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Humanitarian Modulations:

*Doing 'Free' (Media and Communication) Infrastructures in Times of Forced
Migration*

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Abstract

In the wake of increased forced migration towards Europe, journalistic as well as scholarly attention has turned towards the role that media technologies play for refugees and asylum seekers. While some accounts highlight their significance for migration processes, integration and everyday struggle, they are followed by a strong media discourse that frame devices such as smartphones as mere luxury. In response, German NGOs and individuals with backgrounds in different hacker organizations have come to advocate for greater accessibility of media technologies for newly arrived refugees. Particularly in the context of institutionalized refugee management and humanitarian care, the free wireless hacker initiative Freifunk has become a prominent voice striving for greater access to media and communication infrastructures for refugees.

Based on a case study of the local Freifunk initiative in Bremen, Germany, the thesis asks how the practices of 'doing' free wireless networks interfere and reconfigure Internet infrastructure within refugee accommodations, given that they are driven by a vision of more equitable access. Through narrative accounts of two Freifunk installations that involved activists, managers, and policy makers, the study focuses on the key actors, objects, and practices that make such infrastructural interventions possible. Consequently, the thesis asks how the critical potential stemming from the lived reality of Freifunk's 'recursive public' (Kelty 2008) expands via conflictual infrastructuring practices (Niewöhner 2015) and at times allows to jointly problematize contemporary questions of digital access and rights for refugees. It also discusses possible changes to these hacker practices itself, as they increasingly interlock with the logics of humanitarianism and travel across the established boundaries of public, private, and institutional refugee management.

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1. Introduction

'This is absolutely humanitarian help, I mean if I would imagine myself in the same situation, then this would be one of the most important factors for me, to have Internet access [...] I mean, for me it's somewhat like radio, electricity and water, the Internet [...] but since nobody else really takes care of it, somebody has to do it [...] I would absolutely wish to have a reliable, decent Internet uplink, in the best case just where I am. As such, it was an easy decision to make, to do it there, yes' – Interview extract with Hauke, member of Freifunk Bremen, about sharing his private Internet uplink with a refugee accommodation, March 2016¹

In 2016, the United Nations (UN) declared that access to the Internet is a human right, while the German constitutional court already ruled in 2008 that every citizen has the right to Internet access.²³ In contrast to this, accounts by activists and NGOs show that communication rights and needs of refugees were (and still are) far from being on top of the German government's and humanitarian actors' priority lists. Issued in November 2015 by a German refugee NGO and the European Council on Refugees and Exiles (Kalkman 2015), a country report on Germany illuminates two important aspects of this debate. On the one hand, the report critiques the lack of clear infrastructural standards for the tents, containers, gyms and repurposed spaces that came to serve as refugee accommodations. On the other hand, access to media and communication

¹ To protect the privacy of my research participants, all names have been changed. Direct quotes from participants have been translated from German to English.

² Shore, M. and Callin, K. (2016): 'Internet access is now a basic human right: part 1 – Chips with Everything tech podcast'. The Guardian, 29 July 2016, Retrieved on 19th September from <https://www.theguardian.com/technology/audio/2016/jul/29/internet-access-human-right-tech-podcast>

³ Bundesverfassungsgericht (2008): 'Urteil des Ersten Senats from 27. Februar', 27th February 2008, Retrieved on 19th September from https://www.bundesverfassungsgericht.de/SharedDocs/Entscheidungen/DE/2008/02/rs20080227_1bv037007.html

infrastructures including the Internet does not appear as a distinct factor in the assessment of reception conditions.

Starting my research in early 2015, a growing body of volunteer groups throughout Germany had already claimed responsibility by donating clothes, food and language courses in newly opened accommodations for refugees. As I looked for a suitable research topic that would take into consideration both issues of forced migration and the role of media and communication infrastructures, I found myself in the hackerspace Bremen, Germany. A self-described workshop for local tech enthusiasts and tinkerers, it was ripe with opportunities to study emerging connections between hacker collectives and their response to what would soon be termed the 'long summer of migration' (Speer and Kasparek 2015).

Here I learned that precisely the lack of interest by social service providers and policy makers had led hacker collectives like the *Chaos Computer Club* (CCC) to highlight the significance that media and communication infrastructures have for refugees and asylum seekers. Later, a member of the CCC related initiative *Freifunk* ('free radio waves', Petersen 2013) approached me, informing me how the question of whether refugees can properly access the Internet in the accommodations where they first arrive had become a central topic for local group in Bremen, but also for Freifunk collectives all over Germany.

Arguing for the importance of Internet access for integration, education and contact with left-behind family members, I was told that Freifunk members immediately increased their efforts to find ways of providing refugee accommodation with Internet access. Like the opening quote indicates, one aspect was to share private Internet uplinks with neighboring accommodations that had little or only limited Internet access. This in turn emerged from the practices of the open grassroots' initiative who attempts to establish and maintain based mesh networks assembled of hardware owned by individual

citizens. Furthermore, the initiatives engages with local as well as national policy debates on public Internet access, surveillance and net neutrality.

With this conversation being the igniting spark of my ethnographic fieldwork, the research brought forth in the thesis further approaches the practices of Freifunk Bremen as entanglements of forced migration, humanitarianism and the sociotechnical imaginations (Jasanoff and Kim 2015) of alternative wireless networks. In turn, the study contributes to the growing body of work on media infrastructures (Park and Starosielski 2015), the cultural significance of free software (Kelty 2008) and mundane workings of humanitarian infrastructures (Donovan 2016).

This intersection of approaches is combined through a theoretical lens characterized by a relational, ecological and processual approach that allows to study *infrastructuring* and the political decisions this entails in the making (Niewöhner 2015). More precisely, it poses the question of how the established sociotechnical practices of the free wireless collective Freifunk become embedded within the refugee accommodation, interfere with the locally situated infrastructuring practices. In doing so, it explores the potential of Freifunk practices as a 'recursive public' (Kelty 2008) that allows infrastructure-based critique of closed networks as well as the necessary work of installation and maintenance (Jackson 2014).

Following the literature review, the theoretical approach and an introduction to the Freifunk initiative, the third chapter presents methodological decisions I took during my eight months of qualitative intermittent fieldwork in Bremen between May 2015 and March 2016. Here, I primarily draw from narrative accounts of Freifunk installation in two refugee accommodations based on interviews with Freifunk members, accommodation representatives and a local community manager which were all to some extent involved in the installation process. This data is further supplemented by my ethnographic, immersive

approach of visiting these sites and trying to document an emerging practice of doing 'Freifunk for Refugees'.

The third chapter then opens with both empirical findings and insights from existing literature to reveal key conflicts that shape Internet access in the accommodations that I visited. This includes an accommodation for minor refugees as well as a 'short-term' emergency shelter. Here, I especially try to work out how a nexus of standards, laws and regulations of corporate Internet provision shapes everyday infrastructuring of Internet access in these distinct localities.

Treating the insights as an important analytical backdrop, the fifth chapter then looks at three distinct practices of doing 'Freifunk for Refugees' that make interventions possible. The first focuses on the shared work of *articulating* Freifunk practices and expertise as an appropriate response to infrastructural neglect in the accommodations, while the second one highlights the need for *negotiation* between Freifunk members and humanitarian actors of what the interventions should look like. The third set of practices then addresses the embodied work of *installing* and *maintaining* as a key infrastructuring moment.

Based on my findings, I discuss how despite prominent rhetoric on total exclusion and digital divides, this 'open' approach to mesh networking succeeds as it raises awareness for infrastructural inequality and practically interferes with forms of *sociotechnical abandonment*. Yet, I also address the fact that even though expertise and technologies are successfully aligned, 'Freifunk for Refugees' should not be understood as a straightforward technological fix. In contrast, I discuss how the ongoing interactions with activists, professional policy makers and social service providers interlocks with logics of humanitarian aid that potentially reshapes the way Freifunk in this contexts is done in practice.

Given the limited scope of my research, mirrored in terms of time and diversity of participants, I end with a brief conclusion on how future research might approach Freifunk, including a stronger focus on the seemingly 'non-

technological' practices as 'minds must be persuaded and hearts won over, in addition to expertise and infrastructure being built' (Jasanoff 2015: 332, Barker 2015). Further work should also try to account for the importance of forced migrants and refugees as autonomous actors in the making of the Internet infrastructure they rely on (Trimikliniotis et al 2015). This includes an overall sensibility towards the quickly shifting challenges that Freifunk practices will have to respond to in the future.

2. Background, Literature Review and Theoretical Framework

The following section reviews the growing body of studies on alternative infrastructure and hacker collectives, as well as its links to literature on forced migration towards Europe and humanitarianism. Here, the aim is to demonstrate the growing need for research at the intersection of STS inspired infrastructure research, media studies and critical work on humanitarian care for forced migrants. I then go on to present my theoretical framework on infrastructuring that binds these diverse bodies of literature with my case study on the Freifunk initiative in Bremen.

2.1 Alternative Network Infrastructures and (German) Hacker Collectives

In STS, conceptual and empirical work on infrastructures figures as a long lasting trend that has only recently been taken up along within media and communication studies via an increased interest in the technological aspects of media (Gillespie et al 2014, Park and Starosielski 2015). In their pioneering volume *Signal Traffic*, the editors Park and Starosielski more precisely define media infrastructures as 'situated sociotechnical systems that are designed and

configured to support the distribution of audiovisual signal traffic' (2015: 13). By placing 'data centers, mobile-telephone towers, and undersea cables' at the heart of inquiry, they add to the dazzlingly vast array of studies and approaches on the 'politics and poetics of infrastructures' (Larkin 2013). One distinct feature of this focus stresses questions of access to, distribution and implementation of media and communication infrastructures in contrast to more established focus on media consumption and its effects (Park and Starosielski 2015: 13). Reflecting this interdisciplinary turn, anthropologist Dominic Boyer argued that the focus on 'infrastructure signals our relationship to the failure of Keynesianism, and now 30-40 years later, to an incipient failure of neoliberalism to really deliver on its own promises' (Boyer 2014).

In tune with this hypothesis, turning to the layers of media and communication infrastructures can be seen as a critical assessment of their 'transformations and emancipatory promises inherited from the 1980s and 1990s', responding to ongoing debates about net neutrality, increased corporate ownership of platforms and servers but also questions of private and government surveillance exposed by the leaks of Edward Snowden (Tréguer et al 2016, Sprenger 2015). It is in response to such concerns that the editors Tréguer et al (2016) understand the ongoing interest of scholars in practices of hacking and tinkering, especially towards forms of 'Alternative Networks' they address in a special issue of the *Journal of Peer Production*.

Attempting to avoid the pitfalls of technological determinism of either a liberating Internet or its critical alternatives, they first highlight that any concept of the Internet must account for its inherent tensions, instabilities and various groups that populate it. Furthermore, they argue that critical alternatives to the Internet can never be fully independent from the discourses and practices of 'state and capital' they often seek to subvert (Tréguer et al 2016). In a similar way, anthropologist Christopher Kelty who has intensively studied the practices and social imaginaries that sustain free software is increasingly concerned with

scholarly work that prematurely celebrates free software and its critical qualities. Instead, he highlights the need to study the 'domesticated' forms that free software in particular takes under its previous synonym 'open source' (2013). Rather than assembling actors from diverse backgrounds as a 'recursive public' (Kelty 2008: 29) – a powerful concept I will return to in the theoretical framework – he sees a shift of the Internet towards a 'small, tight web of powerful ISPs' that further are subject to government surveillance and control (Kelty 2013).

Despite this hesitation towards immediately celebrating forms of 'DIY, low-power, backyard creativity' (Kelty 2013), wireless community networks (WCN) have been of growing interest for an interdisciplinary set of scholars since their emergence in the early beginning of the 21st century. In this literature, WCN are studied for their distinct approaches to building horizontal networks as a form of resistance and appropriation, with the result being a hybrid role of seemingly independent local networks and successful alternatives to the neglect or limits of commercial service providers (Petersen 2013, Jungnickel 2014, Dunbar-Hester 2014, Crabu et al 2015). In the shared scholarly approaches within STS, these networks have been approached as sociotechnical assemblages that are the product of aligning distinct horizontal routing protocols, free software, off-the-shelf hardware, traditions of 'open' software development with the counter cultural politics of hackers, artists and left-wing activists (Petersen 2013: 39). Yet, for my own study it is important to note that so far there is no examination of the links between the politics of forced migration and forms of volunteer/migrant activism.

As a starting point to such shifts in focus, recent scholarship first and foremost highlights that WCN continue and develop different internationally (Crabu et al 2015) along with both more established and contested definitions of who 'hackers' that build such networks actually are. As one of the most prominent scholars in the field, anthropologist Gabriella Coleman has defined

hackers loosely as 'skilled programmers, security researchers, hardware builders, and system administrators' (Coleman 2011: 512), emphasizing her overall goal to reveal the diversity of practices, biographical trajectories and 'political genres' that tend to disappear under stereotypes (Coleman 2011). Contrasting with media portrayals that frame hackers as criminals knee deep in illegal data theft, this scholarship is interested in how hackers actively address issues of market liberalism through new forms of copyright and collaboration (Coleman 2013, Kelty 2008). In turn, such a perspective demands critical inquiries into the practices and motivations of CN collectives, asking how their approaches and politics differ throughout cultural contexts (Jungnickel 2014: 17).

Narrowing the focus on hacking in the German context draws attention to the *Chaos Computer Club* (CCC) as one of the oldest hacker organizations in Europe. Lately, it has been examined for its overall importance of highlighting political issues of contemporary media and technology infrastructures (MTI), especially through fostering links to institutionalized politics and by communicating their hacks to both professional and alternative media outlets (Kubitschko 2015a, 2015b, 2015c). As Kubitschko argues, these media-related practices form an interlocking arrangement with the maintenance and use of alternative networks, summarized as the ways they 'act through, engage with and act about contemporary MTI' (Kubitschko 2015c).

Even though this points to a further research gap, similar practices can be identified in regards to the German WCN initiative *Freifunk* which is in part developed by active CCC members (Petersen 2013: 39). Yet, the literature review shows that no scholarship so far has accounted for the institutional links between German WCN like *Freifunk* and policy makers, a move that other scholars explicitly call for given WCN's 'unique opportunity to intervene in the spaces of privacy and digital infrastructure' (Haralanova and Light 2016). Most importantly for this present thesis, this shift in focus and practices towards policy making might be connected to even unexpected contexts such as

humanitarian aid. For the purpose of further sketching this research opportunity, I will briefly turn to the literature on humanitarianism, forced migration and media technologies.

2.2 Forced Migration, Media Technologies and Humanitarianism

Along with the constant journalistic coverage of the so-called European 'refugee crisis', social scientists have more and more addressed with the role of media for refugees and forced migration. Overall, it is important to note that approaches come from a diversity of fields, with recent studies still ongoing or of an explicitly explorative nature, embracing qualitative frameworks to uncover previously unstudied phenomena. As a recent example, a call for papers issued by Leurs and Smets (2016) has called for broad participation by scholars to study the role of media and forced migration, under which label they place 'asylum seekers, refugees, forced migrants, stranded migrants, left-behind children and child migrants as well as internally displaced populations'⁴.

So far, many existing studies are either concerned with the media discourse of forced migration and its politics (Rettberg & Gajalla 2016; Holmes and Castañeda 2016) or focus on media technologies as an important part of the innovative migration practices and the 'mobile commons' they constitute (Trimikliniotis et al 2015). As critical migration scholar Vassilis Tsianos points out in an interview, the prominent notion of a clear cut *digital divide* does not account for central media related practices and rather reinforces 'paternalistic'

⁴ In light of this broad definition, I want to note that throughout my thesis I am sticking to the prominent term 'refugee' my research participants used. Yet the English translation misses a distinction between the more derogative term 'Flüchtling' and term 'Geflüchtete' (i.e. people who fled), a label that is often used by activists due to its seemingly less essentializing notion. While I don't have the space to discuss such highly debated definitions in terms of identity, it is important to note the important disciplining quality of such labels especially for refugee management (For a recent analysis see Witteborn 2011: 1146).

attitudes of social scientists (2015: 116) In a recent study titled 'Internet ist gleich mit Essen' ('Internet equals food') Kutscher and Krefß (2015) highlight the media usage of refugee minors in German refugee accommodations for social interaction and education opportunities (2015: 3). Even this focus remains marginal, they also stress that access to media and communication infrastructures are often limited either due to pedagogic means, fear of refugees breaking the law through illicit online activity or lack of finances, both on the sides of refugees and the social service providers themselves (2015: 55).

Given the rather small body of work that focuses on media infrastructures and refugee accommodations, it opens research opportunities to further stress the interplay of state institutions, NGOs, social service providers, volunteers and social movements that lead to often unexpected humanitarian configurations. As an influential scholar of humanitarianism, Miriam Ticktin has pointed to Coleman's (2013) work on the Anonymous hacker collective and its shifting, often obscure and spectacular activist efforts (Ticktin 2014: 283), signifying a turn within the field towards the 'ambiguities, limits, and constraints' (2014: 281) of often unexpected forms of humanitarianism. It is also at this particular moment where STS driven scholarship pays attention towards humanitarian assemblages that include both human and non-human actors (Ticktin 2014: 284) as well as radically situating humanitarian care and its consequence in mundane infrastructuring practices (Donovan 2016). Yet, no major scholarly work has so far addressed the intersection of hacker collectives and humanitarianism.⁵

Thinking about the possible responses by STS scholars to the 'drama of fleeing, Ignacio Farías (2016) acknowledged that despite many possibilities for research, a certain uneasiness of STS methodologies that try to de-center the human prevails. In turn, he argues that the strength of such approaches is to

⁵ For an exception see Haywood (2013) on the motivation of hackers at a two-day 'humanitarian hacking' event organized by different technology companies and the PhD thesis by Hsu (2007) on hacker NGOs and development aid.

shift the attention from forms of 'universal suffering' to the 'universal right to be sociomaterially entangled, sociotechnically equipped, heterogeneously assembled, that is, to be more-than-human' (Farías 2016). Attempts by volunteers to donate clothes, give language classes but also enabling Internet access become visible as answers to the 'painful process of disassembling and disentangling from the sociotechnical assemblages they [refugees] live by' (Farías 2016). It is at this intersection of STS, humanitarianism, hacker collectives and media technologies that I want to contribute to with my own research.

2.3. Theoretical framework: 'Doing' Humanitarian Media and Communication Infrastructures

As the extensive review of the current literature on alternative media and communication infrastructures, hacker and humanitarianism suggests, the ongoing popularity of infrastructures as both empirical and theoretical framework lead the way towards a joint theoretical lens on *infrastructuring* (Niewöwner 2016). In terms of theoretical approaches, it was originally derived from ethnographic studies trying to uncover the invisible effects of large technical systems and later a broad analysis of seemingly boring standards, classifications and protocols in general (Bowker and Star 1999). Among other things, this concept highlights how infrastructures that seem taken for granted and ready at hand only arise as such in-situ, with infrastructural configurations having relationally configured effects for different people (Star and Ruhleder 1996).

Even though this approach already acknowledges that infrastructures are both embedded in and enabled by different practices, more recent theoretical work stresses a move away from thinking about infrastructures as fixed technical entities and focuses instead on the ongoing work of 'infrastructuring'

that they rely on (Bowker and Star 2006, Niewöhner 2015). As Donovan (2016: 733) points out, this line of thought resonates with an overall more processual empirical philosophy of influential STS scholars such as Bruno Latour (2013) that argue against any essentializing concepts of 'materiality'. Yet, this attention on materiality is combined with a focus on the politically relevant decisions that go into the development, deployment and usage of infrastructures. In tune with what within STS has been termed Post-ANT practice theory, the approach stresses both the agency of technologies and the attentive 'care' that they constantly demand (Mol et al 2010, Jackson 2014).

With this thesis being interested in how the practices of doing alternative media and communication infrastructures like Freifunk gain significance and challenge the way Internet access emerges from infrastructuring practices in refugee accommodations, I draw on two interlocking aspects of this infrastructural lens to understand 'free' technology. First, arguing along the lines of Christopher Kelty, I assume that Freifunk just like other free software or open source project can be analytically approached as a 'recursive public':

'Recursive publics are publics concerned with the ability to build, control, modify, and maintain the infrastructure that allows them to come into being in the first place and which, in turn, constitutes their everyday practical commitments and the identities of the participants as creative and autonomous individuals' (Kelty 2008: 7)

In this particular case of free software development, Kelty argues for a definition via the distinct practices of sharing source code, debating openness, forming movements and writing new copyright licenses that allows geeks and hackers (but potentially everybody) to contribute to and criticize the (infrastructural) means of the public's very existence (Kelty 2008: 29). What follows from this is an ontology of (free) software as 'lived and experienced', changing over time and constantly 'becoming' (Kelty 2013) as it gains significance in different contexts such as music, medicine and academia (Kelty 2008: ix, 306). Besides leading to a unique definition of culture an 'experimental system, a space of modification

and modulation, of figuring out and testing' (Kelty 2008: 2), it resonates with the notion of infrastructuring since geeks 'express infrastructures' (Kelty 2008: 29) as a contribution to the public, making free software as 'principal made material' akin to policy implementations (Kelty 2013).

The shared awareness on both discursive and infrastructural levels of technologies like the Internet then might give this public the ability to be 'a check on constituted forms of knowledge and power' outside of it (2008: 2). Yet, it also opens the questions in how far free software can hold to their emancipatory claims as they gain relevance in other, increasingly commercial contexts, most prominently in the form of 'open source' projects (Kelty 2013). Concerning the critical qualities of free networks, I therefore follow Kelty's claim that 'the reasons why people become obsessed with free software and its power come to free software, not *from* it' (Kelty 2013, emphasis in original) by focusing on the new actors and practices that enter the stage.

Acknowledging such a mutually shaping relationship between concepts, practices and infrastructures then allows to analyze any liberating notions of technology as practice based, situated and partial. In turn, it not only allows an analysis of different forms of freedom we 'design into technology' (Kelty 2014a) but also position any notion of networks as 'the things that needs explaining' (Kelty 2014b). This perspective of neither taking the essential qualities of 'networks' or 'publics' for granted, it further allows to ask how concepts of 'humanitarianism' take shape through mundane infrastructuring practices (Donovan 2016: 733).

Building on these insights, my second focus emphasizes those practices that make many infrastructuring efforts possible in the first place, namely the overlooked activities of installation maintenance and repair (Jackson 2014, Sánchez Criado et al 2014). Expanding this point, Sánchez Criado et al (2014) have drawn on installations of 'telecare' services for elderly people in Europe to show how socio-technical assemblages that might at first appear as a mere

technological 'fix' to a given problem are always in need for careful tinkering and maintenance. Trying to break with fixed notions of 'builders' and 'users', this processual perspective then allows to see reveal how any technological intervention – including Freifunk installations – is always delegated among a heterogeneity of actors and practices that lead to distinct infrastructuring arrangements that allow technologies to be both cared *for* and *through* (Sanchez-Criado and Rodríguez-Giralt, in press).

2.3 Situating Freifunk (For Refugees)

Founded in Berlin in the early 2000s, Freifunk is the most active and widespread 'non-commercial initiative for free wireless networks' in Germany (Freifunk 2016a). Since its inception, the initiative drew together members of hacker organizations like the Chaos Computer Club (CCC), engineers, left-wing activists and artists that were frustrated by the lack of public and private Internet infrastructure in the then recently reunited German capital (Petersen 2013: 39).

Yet, as anthropologist and long-standing Freifunk member Gregers Petersen points out, there is no straightforward definition but rather a need to understand Freifunk as a complex assemblage (Petersen 2013: 39) made of both individual 'Do-it-Yourself' and 'Do-it-Together' practices of collective tinkering (Jungnickel 2014). The idea is to reconfigure free software, routing hardware, protocols and open frequency ranges into a decentralized, non-hierarchical wireless network. In practice, this is possible since each device within the network (including small, cheap routers and more powerful antennae) is maintained individually, but can link up with other 'nodes' within the signal range. This emerging network further allows to share files, services as well as private Internet uplinks from node to node across the city (Petersen 2013: 39).

By 2016, 'local' Freifunk communities can now be found in over one hundred German cities and villages, comprised of up to 1,500 individual nodes in cities

like München and about 600 in Bremen. Similar to other free software projects, Freifunk consists of local groups as independent 'Organized Publics' and Formal Social Enterprises (FSE) such as the 'Verein für Freie Netze e.V.' in Berlin and the umbrella organization 'Freifunk Rheinland e.V.' (Currie et al 2013). Essential tasks include the maintenance of the freifunk.net website, online forums and critical server infrastructure.

Despite similarities to other international wireless mesh projects, scholars as well as Freifunk members have emphasized the distinct activist position that the Freifunk initiative emerged from (Crabu et al 2015: 115)⁶. From this position, Freifunk is first and foremost an independent wireless *intranet* that seeks to be a local, citizen-led alternative to existing corporate infrastructures. Highlighting values of emancipation, experimentation and flat hierarchies contrasts with both commercial and alternative collectives who primarily try to provide Internet access. Telling examples are that no formal membership is necessary, but people are encouraged to attend local Freifunk meetings where they can learn about the technologies. Furthermore, Freifunk infrastructure counters surveillance issues and data collection by rerouting all traffic from the network to other European countries or collective servers in Berlin.⁷

Expanding their effort to include refugee accommodations resonates both with their positioning within a 'global movement for free infrastructure and open frequencies', a claim for the 'democratization of media' as well as inclusive provision of Internet access. (Freifunk 2016a). While the first instances of these activities can be traced back to early 2013, where Freifunk members installed equipment to serve a temporary refugee shelter in Hamburg from nearby

⁶ A prominent example is the campaign that focused on distributing flashed devices as 'Freifunk-Freedom Fighter-Boxes' to business owners in Berlin (Behling 2012).

⁷ This rerouting through a VPN (Virtual Private Network) to the Freifunk server in Berlin is achieved through four to six servers owned by Freifunk members in Bremen. It is a direct response to the German liability law (*Störerhaftung*) according to which private network owners can be made responsible for its usage, especially copyright violation.

buildings (Freifunk 2015), similar configurations can now be found in hundreds of accommodations all over Germany. Focusing on the situation in Bremen – which is itself a rather young community, only founded in 2013 – internal statistics indicated that at the time of research around 19 out of more than 30 accommodations offer an access to the Internet in one way or another, while 13 of those do so through an instance of Freifunk infrastructure (Freifunk Bremen 2016a).

3. Research Design: Constructing the Field

In the following section I address what has guided the design of my research. In the first section, I address the methodological implications and limitations that arose as I further draw on scholarship on community networks and their practices through an infrastructural lens. I then conclude with my methods and analysis of the empirical data.

3.1 Methodology

Overall, my research was shaped by an explorative, deductive, open-ended and immersive ethnographic approach. In one way, this design responded to the relatively sparse literature on Freifunk and forced migration, but like other research in STS proved suitable to study emerging but not yet explored phenomena that populate free software projects and its intersections (Knecht 2012b). Here, methodological decisions were further supported STS scholar Gregers Petersen who argued 'that understanding a cultural setting such as Freifunk requires both 'being' and 'doing' Freifunk' (2013: 41). Similar work on wireless networks (Jungnickel 2014), ham radio (Dunbar-Hester 2014) or the provision of technical infrastructures for social movements (Milan 2013) has

made use of qualitative and immersive approaches to understand their practices and internal organization. Yet from the outset I did not want to limit my analytical perspective on any fixed notion of 'a Freifunk culture' or distinct group. Rather I relied on the self-proclaimed vision that 'Freifunk is not only for 'techies'' (Freifunk 2016b) and encourages the participation of people with a variety of skills, hoping to avoid the artificial distinction of an 'inside' group but rather draw insights by aligning my interest as an undergraduate ethnographer with those of an active participant and collaborator (Knecht 2012a: 19).

Beyond this, I struggled to keep my initial research focus clear given the diverse set of actors, objects, imaginaries, frictions and infrastructuring practices that Freifunk assembles (Petersen 2013: 39). Here questions arose whether it was possible to actually speak of 'one Freifunk network' and where to draw the (artificial) line between technologies and the initiative. In the end, I decided that I do not need any straightforward answer, but rather that the idea of 'Freifunk (for Refugee)' has the qualities of a 'boundary object' (Star and Glimmer 1987) that links together Freifunk members, politicians, volunteers, managers and others as distinct communities of practice (Lave and Wenger 1991) even though imaginaries or definitions are only loosely defined and assumed.

In line with George Marcus' concept of 'multi-sited fieldwork' (1995), I then started to trace the idea of doing 'Freifunk for Refugees' along relevant actors and spaces beyond the 'local' community itself. This attempted resonated with Coleman and Brunton's call to approach information and media infrastructures with attention towards 'the multiple, sometimes contradictory and sometimes coexistent experiences that obtain on the network infrastructure' (Coleman and Brunton 2014: 82).

After going to several Freifunk meetings and talking to members, I became aware of four to five people who were actively doing Freifunk installations in the accommodations. Inspired by the literature on installation, repair and care practices, it first seemed appealing to 'shadow' (Czarniawska 2007) Freifunk

members practices in-situ as they organized the installations. Though I tried to accompany Freifunk members to meetings with accommodation representatives or even installations, I gave up after first attempts were not successful, as I was at times simply not notified or members did not respond to my emails. Here I came to conclude that my position as Freifunk novice mostly non-technical tasks clashed with the formation of new, much more expertise driven practices of providing wireless connections for the accommodations.

For one, the increased focus on technological practices demanded to interrogate my own practical skills and commitment to wireless technologies. Drawing on the provisional distinction proposed by Coleman (2011: 512) on 'geeks' and 'hackers', I rather came to situate myself as the former, someone with enough proficiency and affinity towards technologies to participate in the Freifunk community. With most of my participants having either a professional or educational background in computer science, software development or engineering, I often found myself in the role of the curious apprentice, an experience I share with other social scientists in the field. These ethnographers often made use of their own presence to ask question about the intersection of important markers like individual expertise and gender (Jungnickel 2014, Dunbar-Hester 2014).

In the end, this first empirical insight guided my overall shift to the 'soft' work that was necessary to do Freifunk installations. To enrich my data, I decided to include social workers and managers to recreate narrative accounts for installations in two refugee accommodations. Overall, these proved particularly interesting cases for analysis as they mirrored the most prominent Freifunk practices I initially encountered. While in accommodation an existing Internet uplink was 'opened up' for refugees with the help of Freifunk equipment (i.e. traffic rerouted via VPN), the other installation was done by Hauke who offered to reroute his own Internet uplink with the use of antennae to an accommodation with no Internet access for the residents.

Tailoring the approach in this direction presents links to studies within STS that not necessarily focus directly on the practical installation of technologies, but rather asks broadly how and why policy measures or technologies come to be implemented in a certain context (Adam and Vonderau 2014, Jasanoff and Kim 2015). A key methodological assumption is that such implementations are never smooth but contain 'moments of friction' (Tsing 2005), contestations, ruptures and reconfigurations that expose established orders as starting points for inquiry.

More specifically, WCN such as Freifunk are rich with such contestations as they do practice an 'infrastructural inversion' (Bowker and Star 1999) of the boring, mundane and invisible parts of infrastructures such as standards and classifications (Crabu et al 2015). As such Freifunk practices both invert the standards, laws and practices that shape the contemporary commercial Internet, as well as itself presents newly configured 'inversed infrastructure' (Egyedi and Mehos 2012) ripe for study.

Considering initial limits of my research design, it becomes clear that I did not formally include interviews with refugees and residents of the accommodations. This decision was guided by both methodological as well as pragmatic reasons. First, doing research with refugees needs to account for their position as a vulnerable population, especially when it comes to the protection of anonymity and consent (Smith 2009). This need for careful research was even more relevant since the first accommodation I started studying only housed minor refugees and only later met adults. This situation posed further pragmatic difficulties I would have needed to obtain consent forms from different authorities, an option I deemed too time consuming given the scope of my thesis. Yet, such a focus on the 'managerial' and traditionally powerful side of infrastructural practices poses an often criticized bias within STS research (Star 1991) and that could be countered by a focus on migrant practices (Trimikliniotis 2015).

3.2 Methods and Material

In order to collect my data, I conducted eight months of intermittent ethnographic field work between August 2015 and March 2016, moving from Freifunk centered events to refugee accommodations. In the end I conducted a total of eight in-depth interviews with five Freifunk members, two representatives of social service providers at different accommodations as well as one of Bremen's district community managers. Four of the Freifunk participants were active in Freifunk Bremen, which means they took part in installations at refugee accommodations, posted on the mailing list and went to the bi-weekly meetings on a regular basis. I also did also one additional expert interview for background information with a founding member of the initiative from, who recently had started several charity campaigns related to Freifunk and refugees. The representatives of the different social service providers included one accommodation manager as well as one social worker. Finally, I interviewed the community manager who, as she tried to build on Freifunk practices for her own participatory community strategy, mediated and established contact between Freifunk members and accommodation representatives, which for me was among the first signifiers of a potential shift towards influencing policies.

Before I conducted the semi-structured interviews, all participants were informed about the scope of my research and addressed my wish to record and transcribe the conversation. All participants showed an interested in being part of the study, guaranteeing that all names and places will be anonymized were often an important aspect of the interview. On one hand, this was a relevant concern for the Freifunk members, who further encouraged me towards the usage of encrypted email plugins to keep our communication private. On the other, the social workers and managers stressed the need to protect the privacy

of individual residents, but also the reputation of the accommodations as they continued to be under increased media attention and in fear of racist attacks.

In the interviews, I started with questions about the personal background and motivation for engaging with Freifunk, free software or refugee care. These discussions would often venture also towards the significance of Internet infrastructure and especially wireless connectivity for forced migrants in general. Whenever possible, I tried to refocus the discussion on individual accounts of installations at refugee accommodations to generate the detailed narrative descriptions of their engagement similar or comparable installations.

Along with my broadened scope beyond these individual accounts, the interviews were complemented by participant observation at the two refugee accommodations, the hackerspace Bremen and the private homes of Freifunk members, as well as the annual *Chaos Communication Conference* held in Hamburg, where I attended workshops on Freifunk and refugees but and also arranged the interview with the member from Berlin. A last supplement of data comes from the informal conversations I had there, as well as from reading the Freifunk Bremen mailing list, blogs and a rare visit to the IRC channel. There are also informal talks with accommodation managers and refugees that found their way into my notebooks.

3.3 Analysis

For the analysis, interviews were audio recorded in German and later transcribed in the qualitative data analysis software F5. I used this approach mostly to keep an overview of my empirical material and draw comparisons between different accounts more easily. Following the deductive approach of the initial research design, this process came close to what Glaser and Strauss (1997) developed as *grounded theory*, which intended to let research themes and theories emerge from

the data, avoiding the influence of pre-conceived theories. At this point I went through several rounds of open-ended coding (Saldaña 2012) of the interviews and especially those parts which could be understood as narrative reproductions of the installation process.

In parallel to this effort, I found those strains of contemporary STS literature that took practices as their central focus of analysis. Combined with my field notes, observations and informal discussions, I ended up distinguishing between three different sets of practices, namely the shared *articulation* of Freifunk infrastructuring practices, *negotiation* of possible infrastructural reconfigurations as well as more traditionally conceptualized practices of *maintenance*.

While this form of data gathering and analysis allowed me to achieve an in-depth exploration of how different objects, actors and practices shape and become reconfigured around Freifunk infrastructure in refugee accommodations, it also demanded a closer reflection of my own trajectory as researcher, ethnographer and, depending on the context, as member of Freifunk Bremen. Looking at the interview transcripts, I became aware of how my analysis was shaped by these at times overlapping, but also contrasting or emerging roles that I came to inherit.

Considering the overall research approach, the reflection points towards several limitations. On the one hand, I did not observe or participate in these installations myself. Even though I tried on different occasions to come along to meetings with accommodation representatives or installations, this repeatedly happened without notifying me. Here I came to conclude that my own position as a 'geek' involved mostly in non-technical tasks posed a challenge to any direct observation of the Freifunk installations I was initially interested in. In tune with my overall shift to the more 'soft' work of translation of practices, it was still fruitful to analyze the level of expertise that was necessary to conduct these installations.

On the other hand, the thesis does take into consideration the role of other Freifunk communities in Germany, with whom members in Bremen discussed in online forums, IRC channels and conferences about how to provide Internet access for refugees. Furthermore, my focus remains very much on the individuals that were most engaged within the Freifunk group as well as at the accommodations. Not included in this account are therefore all those experiences and practices of people who did Freifunk in other volunteer groups or individual acts. Both these perspectives are important and remain open avenues for further research.

4. Following the Issues: Internet Infrastructure in German Refugee Accommodations

In this section I turn to my empirical data on Internet infrastructure within the two refugee accommodations I visited, tracing recurring issues of availability and access that I encountered. The analysis both draws on thick descriptions from my fieldwork as well as the existing literature on other German refugee accommodations, paying attention to the intended and unintended exclusionary effects of Internet infrastructure. These findings serve as an important backdrop for the further examination of how Freifunk arrangements took shape in these spaces.

The following vignette is taken from my first visit to the accommodation V where, after I visited Hauke and received her contact details, met the manager E. to interview her about the experiences she had with the Internet infrastructure as well as the Freifunk installation that took place in response:

I arrive late at accommodation V, having spent more than one hour on public transport. After I missed one bus, it turned out that fewer connections are offered on Easter Friday. Yet, as E., the manager of the accommodation told me on the phone that this would be a good day for an interview as she would not be 'bombarded' by requests from other

institutions for a change. Walking up the small path to the former hospital, I recognise the small milk and water cartons sitting on the window shelves of nearly every room. Since it's March and still chilly outside this must be an easy way to keep the products cool. I start to wonder why this disturbed my view and ended thinking about food infrastructure. Would a regular hospital allow this? A prison certainly would not.

Thinking of prisons is no surprise, as I am welcomed by a security guard and E., who is surrounded by a small cluster of people. One resident asks for a vacuum cleaner, another complains about a family who regularly demands more washing up liquid than is scheduled. On the way to her upstairs office, E. explains to me that the main purpose of the emergency shelter is to house around 180 people while 'they work on the asylum application process'. Besides a small staff and team of volunteers, some of the residents we met before help out with tasks like the distribution of goods.

In her office, E., who is a recent biology PhD graduate in her early 30s, tells me that she helped to open the accommodation in December 2015 after she finished her PhD in Biology, turning a part-time job as a social worker into a full-time management position. Back then, she says, neither fixed Internet uplinks nor wireless infrastructure was available in the building. Such installations would have been costly, especially since the accommodation in total was rather improvised and its future uncertain. Still, the staff was provided with mobile Internet USB sticks that allowed only a slow Internet connection. Luckily, a few weeks later, the accommodation was chosen as a kind of pilot project for the prototype of a new refugee management software. Promoted by the city's senator for social affairs, the installation included a repurposed logistics software as well as a fixed Internet uplink.

Yet, this technical solution she explains is still under development, but the company already responded to many of her remarks, including the difficulty of chip cards that are never properly used, even though people should sign in when they come and go. Going back to issue of Internet access, she points to her desk, where a network cable is plugged into her laptop. This allows faster access to the Internet and the private server infrastructure of the social service provider. In consequence, the

uplink is registered to the IP address of her device and therefore can only be used in this particular configuration. (Reconstructed from field notes, March 2016)

As Miriam Ticktin argues, studies on the 'unintended consequences of humanitarianism' (2014: 278) often see refugee accommodations as signifiers for a 'state of exception' (Agamben 2005) or as 'heterotopic' spaces (Foucault 2008). Following such a perspective, Saskia Witteborn (2011) described refugee accommodations in Munich as 'social spaces which represent exclusion, temporary arrangements, and uncertainty, characteristics which societies tend to shun and aim to control and contain' (Witteborn 2011: 1148). For her research, she visits at several German 'asylum seeker heterotopias' , ranging from brick houses to apartment complexes and container facilities (2011: 1146). In interviews, residents tell her about the differences between 'indistinguishable from surrounding houses in which German citizens live' which 'provide the comfort of city life and infrastructure' and the 'the barrack-style structures' characterized by their 'lack of privacy, thin walls, and sometimes problematic hygienic conditions' (2011: 1148).

What becomes clear is that spatial and material dimensions of the accommodations a valuable starting point to make sense of infrastructural

questions including access to the Internet.⁸ In Bremen as well as other cities in Germany, accommodations are often repurposed or improvised buildings found at the outskirts of the city centre or in previously unused areas, with tents being among the most highly debated forms of housing. These often cannot be easily linked to any pre-existing commercial internet infrastructure, while containers offer more options by commercial providers.

Given this spatial and material diversity, it turns the attention towards how standards and funding priorities shape the intention of social service providers to create a connection to existing Internet infrastructures. As E told me in our interview, she was not exactly sure about how such decisions were made, but pointed towards the difficulty of funding Internet access points throughout the different accommodations her social service provider operates. Here, an interesting point she highlighted is that contracts with ISPs can be difficult to

⁸ T: okay, just a short thing about that, why would it have been too much effort to equip all accommodations [with wireless internet]?

E: I don't know, it's a matter of money, I mean I am treading on thin ice if I comment on this since I don't know what was discussed there exactly, they said it's a matter of sink or swim [...] I think it's a matter of effort and costs, since we would have the fees plus the hardware plus the installation, plus plus, and refugee care was never, I mean it's a non-profit organization, it was not covered with such a budget at that time and it's just being covered in retrospect [...] I think it's just a pretty precarious financial situation in refugee care [...] where at times I had the feeling they are glad that they can pay the salaries, of course there was always some workaround [...] but let me put it like this, for such 'add ons' [i.e. Internet access] there was no capacity, because it burns a mental amount of money [...] but I am not exactly sure who pays what, I can just imagine it was one of the lesser problems [...] I mean it got just really intense in July last year, when from July to September they just raised accommodations en masse, and in principle they were not equipped [...] the gym X had no partition walls and no beds, I mean no field beds, that's a difference, here they have regular beds and pretty good mattresses I have to say, but that's the thing with the infrastructure, you can not just start to build houses when you don't have streets and then right away say 'hey there should be wireless networks included!', maybe you can if you can book an all-inclusive packet, that would be neat, but it did not work out that way here (Extract from Interview with E., March 2016)

obtain, since her accommodation was only planned to operate for one year. Instead ISPs demanded the contract to run for at least two years, making it a less attractive investment. Overall, such contracts are a practical example of how standardization is necessary to allow commercial infrastructures to function, but also leads to difficulties or ruptures for others (Star 1990). Still, it is important to note that many Freifunk members closely followed the engagement of commercial providers like the Deutsche Telekom who provided wireless Internet solutions to a selection of emergency shelters, but many claimed that it was not effective but rather a PR stunt.⁹

Connected to the importance of standards was the legal dimension of infrastructure that I want to highlight through another vignette on accommodation B that I visited several times for interviews and observations:

Accommodation B is a newly built container complex for 32 male refugee minors, located in the north-eastern suburbs of Bremen and reachable after a fifteen minute cycling tour from University. Run by a consortium of four social service provider and a central management, it opened in spring 2015. I had the opportunity to visit this accommodation several times where I talked to L. who was a social worker at that time. In the interview, she told me that a fixed-line Internet uplink was available in the individual offices as well as in every of the four shared 'living rooms'. Here, a desk with one stationary computer could be used by the teenagers.

In the interview, she emphasized the importance of access to computers for homework but also leisure activities like watching movies. Still she acknowledged that there was a pressing problem of how to guarantee equal access for eight people at once. Instead, she proposed to open up the Internet uplink through a wireless connection, since as a majority of the teenagers owned a smartphone or a similarly portable device. When she brought up the topic at staff meetings, some

⁹ As Johann pointed out in our interview, such uplinks were not only hard to get but also not effective, since it relied on individually distributed accounts and passwords. He would refer to a tent accommodation in Bremen where social workers told him about how these little pieces of paper would quickly get lost and were hard to redistribute given a flux of people staying there (Interview with Johann, February 2016)

employees claimed that computers could be surveilled easier for any pedagogic ends. Furthermore, she encountered the fear that illegal downloading of copyrighted material and other illicit behavior could be traced back to the social service providers and staff. (Reconstructed from field notes, August 2015)

This last part can be directly linked to the laws and regulations that permeate most Internet uplinks and hotspots in Germany. The most prominent example is the legal liability of network owners (*Störerhaftung*) mentioned above. As the interviews showed, this legislation is highly relevant concerning the Internet access in refugee accommodations. Staff and accommodation management argued that they were especially afraid of being made responsible for any illicit activities that the young refugees could partake in. Beyond the concern with copyrights violation, L. and E. both touched upon the question of security and surveillance featuring prominently in media discourses at that time. Would free and less surveilled networks make it easier to contact terrorist groups or other criminal activities? In the end, most representatives that I talked seemed to be forced to take a more liberal attitude. For example, the head of one of the social service provider's at accommodation B told me with a sigh that since 'there's no absolute certainty, one must take some risks'.¹⁰

In addition to the perspective of the accommodation representatives, I lastly want to turn the the attention towards the refugees as the imagined end-users. Here, similar issues of financing, surveillance and (data) security are salient. First, it becomes obvious that most refugees have access to the Internet through mobile devices and other open uplinks. An emblematic example is a group of young Syrian refugees who would often meet in front of Hauke's apartment to use the Freifunk node. Even though I did not directly interview refugees for this thesis, the qualitative study on media usage by Kutscher and Kreß (2015) shows that most refugees tend to rely on pre-paid mobile credit. Given the amount of

¹⁰ Personal communication with accommodation manager, August 2015.

pocket money of around 60€ per week these limited data packages can turn out to be rather expensive, especially when used for data-intensive services like Skype. These popular mobile providers often only require a brief registration and no fixed address. Despite this comfort, it is important to note that services that demand either literacy in a certain language or valid data can be an obstacle for refugees. In regard to Internet access, this can be problematic as most 'public' commercial hotspots demand a short registration with a valid email address (Kutscher and Krefß 2015: 34).

Beyond this financial aspect, Kutscher and Krefß report also stresses the lack of clear standards regarding data security. The interviews showed that many refugee minors use messengers like WhatsApp to communicate with their official caretakers, leaving especially sensitive content unprotected (2015: 55). Public hotspots also pose a threat in this way, as they process data in return for the free usage (2015: 34). Such security issues where also an ongoing friction within accommodation V.¹¹

Overall, the collection of these empirical findings stress that Internet access in refugee accommodations – and in turn media usage by refugees – has to be addressed through a variety of factors that shape different levels of 'accessibility' (Tsianos 2015: 117). Even though the two refugee accommodations become visible as sometimes contrasting examples, in terms of inhabitants, management, and architecture, some preliminary generalisations become visible. First, whether Internet infrastructure is available depends on the funding and agenda of different service providers. In turn, spatiotemporal aspects such as architecture and location of the accommodation play a crucial role.

¹¹ 'E.: well, Internet is funnily still the first thing [...] that seems to be like a basic need, right (?) like, eat, sleep, Internet, showering [...] I mean it slowly keeps trickling in and then somebody realises that yeah, this violates like five hundred thousand laws since one was not confronted with that before [...] I mean what happens in the management, on one hand they do data protection like crazy, on the other hand like absolutely nothing, I mean we try to protect it but sometimes it just doesn't work for practical reasons, because then you would not even be allowed to communicate with the authorities' (Extract from interview with E., March 2016)

Furthermore, there is a range of standards and laws that limit the possibilities for offering Internet access, as it stirs up anxiety of misuse among the staff. Importantly, the existing literature has shown that refugees nevertheless access the Internet via mobile contracts and public hotspots, but face many obstacles on this way.

Based on these heterogeneity of aspects that structure Internet access, it lastly helpful to engage with Andrew Barry's concept of 'technological zones' (Barry 2006). In his definition, technological zones 'can be understood as a space within which differences between technical practices, procedures and forms have been reduced, or common standards have been established' (2006: 239). Since he works out different forms of technological zones, Internet provision might be best understood as a 'zone of qualification' where objects and practices are subject to increased standardization (2006: 240). Since this section was interested in the hard to account for issues of access and exclusion, it is further fruitful that Barry draws on Deleuze (1988) to describe a zone as 'an agencement or assemblage that accelerates and intensifies agency in particular directions, and with unpredictable and dynamic effects' (Barry 2006: 241).

With these findings and awareness for how Internet provision as a technological zone structuring relations in a locally situated way (2006: 239), I now turn to the practices of Freifunk members and how they address this assemblage of routing hardware, laws, standards, spatial configurations, pedagogies, fears and imaginaries that shape Internet access in these particular environments. Through a focus on implementation and its frictions, I also indirectly follow Barry's call to start the ethnographic investigation on technological zones:

'in the middle of events, at times and places where the discrepancies between the public statements of international organizations, multinational corporations and NGOs and the complexity of social

forms become most apparent, and when the direction of change is uncertain and contested' (Barry 2006: 244).

5. Doing 'Freifunk for Refugees'

Based on these insights on the media and communication infrastructures in the accommodations as a backdrop, I now want to turn the attention to the Freifunk initiative and the infrastructuring work of its members to reconfigure Internet access in two accommodations. The following sections address three different sets of practices that have emerged from my empirical data, drawing in particular on the Freifunk installations that took place. At times, these are complemented or contrasted by data of other installations that I collected or that my research participants referred to in the interviews.

Overall, the division of practices into *articulation*, *negotiation* and *installation* attempts to mirror patterns and structures of 'doing' Freifunk as I encountered them in the narrative interviews. Here it is important to note that though this processual perspective is inspired by how Freifunk understand their own practices, the division into different sets of practices serves first and foremost as analytical categories that are not easily divide but increasingly overlap and influence each other.

5.1 Practices of Articulation: Communicating Freifunk Expertise to Legitimate Humanitarian Actors

This first set of practices addresses the emerging expertise of Freifunk members and how they manage to communicate their solutions to the infrastructural problems encountered in the accommodation. The focus on this set of practices emerged as I concentrated on the actions that happen before any installation in the classical sense takes place. Overall, it is important to note that all Freifunk

members I interviewed were more or less associated with the CCC. They were also all male, in their mid to late twenties and working full-time in the local IT industry.

Here, one of the first aspects I noticed in the narrative accounts was the mundane, yet contested practice of writing emails and getting in touch with the local management of the accommodations. It was instructive to talk to Markus, a software developer in his late twenties who had only recently joined Freifunk for a couple of weeks earlier, but had already contacted different refugee accommodations. When I asked him how he approaches this task, he emphasized that every inquiry takes good preparation and is best kept short. Since most managers were busy, it was important to only briefly outline that one had an interest in discussing a possible Freifunk installation. Still, he voiced his frustration, since many emails tend to go unnoticed, making it difficult to politely ask several times.¹²

This need to be polite, concise and short for communicating individual expertise as well as the established Freifunk practices further become visible in the conflict with Freifunk member Gregor that unfolded in parallel to my research in the field. As one of the more active members that I met, he would often decide to approach accommodation managers through unannounced visits or phone calls. When he presented his ideas about how to best 'provide' Freifunk for the accommodation, he left many people at the accommodation puzzled or even angry. In the interview with manager E., she recounted how she first heard about Freifunk from a refugee resident who was working at an automobile company where he encountered Freifunk. At the same time, she received a call from Gregor, but felt overwhelmed by the detailed information that he laid out

¹² Personal communication, Markus, May 2015.

for her on the phone, leading her to postpone her decision on whether to do a Freifunk installation or not.¹³

Back at Freifunk meetings, the IRC channel and the mailing list, this issued reached especially heated levels when rumors appeared that Gregor had received restraining orders from security agents at different accommodations he visited. Overall, such discussions go back to the imagination and social organization of Freifunk as a decentralized, horizontal and ‘open’ initiative that often reminded me of the ‘amorphous’ (Coleman and Brunton 2014: 85) state journalists attributed to the Anonymous collective. Yet, as Coleman (2014) has shown in her ethnography, one can look out for specific groups and steady positions held by the same people. Going back to Freifunk Bremen, it was interesting to see that even though there were attempts to ‘manage’ the competition among members by forming work groups, such efforts were met with resistance until the end of my field work, mostly based on claims to autonomy and flat hierarchies.¹⁴

This demand for a careful articulation of expertise and coordination when in touch with the representatives of accommodations revealed the importance of

¹³ T: okay, and he [the resident] was working at company X?

E: yes, he was in some refugee project at company X, he actually studied something else, english literature or so, and then he said there is something [Freifunk] and then Gregor contacted me and then I just took a look at it [...]

T.: independently of each other?

E.: yes independently of each other, and then I called him and I just thought ‘wow, how complicated is that’, and then I just said okay, it’s my first month and just so much to do, I have never worked so much in my entire life like in December, I mean I was done at the end of the day, it was just mental, and then when I had just a little more time to breath and then Johann came (laughs) and I thought he was instructed by Gregor to do it [Freifunk] here and then everything went pretty quick, I was also frequently in touch with Hauke. (Extract from Interview with E., March 2016)

¹⁴ The discussion of such groups and delegation was a constant issue at the meetings I went to, stretching also to other domains such as public relations and other inquiries by professional organizations that would demand a representative of ‘the initiative’. Along with Markus I came to the conclusion that this organizational dimension of Freifunk is best understood as based on a ‘doocracy’, with people often taking similar tasks and positions. This concept is interesting, as its links with the constant ‘ad hococracy’ that Dunn (2012) observed in humanitarian aid in Georgia.

other, more legitimate actors outside of the Freifunk group. Interviewing Markus about his first installation at accommodation B, I learned that his partner L, who was a social worker at that time, brought up Freifunk at various team meetings. In the end, she arranged a meeting with Markus and the accommodation management. Similarly, trying to learn more about the situation in accommodation V, Johann and Hauke first contacted the senate of social affairs which provided them with contact details and further instructions to contact manager E. to propose their ideas.

Here, the narrative accounts stress not only the importance of relationships of Freifunk members to actors within the accommodations, but also the role of policy makers to foster installations. At one point during my fieldwork, Markus was contacted by D., a community manager of the district where he lives, trying to help him to get in touch with the representatives of other accommodations in the district more easily. In the interview, she explained:

'I think it is quite new that the district management can have more influence on this topic [Internet access in the accommodations] and to promote it more, it helps if I just mention it at the city council or at the local central office [...] and then I realized that nobody might know Freifunk [...] in the beginning it might always seem a little infamous, like the pirates are coming or something like that [...] but if you really get into it and pass it on [...] that's why I find the pilot project in Walle [a district of Bremen] super because it immediately has another status, another format' (Excerpt from interview with D., January 2016)¹⁵

First, this quote further reveals the contested nature of Freifunk practices as they enter in dialogue with institutionalized politics and humanitarian actors. Second, a salient point is the attempt to give the project an 'official' status by

¹⁵ In the interview with D., we discussed the growing significance of citizen engagement like Freifunk for her own position as a district manager more broadly. Here, she emphasized how such initiatives are especially important in times of austerity and the public budget cuts in Bremen. Furthermore, the district she oversees is also experiencing increased gentrification, which can negatively impact the creation of WCN as Cardullo (2016) argues.

linking the newly emerging practice of supporting accommodations to other officially recognized infrastructural projects the initiative is engaged with.

Overall, a look at these mundane organizational practices point out the contested circumstances under which the individual practices and expertise of Freifunk members are met in dialogue with refugee accommodation management. Rather, this early infrastructuring work might demand relationships to other legitimate representatives such as social workers and policymakers who support Freifunk practices. Here, similarities to other German hacker collectives becomes visible, who also depend on the successful cooperation with institutionalized politics to communicate the political relevance of their hacks (Kubitschko 2015a, 2015b).¹⁶

5.2 Practices of Negotiation: From Local Assessment to Infrastructural Solution

The next set of practices that emerged from my data is focused on the negotiation work between Freifunk members and the representatives of the accommodations. This process features the assessment of infrastructural needs and the building of trustful relationships in order to figure out what an appropriate Freifunk installation could look like. Central issues are the legal liability, finances, locations of the routing equipment as well as performance and sustainability of the emerging network connections. While I could not be present at these meetings, these practices can be explored through the successes, challenges and frictions to be found in the negotiation narratives.

¹⁶ Even though I did particularly focus on the media-related practices that Kubitschko works out, it is important to note that a significant amount of community blog posts and a podcast by the CCC, as well as professional news paper articles covered 'Freifunk for Refugees'. Also two members that I did not interview promoted the cause in a local radio show. These media-related practices are a further avenue for inquiry.

Since the managers they encounter have most likely not heard of or engaged with wireless community networks before, the negotiations take issue with the specific imaginaries of what Freifunk is or should be about. Similar to the articulation of expertise, negotiation includes figuring out what Freifunk is and should be in the accommodation. As Hauke put it in the interview:

'To simply say that Freifunk is a free data wireless network actually doesn't lead anywhere, since they say 'that is not our cup of tea', so the aspect of Internet is decisive in all cases. The second aspect is the legal security for the providers, so that they are not responsible for what the inhabitants are doing, no matter if it is their own uplink or if it comes through cables or through the air from somewhere else. And that the whole thing is for free, that is also usually a crucial factor [...] You still have to emphasise what the surplus value is, an Internet connection for their residents, a bit of life quality, maybe a bit of comfort' (Excerpt from interview with Hauke)

First, there is a dimension of legal responsibilities. When talking to manager E. at accommodation V, Hauke and Johann came to a verbal agreement that they would take care of any legal issues that may arise. On the contrary, the management of accommodation B requested written proof that rendered Freifunk legible as a legally safe project. Markus successfully researched a lawyer on Twitter who specialised in Internet law. Before he proceeded to do the installation, he handed in a written statement that was circulated among all social service providers at the accommodation but also at the Freifunk meeting.

Since such legal translation work included the costly services of third-party professionals, it touches upon the thorny questions of finances in the infrastructuring process. Among the Freifunk members, I encountered the notion that all possible costs should ideally be paid for by the accommodation, in tune with the Freifunk specific value of mutuality and individual (and in this case institutional) engagement.. Yet, the manager E. made clear that no further funding for media and communication infrastructures was available at accommodation V. In this case, Johann decided to borrow a set of spare equipment, as was common practice among the Freifunk community.

Furthermore, they agreed to use the money generated by a charity campaign that Freifunk members had initiated earlier to cover running costs of the equipment and servers. In contrast to this, the social service providers at accommodation B had the necessary funds to pay for both the routing equipment as well as the statement by the lawyer they requested. Ranging below a margin of 500€, these infrastructuring costs were considered rather low by most Freifunk members I talked to but were a crucial aspect to infrastructure appropriately.

What further struck me as interesting was that members not only discussed Freifunk configurations as a potential solution but also brought up other possibilities, including commercial alternatives. When talking to the management, Markus presented them with the option that they could simply pay for a monthly subscription of a Virtual Private Network (VPN) connection service. Such software solutions reroute the traffic to countries with different policies to avoid legal liability issues. Yet, these VPN providers only offer the necessary login data and software, there are other commercial services who provide VPN connections along with pre-configured hardware.

In the interview with Johann, I then learned that besides his engagement with Freifunk and a software development company, he was operating exactly such a business. Among his main customers, he argued, were hotels who wanted to offer protected hotspots to their customers. The difference to Freifunk would mostly lie in the greater privacy since it did not disclose who was connected to the network. Furthermore, the paid service was a guarantee for more reliable maintenance and repair work.

In contrast to Freifunk, the aim is to offer the best of connections and not mesh several devices together. In some cases, he ended up installing such a setup by his own business as the accommodations would accept a commercial provider for its faster and more reliable setup. Questions of whether Freifunk members should endorse such commercial services or even get paid for doing Freifunk installations remained a controversial topic throughout my research. In one way,

it is telling of the conflict blurred boundaries between the emancipating and empowering imaginary of free software and the more corporate versions of open source development (Kelty 2013).

While this can be seen as an ongoing friction that is discussed as a threat to the recursive public of free software/wireless development, the choices made about commercial or community run networks are interesting for the negotiation work with the accommodations. The interviews showed that the main goal for many Freifunk members was to achieve a consensus that leads to the installation of more accessible and secure Internet uplinks in the accommodations. In practice, this meant bringing as many opportunities as possible to the negotiations while highlighting what makes Freifunk installations stand out.

As mentioned above, for some accommodations the commercial hot spot solutions offered by Johann promised more stability and steady support. During the time of my research I experienced slow connectivity and breakdowns of the infrastructure myself with the Freifunk router that I installed in my private home. This could sometimes be traced back to unforeseen errors but also to the experimentation by members that the network was subject to. Yet, as Markus on one occasion told me, it was this volunteer and community driven attitude that would lead to trust building between the Freifunk Bremen initiative and the social service providers. At both accommodations where I did my participant observation, volunteers were engaging in other domains such as bicycle repair or teaching language classes. In this light, the negotiation practices can be seen as linking up with such newly emerging modes of public-private cooperation.

Going back to the technical infrastructure itself, a final crucial question during the negotiations was how far and where the wireless network should reach after the installation. In accommodation B, it was decided that wireless Internet should be accessible in the living rooms where stationary computers were already in place. An extra router was added to the front yard of the

accommodation. With its metal structure, the signal would only sometimes reach in the private rooms of the residents. In clear contrast to these technical limits, Mrs E at accommodation V argued that the wireless connection should only be available in the main entrance of the building. Aside from the financial effort needed to cover other spaces, she particularly argued against availability in the private rooms:

„I did not want to do it, it would have meant many routers [...] and if the Internet would only work in every other room, this would mean a war around the rooms [...] I mean Internet is offered, but this is also an emergency shelter, these are not apartments [...] I mean the people can't relax too much here, they have to do a lot of stuff, it can't be too comfortable, I mean it's supposed to be as comfortable as possible, and most people don't want to stay here, but some think it's practical that they don't need to cook, receive money and now also Internet [...] It would also have been a too much work, now that we get an additional building [...] and maybe it increases the likelihood that people watch or circulate content that is not wanted here' (Excerpt from interview with E., March 2016)

This close look at the practices of negotiation shows, that it is here where many important decisions about the type of installation but also its scope and accessibility are being made. First, it is an arena to issues most pressing to the management, such as legal liability. It is also a possibility for Freifunk members to show what kind of opportunities a cooperation can provide in contrast to commercial services. An important aspect here is to carefully negotiate responsibilities such as funding, legal liability, media pedagogies and technical maintenance according to each different context of the accommodation. What becomes visible is a range of frictions that open up as the Freifunk members take more and more the position of technological evangelists trying to convince the management to take part in the Freifunk community in one way or another, a range of 'soft skills' that Barker (2016) has also attributed great significance to in his analysis of the sociotechnical imaginary of free networks in Indonesia.

What is further important about these practices is how Freifunk members, in tune with their articulation of expertise, stand out from commercial alternatives

exactly because of their position as engaged amateurs. Similar to other volunteers and activists offering clothes, repair or education, the Freifunk members try embed new infrastructuring practices to the accommodation. At the same time, this infrastructuring also means engaging and assessing what is already there, and more importantly what the management imagines to be a appropriate solution.

5.3. Practices of Installation: Enrolling and Maintaining Infrastructural Arrangements

With this third and last set of practices, I refer to the more common sense understanding of doing installations at the accommodations. As this section shows, the practices are grounded in an engagement with the spatio-material realities of the accommodations, exploring their spatial qualities and trying to align them with the affordances of different devices. Yet, it also includes organising the hardware to be used, bringing together members according to individual expertise as well as interactions with other maintenance staff and refugee residents. Again, the narrative accounts are rich with insights about what such practices look and feel like.

In the former section, Freifunk members' ideas and imaginations of which hardware to use already played an important part during the negotiations. The installation practices further point to the work of not only deciding on suitable equipment but also the means to assembling it. Besides drawing the practices of sharing hardware within the Freifunk community, Johann told that he quite regularly searches on online platforms such as *eBay* in search for good deals on

routers. At other times, hardware companies directly offer equipment to Freifunk communities or it is traded within the group.¹⁷

To assemble suitable hardware also comes with the gathering of individual expertise to do the installation. In general, how to set up a Freifunk router to an Internet uplink in a regular home is well documented across communities, websites and forums. In contrast, Markus, who was himself fairly new to the Freifunk group, requested Johann to accompany him during the installation of the routers at accommodation B. Likewise, it was Johann who brought a box full of test equipment as well as his co-worker in order to assist Hauke at accommodation V. What is interesting to note for both cases is the ad-hoc character of the relationships, as the members did not know each other prior to the installation. Instead, they first got in touch through Freifunk meetings or request individual assistance through the group's IRC channel, a hint towards the hacker practice of 'acting through' (Kubitschko 2015a) Freifunk's alternative media and communication infrastructures.

Besides this organisational work among Freifunk members, the installations further demanded an engagement with those who are already in a caring relationship with the existing infrastructures. At accommodation B, Markus and Johann were joined by the local IT support during the installation. Similarly, a janitor and local security staff attended the installation at accommodation V to open closed security doors. In tune with the agreement with the management, the routing equipment was to be placed away from any possibility to be manipulated after the Freifunk members left.

Even though this meant that the infrastructure was not to be touched by other people, Freifunk members used the opportunity to get in touch with the refugees they. This was usually in relation to those residents who would follow

¹⁷ Personal communication with Johann, February 2016. As becomes clear, this ecology of second hand routing equipment is a vital part for every Freifunk endeavour and therefore interesting for further research on maintenance and repair of WCN.

the installation process, eager to see the network go online. Both Johann and Markus explained that here they tried to strike up conversations about their Freifunk activities. Their vision was to find people willing to adapt some of the maintenance practices or become interested in the initiative. Even though this did not work, they tried to form other kinds of relationships. Johann told me about how he befriended a refugee who had formerly worked in IT himself and who he later donated a second-hand laptop to. What becomes visible here is the contrast to other collectives who place more emphasis on the autonomy of refugees over the emerging infrastructures such as the aforementioned NGO 'Refugees Emancipation' who advocates for self-organised Internet cafés in accommodations in Brandenburg (Witteborn 2012).

When I met again with Hauke to take a look at the installation he did, I was especially curious to learn about the further maintenance work. In the interview he told me that he would frequently check on the network connection to see whether there were any problems. On the day of the interview he had received a call from E. who wanted him to replace some of the routers, since she did not want the security team to be distracted by surfing online with the new connection. Markus also returned to accommodation B to deal with connectivity issues reported by the staff.

Reflecting on the larger installation process, I could frequently feel the passion of Freifunk members when they told me of running around to test devices in different setups. This points to what Gabriella Coleman has termed the 'poetics of hacking' (Coleman 2013: 95), by which she means pleasures, aesthetics, joy, humour and cleverness that hackers seek in their tinkering with technology. As a look at the practices makes clear, this practical configuration work always happens in relation to the expertise of different people, hardware and the spatio-material conditions of the accommodation. Furthermore, these practices point towards both the infrastructuring 'delegation' (Latour 1999,

Sánchez-Criado and Rodríguez–Giralt, in press) of work to achieve these installations, including their consequences and sustainability.

6. Discussion

In this final chapter I will discuss and integrate the findings from the previous sections on Internet infrastructure in the refugee accommodations and the practices of 'doing' Freifunk to intervene in the infrastructural configurations. Central points of discussion are the way that Freifunk practices rely on distinct articulation of sociotechnical neglect, the modulations to Freifunk infrastructuring practices that become visible in the humanitarian context as well as future avenues for research that pays attention to embodied, local and mundane maintenance practices.

6.1 Infrastructuring Zones Of Sociotechnical Abandonment

As the findings suggest, Freifunk practices attempt to address and intervene the issues presented in the first section on Internet access in the accommodation. This reaches from reconfiguring who can access the Internet (is it only staff or also the residents?), to what extend access is granted (is it limited to a certain time of the day or devices?) and also the quality of the connection (is it fast, slow or 'protected' through re-routing of potentially illegal traffic?). While this constant work of articulating, negotiating and reconfiguring infrastructural exclusionary effects is clearly necessary, I will briefly discuss how these infrastructuring practices might also be successful since they practically rework prominent notions of infrastructural exclusion to forms of ongoing, actively sustained sociotechnical abandonment.

Most importantly, Freifunk practices pay attention to how the access is relationally configured, revealing how refugees are often excluded even though

fixed Internet is available, acknowledging how access for both staff and refugees is shaped through standards, policies, architecture and funding schemes. Through the direct engagement without accommodation representatives that articulation and negotiation practices demand, they also address how key actors imagine the risk of Internet access and its potential (pedagogical) effects. Lastly, and even though this is to a large degree bracketed in this study, these practices demand thinking about how refugees already access the Internet and how it might be improved. Even though I encountered a lot of Freifunk rhetoric that is still based on notions of absolute digital divides and emancipatory claims for populations such as refugees¹⁸, the analysis highlights that the practices are more responsive to different forms of negligence over total exclusions. Connecting these thoughts to the literature, it becomes clear that Freifunk infrastructuring practices challenge work on humanitarianism that traditionally conceives accommodations as spaces of exclusion with refugees positioned outside the law and reduced to forms of 'bare life' (Ticktin 2011; Agamben 2002).

Instead, the overall Freifunk practices might be much closer to reconfiguring what political scientist Julia Schulze Wessel's termed 'border space' (2014, 2016). The essential notion of this concept is that in border spaces, illegal migrants and refugees are not thought of as outside of the law, since they are subject to a range of rights, but more than others run the constant risk of having these rights not granted (Schulze Wessel 2014: 22). The consequence is a much more dynamic and relational understanding of borders, understood not as mere obstacles to be overcome but enacted relationally by and for specific actors. In other words, for some migrants the exclusionary borders are next to invisible while they pose a constant challenge for others (Schulze Wessel 2016: 52).

¹⁸ Johan Söderberg has helpfully suggested to not dismiss seemingly technologically deterministic claims but rather to work out 'the inconsistencies of these accounts [that] can then be explored 'from within', and the discrepancy between the ideas of hackers and their practices can be unravelled' (2013: 13), opening another avenue of research on Freifunk research not investigated here.

Going back to my initial findings, it is helpful to return to Barry's (2006) notion of the 'technological zone' or 'zone of qualification' that accounted for the specific exclusionary qualities of standardized Internet provision that stretches across many different locales. Yet, I find it helpful to further tailor this concept along the relationally configured qualities of Internet access in the distinct space of accommodations and refugee reception centers. Since border spaces do not necessarily need to be associated to humanitarian infrastructures, I want to synthesize all three approaches with what anthropologist João Biehl (2013) termed 'zones of abandonment'. In his ethnographic work, he concentrates on asylums in Brazil that are distinct for their inhumane treatment of its residents as they are excluded from society. Given the importance of Internet access for the well being of refugees in the accommodation, Freifunk practices might render them visible as *zones of sociotechnical abandonment*, stressing the risk of refugees being 'painfully disentangled' (Farías 2016) from those sociotechnical assemblages that are dear to them.

Concluding with these emerging terms, I favor this thinking about abandonment rather than exclusion for two reasons. First, in tune with a perspective out how neglect is not absolute but rather constantly infrastructure in the mundane, everyday reality of the accommodations. Even though the unintended effects of standards and of infrastructuring in general are not easily attributed to responsible entities, they can be investigated in their processual, assembled character (Niewöhner 2014: 347). Second, only pointing in the general direction given the scope of the thesis, Freifunk practices might be further analyzed in terms of a more *careful* response to these forms of neglect. More precisely, the question could be whether one crucial quality of the *recursive public* that the Freifunk practices enable is turning Internet access for refugees from a question of rights or standards (facts) into a 'matter of concern' (Latour 2004) or 'matter of care' (Puig De La Bellacasa 2011) that takes issue with the ongoing infrastructuring practices analyzed in this paper.

Even though care as a concept remains fluid and, as Mol et al (2010) argue best used according to context, it might be suitable in this case. This becomes more obvious when drawing parallels to similar conflicts and collectives. In their analysis of a DIY design piece against the exclusionary effects of standardized wheelchair equipment, Sánchez Criado and Rodríguez–Giralt (in press) discuss how this ‘small object intervention’ can be understood as care via the process of design that is fostered by what they call ‘joint problem making’ (in press: 213). By this they refer to:

‘a radical approach to collaboration and an interest in sharing problems and skills between those are usually called designers and users; a way of politicising and opening up the foundations of technical aid design through small DIY design interventions that have enabled people to continue living more comfortably; creating interesting relations through the sharing of problems.’ (Sánchez Criado and Rodríguez–Giralt in press: 217)‘.

Here, parallels to the Freifunk interventions potentially forming a similar mode of care then becomes further visible as the authors stress the importance of bringing together important actors (such as the independent living movement in this case) but also addressing the austerity measures that lead to the health care shortages (in press: 217). Another analytical upside is that the notion of care they employ links up to the practices of maintenance and repair (Jackson 2014) and the ‘everyday lives with diverse materials’ (Sánchez Criado and Rodríguez–Giralt in press: 214), also making room to see this care work in terms of the delegations mentioned above.

Despite the potentials of Freifunk practices in articulating a more nuanced understanding of abandonment and leading to a more careful way of ‘joint problem making’, e.g. by forming a recursive public that opens up ways to challenge the previously invisible or untouchable infrastructuring practices of key actors and objects, the analysis of the practices show that this is not a

straightforward process and that they are also being reshaped through the dialogue with humanitarian actors, policy makers and volunteers.

6.2 Humanitarian Modulations

If Kelty is correct that free software is constantly shifting as it travels to new contexts and gets mixed up with other sets of practices, I briefly want to discuss a range of possible modulations that become visible as the practices of doing 'Freifunk for Refugees' gains significance as a humanitarian intervention in refugee management Bremen and Germany. Regarding my empirical material, this question is particularly linked to the practices of negotiation, in which an assessment of the local Internet infrastructure in the accommodation became visible as well as the need to arrive at an at least partially shared solutions among Freifunk members and management.

Going back to my own empirical research, such inherent 'chaos' and need for improvisation was at least partly highlighted by my research participants in the refugee management who directly addressed the long work hours, issues with funding, housing and overall lack of infrastructure, but also evident in the constant tinkering of Freifunk members. Following the attempt to make visible such demands for negotiation not only in times of crisis and conflict, Elizabeth Dunn (2012) in her work on humanitarianism in Georgia has stressed the way that humanitarian interventions tend to present themselves as 'apolitical' (Dunn 2012: 1), despite her observation that 'especially refugee settlements and the bureaucratic structures that enable their creation are not just technologies for the creation of order but also technologies for the production of chaos and disorder' (Dunn 2012: 19).

One important aspect from Dunn's study is how 'adhocracy' clash with refugee care in the form of standardized kits (Dunn 2012: 7). In analogy to these kits, my ethnographic engagements suggests that the practices of 'flashing'

devices with the necessary Freifunk firmware, the need for collaboration (with neighbors and community members) to build long-distance connections but also demonstrating the strength and opportunities of Freifunk approaches to non-members that can be considered quite established set of practices.¹⁹ Similarly, even though there are several, often competing imaginaries of what ‘the network’ and its relation to the corporate Internet should be about, I encountered a quite consistent imagination that Internet uplinks for refugees should first and foremost be free in terms of no money, registration, surveillance (from copyright lawyers and government surveillance) and available in as many spaces as possible.

At this point, one aspect why Freifunk installations are successfully embedded might be that in practice, these infrastructural arrangements exceed the limits of bureaucratic, standardized and corporate Internet infrastructure provision. Instead, especially since the practices of how to do ‘Freifunk for Refugees’ are still being figured out, they can respond to the improvisation and ‘chaos’ of humanitarian aid, albeit in a very privileged fashion.²⁰ Yet, such flexibility is not only highlighted by the established approach to use cheap devices, free software and horizontal networking protocols, but also in the engagement of Freifunk members to provide Internet access ‘by all means’. This includes presenting the accommodation management with commercial alternatives that also provide network protection to VPNs.

Still, the empirical research makes clear that these negotiations shape how the Freifunk specific imaginary of network connections actually is put into practice. One of the more provocative cases can be found at accommodation V, where

¹⁹ Even though I lack the space for analysis, one could also further highlight the agency of the routing equipment and the ‘scripts’ (Akrich 1992) that have established themselves over time and how they might change.

²⁰ As mentioned above, all Freifunk members I talked to are fully employed in the IT industry. In our interview, Johann further pointed out that being an entrepreneur was crucial for his engagement with the accommodations, as he could deliberately ‘spend two hours on the phone’ organizing installations.

Internet access for the residents is only provided in the main entrance hall, given concerns about the circulation of illegal content and fear of refugees 'settling in' too much. In accommodation B in turn, the imaginary of an easily accessible wireless network connection aligned much more easily with the already configured stationary computers who were set up in the common rooms of the container accommodation.

Lastly, this engagement with refugee accommodations demands a rethinking dimension of Freifunk practices, which is (individual) responsibility for the emerging infrastructural arrangements as well as the much contested role of the initiative as an alternative Internet service provider, including questions about how these configurations of emancipated 'users' clashes with a humanitarian logic that is often driven by clear cuts between 'supporters' and 'refugees' as beneficiaries (Ünsal 2016). Yet, in this register it is first important to note that Freifunk in its founding narratives is often directly framed as a response to the neglect of markets and governments in the provision of Internet infrastructure, sparking the initial interest of the founding members (Petersen 2013: 42). With the rise of broad band and mobile connections perceived by many users as ubiquitous, I frequently encountered the narrative that Freifunk should further stress the 'inverse' aspect of its infrastructure, working towards a notion of the

‘network commons’ that troubles the capitalist notion of ‘providers’ on one hand and ‘users’ on the other.²¹²²

Once again, it is here that a notion of care might be revealing for further studies, especially since recent STS scholarship highlights the non-normative reading of the term as ripe with different forms of doing ‘the good, bad, and ambivalent’ (Mol et al 2010: 11). Just like the design project of Sánchez Criado and Rodríguez–Giralt had to work through the paternalistic notions of care that the Independent Living Movement faced (in press: 214), it will be seen how all participants – but especially Freifunk members – address the changes that might await their established practices.

In one way, it is important to note the recent engagement of the CCC and Freifunk to help with fundraising for the already established NGO ‘Refugees Emancipation’ that has trying to establish self-organized Internet cafés in accommodations for over ten years. On their website, the main slogan already speaks a different language, as they claim to support ‘Internet for Refugees by Refugees’.²³ In another way, the work of anthropologists such as Silke Betscher (2016) or Nadine Wagener Böck (2016) already begun to analyze volunteer

²¹ An interesting point came up when I talked to a Freifunk founder member from Berlin at the Chaos Communication Conference who critiqued the practices of Freifunk Bremen members of also doing ‘commercial’ installations. This was based on a discussion sparked by members from Bremen in one of the workshops of whether Freifunk installations in the accommodations. (Personal communication, December 2016)

²² Armin Medosch, another Freifunk founding member whose emerging work ‘Cities of the Sun: Urban Revolutions and the Network Commons’ (2015) I discovered too late in the writing process to fully consider commented on the issues of commercial provision: ‘[a] new generation who has never known anything else but neoliberal informational capitalism follows the patterns of the start-up mentality and of a competitive commercial environment. In this environment, mastering the technology becomes a pretext of commercial success and mastery over other people.’

²³ For the website see Krakenbürger, Fiona (2016): ‘Support Refugees Emancipation’. Retrieved on 19th September from <http://support.refugeesemancipation.com/de/>. For a first explorative study on media usage in Internet cafés run by Refugee Emancipation, see Witteborn (2014).

donations and actions for refugees as part of emerging care economies. These point towards increased structuring efforts by local management and the demand for professionalization, that as Betscher argues, present ways for more control over the volunteers (2016).

That such detailed and situated work is necessary is indicated by the fact that no matter how careful or 'open' practices are, they always seem to come with new exclusions. At least this was one of the remaining thoughts I had when I received an automatic notification of the latest blog post on the Freifunk Bremen website that Gregor, unable to stop his conflicting behavior with the accommodations and other third parties, would 'officially be excluded from all activities of the Freifunk Bremen initiative', yet he 'would always be welcome to return if he betters himself'. Given this obvious paternalistic narrative of sending members to exile and the chance of individual improvement following these emancipatory practices calls for a sustained reflection that notions of feminist hacking/making (SSL Nagbot 2016) might open up and remains an important starting point for future work at the intersection of humanitarianism, media infrastructures and their envisioned alternatives.

7. Conclusion

In the months after I formally stopped my field work and returned to the desk to analyze my data, I continued to receive more updates via the Freifunk mailing lists. There, news of other accommodations which had been successfully 'linked up' to the network mixed with excited messages that the much loathed network liability law might be abolished nation wide, while the city of Bremen decided to fund the Freifunk project with figures reaching up to 24,000 Euros. At the same time, there was talk about a recently published EU regulation that would force producers of routing equipment to further secure that the software the devices could not easily be changed, potentially undermining a core practice of the Freifunk initiative.

In these moments, I often found myself opening up a digital map provided on the initiative's website. Here, I zoomed my way through the cluster of small blue blinking dots scattered all over the city until I eventually arrived at a birds-eye-view of accommodation V. Many times, I felt relieved to see the bright green lines going from Hauke's balcony to the big blue dot in the hospital complex, which in turn assembled a hand full of small pink dots for each connected device around it. On one particular occasion, I was further surprised to see that the green line was now also being forwarded to other formerly unused parts in the back of the building.

Given such feelings of surprise and relief, it brought me to think about how this arrangement could well be otherwise. What if Hauke for some reason decided to stop sharing his Internet uplink? What if the accommodation management had to obey the new regulations and remove all devices? Yet, these scenarios seemed strange given the plethora of initiatives, institutions, and users – now including thousands of refugees on a daily basis – who currently connected to the Freifunk networks in Bremen and other places in Germany.

Going back to the question I posed in the beginning of my research about how the sociotechnical practices of the free wireless collective become embedded in and possibly interfere with infrastructuring practices that shape Internet access in refugee accommodations, I found a tangible fragility of every single connection to be at the core of what I had discovered. Rather than being straightforwardly implemented as a technological fix to a clearly defined problem, my findings highlighted the contested reality and constant need for translation to put any vision of a 'free' Internet to work in the context of the accommodations. Yet, it was also clear that new exclusions, new black boxes, invisibilities and inequalities followed, with the question remaining for whom they arise.

Overall, my sustained ethnographic investigation, based on narrative accounts and observations around Freifunk's 'inversed infrastructure' has revealed that the embedding and reconfiguration of the wireless network infrastructuring efforts in these newly emerging humanitarian contexts can be understood through at least three distinct sets of practices. First, it depends on the frequent articulation of a vision that positions Freifunk practices and its related expertise as a more careful answer to the exclusionary qualities that 'closed' corporate media and communication infrastructures and their operation in refugee accommodations entails. Even though this articulation work is not unidirectional but shared by a potentially growing set of humanitarian social service providers, NGOs and policy makers, a lot of this work depends on members of the Freifunk initiative. In dialogue with the existing literature, it became clearer that a distinct quality for infrastructural critique that Freifunk draws from its mode of existence as *recursive public* might further point out the need of Freifunk members to render sociotechnical exclusion visible as forms of *abandonment*, with the challenge being to assemble key actors around the relational, intended and non-intended exclusionary effects that corporate Internet infrastructure entails for staff and refugees alike.

First and foremost, by proposing a set of different solutions beyond Freifunk installation, this infrastructural neglect appears as never simply given but as sustained in practices, a *matter of care* up for possible contestation. The practices of addressing the issue on alternative media platforms but also in front of professionals and policy makers points to the increasingly relevant position the collective might take in the future shape of infrastructuring policies.

Second, it has become clear that both discursive constellations as well as the practical implementation of Freifunk infrastructure in the two accommodations under study are always subject to a careful (re)negotiation of the local needs and imaginations around wireless Internet access. As discussed, this could be an indicator for how established Freifunk vision of a secure, fast, widely available yet open experimental network shifts as it becomes shared by humanitarian actors. Even as Freifunk members strive for efficiency, availability the possibility to keep experimenting with the emerging infrastructures at the same time, enabling access within the accommodations comes with its own challenges, limitations and needs for negotiation. As the treatment of the Freifunk member Gregor has shown, every emancipatory practice comes with its own new sets of standards and exclusions that future studies should take into account.

Third, while this study has tried to taken a broad view on what practices sustain the diffusion of Freifunk practices, thinking about this process makes little sense without paying attention to the embodied work of organizing wireless hardware, testing devices and then settling into the mundane maintenance that infrastructuring demands. At this point, it becomes relevant to ask how this work is distributed, who takes which responsibilities and how these arrangements might still be improved. While it is the moment of plugging in the routers where the empirical part of my ethnographic inquiry ends, it might pave the way to further avenues of research, of which there are plenty.

On one hand, it would be interesting to investigate how complex knowledge practices like providing for accommodations that are very much at an emerging

stage of being figured out become documented and circulated for other members and non-Freifunk actors. First attempts of this can be found in blog posts on the Freifunk Bremen website that at least briefly document the installation process in different accommodations. Then, an important question largely ignored by my study is the question of how infrastructuring practices and arrangements change over time. Such research could focus on the way that responsibilities for maintenance shift or refugees themselves become involved in the management of the network and asking how Freifunk uplinks and nodes might already play a distinct role in the emerging *mobile commons*.

The fact that Freifunk installations have been taken place in accommodations all over Germany then poses an open calls for comparisons between these different sites, groups and practices, but also looking the phenomena in international contexts. Lastly, since I have mostly focused on ‘successful’ installations, which poses a a need for more diverse accounts that includes ‘failed’ installations and other conflicts. In extension to this, my material suggests that there are several more ways that Freifunk approaches gain significance for refugee accommodations, such as the work of private individuals and NGOs not associated with the initiative as such.

Overall, my a small ethnographic contribution on the hopefully growing intersection on hacker collectives, humanitarian care for refugees and the infrastructuring of media technologies can be read as an attempt of describing interventions that have an impact on the world and its people – and to conclude with the words of the pioneering anthropologist Liisa Malkki – opening the possibility for better ways of ‘conceptualizing, designing, and challenging’ (1996: 379) emerging forms of humanitarianism. Here, a crucial point might be how every infrastructural arrangement, no matter how ‘free’ or ‘open’, always needs to address ever changing practices, policies and environments.

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