alter spaces over time. As previously mentioned, one of the app’s main goals is to “show [drivers] new routes they never even knew about” (WAZE 2016a). This is mostly done by rerouting the driver onto side streets, avoiding more substantial congestion along the way. However, such rerouting might have profound effects on the inhabitants of those “hidden” paths and on the nature of neighborhoods, which Waze deems “shortcut-y” (see WEISE 2017; LOPEZ 2018). Local knowledge becomes widespread through the app, which detects local users succeeding in overcoming traffic in creative ways and suggests similar routes to other users. Such occurrences happened through several large urban blocks, primarily in the US. An indicative report from the Washington Post (HENDRIX 2016, para. 1–2) clarifies the scale of the issue:

“It used to be that only locals knew all the cut-through routes, but Google Maps and Waze are letting everyone know,” said Bates Mattison, a city councilman in the Atlanta suburb of Brookhaven, GA. “In some extreme cases, we have to address it to preserve the sanctity of a residential neighborhood.”

When population growth began to overwhelm a set of major intersections in his district, there was an increase of 45,000 cars a day on some residential streets, as app-armed commuters fought their way to nearby Interstate 85. In response, the city is posting signs to restrict left or right turns at key intersections. The apps didn’t create the traffic, Mattison said, but they gave drivers options they wouldn’t have known about otherwise.

Thus, we see a creative disturbance of the map-territory by thousands of Wazers and users of Google Maps, which now integrates functions similar to Waze’s (LEVY 2016) while also being available as one of the pre-installed applications on many mobile Android devices (ETHERINGTON 2015). Their collective work, performed under the aegis of the “sharing economy,” often results in precarious and exploitative labor that benefits the platform holder (TERRANOVA 2000; SCHOLZ 2008). Waze is in a prime position to capitalize on this spatial and behavioral data, as exemplified by its recent moves into city management (BRADLEY 2015) and ride sharing (NICAS 2016).

Beginning with a pilot in greater Tel-Aviv, Israel and the Bay Area, USA, Waze’s carpooling services aim at combining its expertise of social navigation with the rise in app-based ridesharing services like Uber or Lyft. By promoting “green” consumerism – “saving the planet (and some money) by riding together to work” (WAZE 2016b) – the app allows drivers to pick up commuters from their area, provided both the origin and end point of the journey are in certain proximity. The drivers then receive automatic compensation from the passengers, calculated by the app and presented as gas money. This move from personal social navigation to the community level becomes even more interesting for the ontological status of the

app's map, as Waze cooperates with several local municipalities such as Rio de Janeiro (UNGERLEIDER 2015). The project offers local governments free traffic data, as collected by the company via users, in exchange for receiving the municipality's own traffic, like garbage truck routes or traffic light schedules, data that is otherwise unavailable. This results in the combination of traffic management automatization with active social media participation. The act of notifying others of mood and actions, as is possible in Waze, is elevated to the level of reporting active and passive data to other drivers, commercial entities, and even local governments.

## AUTOMATED DRIVING

Automated driving radically alters our understanding of the map/territory relation, as it fully-integrates the act of driving into the machine itself. Thus, no longer is the automation of driving presented as an optional feature or "add-on," but as a very real part of everyday driving. Moreover, the map may not even comply with our traditional perception of what constitutes a map, as such a "map" might be largely unreadable to a human yet indistinguishable from territory to the automated car navigating by it (see STILGOE 2017a). Autonomous cars require detailed maps, as current sensors and processing assemblages are insufficient to give the response time necessary to operate such vehicle in real-life conditions (MILLER 2014). But such maps are constructed with the use of meticulous Lidar sensing using specialized equipment and/or by tracking existing drivers and extrapolating the road from those drivers' data (GITLIN 2014). Autonomous car developers are more concerned with pinpointing what might confuse the machine vision of a driving computer than with other elements human users prioritize. This is because, as Steve COAST (2015, n.p.), the founder of OpenStreetMap, notes, "Armed with cameras, GPS, radar and sonar, a car can just capture all the data and (pretty much) make a map automatically, for free." With "[t]he costs...now so low and [t]he incentives...so high" (COAST 2015, para. 2–3), mapping for autonomous driving is the newest cartographic frontier, with a variety of digital companies (Google, Uber), automotive corporations (Daimler AG), and engineering firms (RDM Group) leading the way. This also leads to the rise of previously unimaginable actors, such as the formerly Nokia-held HERE company, now co-owned by rival auto-manufacturers Audi, BMW, and Daimler.

In October 2015, Tesla launched a software update for its Model S vehicle. Included within this was the company's Autopilot feature, comprising a suite of functions designed to automate particular driving activities (see Figure 2). "Autosteer," for instance, "keeps the car in the current lane and engages Traffic-Aware Cruise Control to maintain the car's speed," and "Auto Lane Change" will "move [the vehicle] to the adjacent lane when it's safe to do so." The "Automatic Emergency Steering and Side Collision Warning" function "further enhances Model S's active safety capabilities by sensing range and alerting drivers to objects...that are too close to the side of Model S," while "Autopark" will allow the vehicle to "park itself by controlling steering and vehicle speed" (Tesla 2015). Needless to say, the





Figure 2: Tesla Autopilot display

update prioritized a range of automatic functions designed to allow the driver to cede control to the vehicle.

There are two points to be made about Tesla's Autopilot feature. Firstly, the press release couched such developments in similar terms to Waze. Rather uncannily, Tesla suggested that the software update "increases the driver's confidence behind the wheel with features to help the car avoid hazards and reduce the driver's workload" (Tesla 2015, n.p.). Further, "While Model S can't make traffic disappear, it can make it a lot easier, safer, and more pleasant to endure" (Tesla 2015, n.p.). Waze is equally concerned with ensuring drivers avoid hazards, whilst the (in)ability to "make traffic disappear" is an issue touched upon in the Brookhaven congestion case described by the Washington Post. Perhaps where social navigation and these automated driving features differ, however, is that whilst Waze ensures that traffic is rerouted to some degree, Tesla's Model S removes the cognitive load that driving through (or avoiding) traffic involves.

The second point to note about Tesla's Autopilot function is that these developments would not be possible without Tesla's "high-precision" mapping. As suggested in a Mashable article published the same day as the software update, whilst "GPS mapping in cars has existed for years...[it] currently only scratches the surface of the data needed for an autonomous self-driving car" (PERKINS 2015, para. 3). This mapping requires a detail heretofore unknown. As the press shot in Figure 3 illustrates, there is a marked difference between current, consumer-grade levels of road mapping and desired ones. This gap is the difference required for human drivers and non-human vehicles. The reason for this shift in detail is that, with the vehicle becoming both automated driver *and* navigator, the smallest road qualities become of critical importance, both spatially and temporally. Whilst sat-navs for human driver-navigators commonly contain a level of detail down to roads, routes, junctions, and lanes, automated vehicles require specific measurements between, say, motorway lanes. Without such, vehicles are liable to drift into other lanes or, worse still, hit central reservations (median strips) or other cars. The observation made by DODGE and KITCHIN (2007, 268) that "GPS-based navigation...can be used to monitor the real-time location of a vehicle to the nearest few metres" no longer suffices for the driverless vehicle, which requires a far greater level of



Figure 3: Tesla's 'high-precision' mapping desires

geographical precision. Further, driverless vehicles need not only to monitor and react to shifting, emergent objects – people, animals, or road works, for example – but also, simultaneously to render these things cartographically so the vehicle can adjust speed and direction appropriately.

What is particularly interesting in Tesla's approach to this cartographic quandary is that it intends to use the vehicles purchased by people around the world to literally drive this mapping endeavor. In Tesla CEO Elon Musk's terms, this amounts to a "fleet learning network" (PERKINS 2015, para. 6), a kind of machine-learning process through which individual vehicles contribute to, and ultimately create, a shared cartographic database of "high-precision" road data (see STILGOE 2017b). Once again, this is similar to the way in which the Waze database is generated and constantly updated by the users of the platform. Each individual driving with the app is simultaneously uploading cartographic data to Waze. The technical difficulty of building and maintaining such maps joins other challenges in operating driverless vehicles, including the public perception of their safety (MILLER 2014) and the regulatory challenges relating to damage and insurance (KOLLEWE 2016). The map-territory of the automated vehicle resists the compartmentalization of the human map, as it simultaneously exists as an approximate representation of the physical space and the pre-requisite for its existence.

What is critical to understand here is that navigational duties are becoming fully integrated into the driving machine. Considered alone, the launch of the various "auto" features by Tesla in 2015 are less significant. The Autosteer feature is a step-change for cruise control technologies that have existed for over 50 years. Moreover, drivers are still required to "remain engaged and aware when Autosteer is enabled" and "must keep their hands on the steering wheel" when operational (DELLA CAVA 2018, para 28–29.). That the feature is also listed as being in beta phase despite roll-out is both indicative of automated driving's slow development, and somewhat worrisome from a vehicle safety and insurance perspective.

But when considered together, these automated features reduce the number of actions and activities required of the driver. In a Tesla Model S equipped with these

various functions, the driver neither necessarily controls the steering, speed, nor lane position on motorway routes; nor locate a parking space or performs a parallel parking maneuver. In fact, as a popular dash-cam recorded video shows, in some dangerous situations, the human driver is inferior to the car, with its multitude of sensors and undivided attention to the road (BROWN 2016). While Waze generated a shift from users (sometimes blindly) adhering to navigational commands to participating in the creation of a new driving commands, developments by Tesla and others in respect to automated driving technologies are shifting this *back* towards the vehicle. The crucial difference is that Tesla's driving technologies are contributing to the physical act of controlling the vehicle's speed and direction.

Thus, navigation and driving are slowly merging into a single act that is fully absorbed into the machine, at least, provisionally. As Tesla suggest in reference to their Autosteer feature, perhaps this integration is in a "beta" phase, something also acknowledged by the German transport minister, Alexander Dobrindt, who suggested that Tesla should refrain from using the term "autopilot" so as "to prevent misunderstanding and incorrect customers' expectations" (ANTHONY 2016, para. 2). Nonetheless, it is a concrete reality that the act of driving now performed by the vehicle becomes fully dependent upon navigational commands also supplied by the vehicle while being contingent on data supplied by myriad other driver-car units. Further still, driving maneuvers are *fed back into* an ever-generative cartographic database of roads, junctions, lanes, and hazards via what Musk calls a "fleet learning network" comprised of sensor-equipped vehicles tasked with performing road maneuvers in the first place. These integrated elements drive a new cartographic relation between map and territory, merging them into a single map-territory entity. On this ontological plane, the individual-as-driver has a reduced input in either the act of navigation or the act of driving. There, driving is performed simultaneously on the map and the territory, imbricated through movement of bodies, vehicles, and data.

## CONCLUSION

In this chapter, we have argued that social navigation and automated driving have, in stages, brought about a new ontological reality challenging old divides. As such, we contend that the map and the territory have combined as one: a map-territory. We have done so by re-examining the shifts in semiotic relation between the map and the territory brought about by the digitalization of the map and the automatization of driving.

We took a historical approach to the changes in our habits of mediated interaction with maps, first, by centering KORZYBSKI's view of the map as undermined by territory, then, by showcasing BAUDRILLARD's overmining of the map by the hyper-reality of mediated landscapes. We then suggested that the shift to digital maps and mobile devices required reconstituting the relation between the two into a single entity defined by a flat ontology: the map-territory. We have exemplified

this shift through a focus on contemporary practices of social navigation and automated driving.

Today, we witness an ongoing progress in computing, ergonomics, and design alongside social practices that elevate connectedness and uninterrupted data-streams. Simultaneously, traditional economic models are becoming subsumed within the attention economy (STIEGLER 2010; CROGAN and KINSLEY 2012) that privilege ongoing user engagement over immediate, extractive, monetary gains. When examining these processes through the prism of mediatization, the continuous amalgamation of media practices with other daily activities makes sense, as it allows users and audiences to find new opportunities to engage with content. The goal, one might say, is to eliminate the barriers to uninterrupted media consumption. Listening to the radio while driving provides such an opportunity but is a limited one. The computational industries (BERRY 2014) could instead strive for freeing up cognitive resources while driving and cementing the link between vehicular navigation and screen time.

We hope that our construct of the map-territory allows for a deeper understanding of changes in media, cartography, and navigational practices. By being attuned to such changes and looking beyond the bifurcation of either “real” or “virtual” worlds, scholars can trace the multitude of economic, social, and technological shifts that occur in these fields.

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