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The 'Humanitarian' Drone

A postphenomenological analysis of the use of mapping drones in humanitarian action.

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1. INTRODUCTION

In 2015 a handful of individuals saw a white whirring device slowly rise to the air. They were in Nepal in the aftermath of the devastating 2015 earthquakes. This colourful group of people had gathered together under the leadership of Patrick Meier to assist the humanitarian agencies on the ground. That white, whirring device? A DJI drone equipped with a camera steadily following a predefined path through the sky, taking snapshots along the way. All of this was part of a collaboration between several partners had as a goal to map the disaster-stricken areas. After days of zigzagging through the Nepalese air, Meier and his team had an up-to-date map of the severely hit Panga[1] (Meier, 2016b).

Humanitarian organisations are always in need of information of the current state of affairs. In areas where Google Maps can no longer guide them around, this means creating maps themselves. Sometimes mapping efforts are necessary because the territory is largely uncharted or because a cataclysmic event has changed the landscape significantly. This would be done by surveyors, from airplanes, or via satellite (Meier, 2015). And now also by the use of small flying robots, drones. The latter will be the main character of this thesis, in which I will discuss the emergence of drones as actors in humanitarian action. What does the introduction of a drone mean for humanitarian action?

The work of Meier and his team seem like a light shining in the darkness after stories of drone warfare and military strikes. There is a way to use drone for the betterment of the world, to step beyond dropping bombs and taking birds-eye perspective selfies! While drones have (arguably) been around since the first world war (Gregory, 2011), in the last decade increasingly smaller and cheaper drones have been developed and appropriated for purposes outside of the originally military context amongst which humanitarian contexts (Choi-Fitzpatrick et al., 2016). Auditing firm PwC has estimates the global "addressable value" of drones to be over $127bn, projecting an immense growth potential for this technology (PwC, 2016, p. 4).

It is only in 2012 when the first non-governmental organisation (NGO) started the use of drones (Soesilo et al., 2016). The International Organisation for Migration (IOM) used drones in Haiti to plan shelters, monitor camps, and to do a census of Port-au-Prince following the 2010 earthquake.[2] Since this first deployment the use of drones for humanitarian purposes skyrocketed, with drone use for emergencies and disaster response seeing a dramatic increase in 2012 as well (Choi-Fitzpatrick et al., 2016, p. 16). Commercial players such as Matternet and Zipline followed suit, with Matternet having done their first field tests in September 2012 in Haiti[3] and Zipline which was founded in 2011 but presented their developments only recently in 2016[4]. UNICEF collaborated with the government of Malawi with the opening of a drone corridor pilot in the beginning of 2017 as a test ground for public and private partners to further explore the possibilities of humanitarian drones[5]. Here they test the use of drones for mapping purposes, cargo transport, and enabling connectivity in emergency situations through airborne WIFI/cell phone

[1] A town in Nepal's Kathmandu district.
[2] See FSD case-studies No 7 and 8: http://drones.fsd.ch/en/tag/case-study/
[3] https://ideas.ted.com/6-ways-drones-can-be-used-for-good/
[4] https://www.theatlantic.com/technology/archive/2016/04/a-drone-to-save-the-world/476592/
[5] See: https://www.unicef.org/media/media_96560.html

transmitters. As of the moment of writing the amount of drone applications stepping beyond a pilot or test case are still very limited. But with the idea of 'humanitarian drones' now being firmly established, more companies and organisations are starting to get involved (notably: WFP, UNICEF, UAViators, MSF, MOAS).

However, the introduction of drones in humanitarian action has not been without its troubles. In response to the use of drones in the aftermath of the earthquake, the Nepalese government quickly restricted the use of drones in disaster areas (see Choi-Fitzpatrick et al., 2016, p. 6). At the time citing worries of the capturing of heritage sites and sensitive information. This gave rise to further worries and rumours that Nepal was banning drones all-out, which turned out to be mistaken. Legislation has shown to be troubling hurdle for drone deployments (Choi-Fitzpatrick et al., 2016; Meier, 2015).

The introduction of drones is complex, in general but also specifically difficult in in a field such as humanitarian action. Humanitarian organisations already struggle with a rise in violent conflicts with non-state actors and the increasing impacts of climate change. Which have led to an all-time high in displacement of refugees as we are moving "into an era in which the scale of global forced displacement as well as the response required is now clearly dwarfing anything seen before" (UNHCR, 2014). Also, there is a major budgetary shortage (15 billion US dollar yearly) troubling the international humanitarian aid community (Meier, 2016a).

The promises brought by drones have the humanitarian world excited for future possibilities and movements such as "drones for good"[6] seem to follow the adagium that if we do good with a drone it is indeed a good drone. For that it is important to understand that technology, and thus a drone; is not neutral.

1.1. The non-neutrality of technology

In the discussion of technology, there is a common recurring frame of thought; that technology is a neutral instrument. This view can often be identified by the reference to technologies as tools. In humanitarian action the drone is commonly seen as a neutral technology (Sandvik & Lohne, 2014, p. 19). An example can be found in Raymond et al.'s discussion of the humanitarian drone in "The Case against Humanitarian Drones" where they talk about the importance of "matching the tool to the task" and focussing on "operational impacts" (Raymond, Card, & Al Achkar, 2012, p. 2). Similarly, a report of the Fondation Suisse de Déminage (FSD) states that they have a "common vision in which drones serve as tools to enhance human dignity and to prevent and alleviate human suffering" (Soesilo et al., 2016, p. 3). It seems in general that discussions on the use of technology in humanitarianism mainly keep to a discussion of functionality and lack focus on the technology itself (Sandvik & Lohne, 2014, p. 4).

1.1.1. Technologies as an instrument

The idea that technology is neutral is generally referred to as an instrumentalist view on technology: it is the user of a tool (instrument) that gives an artefact its moral value (Franssen, Lokhorst, & van de Poel, 2015). Its pervasiveness can be seen in for example the North-American Rifle Association's slogan "Guns

[6] See #dronesforgood or #drones4good on Twitter: https://twitter.com/search?q=%23drones4good

don't kill people, people kill people" (Henigan, 2016). When we discuss the use of drones as a tool or keep our discussion of technologies to the risks and benefits that might come from their (assumed correct) use, then we tend to assume technology to be a neutral 'thing'. However, this neutrality has been challenged in the last century by various scholars in philosophy and sociology (Borgmann, 1987; Feenberg, 1998; Heidegger, 1977a; Latour, 1992; Verbeek, 2005; Winner, 1980).

In one view, technologies either inhibit or promote certain possibilities and these possibilities have political valence or are related to values, as such by nature of their design they are not neutral. Take for example the overpasses on the parkways in Long Island. These were too low for public transport to pass under, as a result inhibiting a marginalised community (of colour) to reach certain public parks; and as such embodied the designer's racist politics (Winner, 1980).

1.1.2. Technologies as control

The traditional counter position to technological instrumentalism is that of determinism. Here technology is not seen as neutral but as a self-determining force (Verbeek, 2005, p. 136). This can be framed both positively and negatively. Especially with the emergence of mass production in the 19th century, philosophers like Karl Jaspers and Karl Marx worried technology might be a determining force driving us towards society in which we are but cogs in the machine. The deterministes see technological development as something that is autonomous, unstoppable, and able to change human culture (Verbeek, 2005, p. 136). In general, this view of technology has been exceedingly negative. However, nowadays the Silicon Valley techno-optimistic attitude seems to represent a similar world view. With technology being this motor of progress that is going to inevitably supersede humanity in some form or another (e.g. artificial intelligence). This is the version of the determinist perspective that can also at times be found in humanitarian technology discussions, that 'its unavoidable' to follow this technological innovation. A story often brought by the innovators pushing the technology themselves. However, this position is also problematic. Empirical studies in science and technology studies (STS) such as Social Construction of Technology have introduced the idea that technological innovations are socially constructed (Pinch & Bijker, 1984).

1.1.3. The middle ground

Both instrumentalism and determinism are quite radical when it comes to technology. In this thesis I argue for a middle ground. As technologies shape the possibilities surrounding us, it is not just the user that decides. However, neither are we incapable of influencing these technological developments. Society and technology are mutually constitutive, society shapes technology and technology shapes society (Feenberg, 1998, pp. 12–14). The understanding that technology is not neutral nor deterministic is crucial to be able to adequately assess the humanitarian drone narrative that has been presented in the introduction. If technological instrumentality is taken for granted, then it is just the good intentions and the good actions that make a "good drone". Such an attitude towards technology can prove dangerous to humanitarian action, as in taking neutrality for granted might result in unintended and unexpected consequences of large scale introduction of new technologies. But also taking the influence of technology too seriously can become paralysing if we see it as a deterministic influence that guides our lives.

1.1.4. Postphenomenology

The postphenomenological framework that I am using in this thesis will show to be on the middle ground; taking technological artefacts seriously but also the agency of the human beings that are in relation to those artefacts. Postphenomenology shows how human and the technology are relation to each other, co-constituting the subject and the object towards each other. This shows technology is not neutral as it coshapes our relation with the world, but also not deterministic as it is only coshaping the world for us in relation to us. In such a way the traditionally upheld dichotomy between the human and the non-human is circumvented. As I will show, technology influences our perception of the world and our actions in the world. In such a way the co-constitution of human and technology also includes human values and norms. If both humans and technology co-shape our values, this adds another layer of complexity on top of an already increasingly complex humanitarian world. However, the contemporary discussion regarding humanitarian drones that this is a layer we cannot ignore. In what way then, do humanitarian drones influence and co-shape humanitarianism?

1.2. Problem statement

When drones emerge as a technology in humanitarian action, it becomes good practice to investigate what that means for those involved in humanitarian action. As I have shortly argued in the introduction, technologies are not neutral but influence us and the world around us. It is the topic of this thesis to investigate how the drone influences humanitarian action, specifically in using them for mapping such as has been done in Nepal. These information gathering practices are why the mapping drone is valuable for humanitarian workers, but also show the need to investigate how they gather and present their information. Drones provide a new perspective, from above, which otherwise is only available in lower resolution by satellites or airplanes. These maps and images that these drones create are also not neutral (Wood & Fels, 1993). However, our intuitive relation to the drone and the maps it creates might as well be that these are objective and neutral. What can be 'wrong' with a map stitched of pictures taken from above?

In general, the emergence of a 'new' technology in a specific practice creates room for investigating what that technology will do that that practice. With such a mindset I set out to investigate the humanitarian drone, to see how it influences and reshapes humanitarianism. As such my main research question is:

How do mapping drones reshape humanitarian practices and perception and as such blur the distinctions between humanitarianism, commercialism, and militarism?

In order to be able to answer this question several subparts need to be investigated, these subquestions are also leading in structuring the thesis. In order to be able to see how a drone 'reshapes' humanitarian action, there is a need to investigate *what does it mean to 'do' humanitarian action?* I will do this by looking into commonly used definitions of humanitarian action as well as the ethical theory and principles that underlie this notion of 'humanitarian action'. As I already suggested the drone is not a neutral technology, so in part of chapter 2 I will also ask *what makes a drone a humanitarian actor?* For this I first introduce the concept of the subject-object dichotomy and how general humanitarian thought seems to think in this split between the

human subject and the outside world. These first two questions constitute chapter 2, which is the set-up for the following chapter 3.

In chapter three I wonder, as humanitarian action is about action; *what does a mapping drone do*? I analyse the use of mapping drones in Nepal through Verbeek's mediation theory to show in what different ways a drone can mediate the perceptions and experiences of those it is relation with. This will be followed by a final investigation into *how do mapping drones blur distinction between different (humanitarian) actors?*

The final conclusion will bring these research questions back together to that the humanitarian mapping drone reshapes humanitarian action and leads to an increase in blurring the lines between humanitarian actors and other actors.

2. ACTORS: THE HUMANITARIAN AND THE DRONE

Something changes when drones come into play in humanitarian action. That is one of the main premises of this thesis. The drone is not a neutral instrument in its use by humanitarian actors. In the introduction I have introduced the complexity involved with humanitarian drone use and how these technologies are not neutral. As such I am investigating how drones change the way non-traditional actors are able to do humanitarian actions and how that further blurs the boundaries of humanitarianism.

To do this there is a need to investigate what is humanitarian and who is doing (or being) it? In this chapter I will discuss who is 'doing' humanitarian action and introduce the drone as an actor. In investigating the source of what makes something humanitarian it becomes clear that is the action that makes something humanitarian. And as I will argue a drone can be seen as an actor also, affecting the humanitarian field.

2.1. What is humanitarian?

When talking about the work done by humanitarians or humanitarian organisations, different terms have been used of time. Some refer to humanitarian aid, others humanitarian assistance or humanitarian action. In this thesis I will use the term humanitarian action, both since it is more commonly used by the United Nations Office for the Coordination of Humanitarian Affairs (UN OCHA) as well as because it highlights in its definition one of the main characteristics of what makes something 'humanitarian', namely *acts*. One cannot be humanitarian in theory, humanitarianism takes place in practice.

Humanitarian action is according to scholars Sandvik and Lohne defined as "action and aid designed to save lives, alleviate suffering, and maintain and protect human dignity during and in the aftermath of emergencies" (Sandvik & Lohne, 2014, p. 2; Vinck, 2013). In order to be able to do this, the humanitarian sector follows the four "humanitarian principles" of humanity, impartiality, independence, and neutrality (ICRC, 2015, p. 8; Slim, 2015, p. 5). These principles have been first established by the International Committee of the Red Cross (ICRC) in 1965, after which they quickly gained a prominent position in the humanitarian moral space. By now these principles have reached such a level of ubiquity that they are seldom explicitly referred to or defined in literature. In 1991 the ICRC elaborated their code of conduct with six additional principles, but the original four remain the de facto standard of morality in humanitarian action[7].

The principle of humanity is defined as "to prevent and alleviate human suffering wherever it may be found … [i]ts purpose is to protect life and health and to ensure respect for the human being" (ICRC, 2015; Slim, 2015, p. 45). Humanitarian ethics sees each human life as an individual intrinsic good, that is the ultimate goal of humanitarian aid (Slim, 2015, pp. 46–47). The principle of impartiality exists to ensure the application of the principle of humanity happens indiscriminately, that is that each life is treated as worthwhile regardless of the actions of the individual. And the principles of neutrality and independence ensure that humanitarian aid retains its abilities to follow the first two principles of humanity and impartiality. By staying neutral and independent, humanitarians attempt to avoid outside influences forcing them to provide their aid discriminately. In addition to this there is the "do no harm" imperative that

[7] The full statement of principles by the ICRC can be found, for reference, in Appendix A.

humanitarian action shouldn't at any point be the cause of harm (Sandvik, Jacobsen, & McDonald, 2017). These four principles are the guiding moral standard in humanitarian action, it is through the application of these principles that the "action and aid designed to save lives, alleviate suffering, and maintain and protect human dignity during and in the aftermath of emergencies" can be truly seen as humanitarian (Sandvik & Lohne, 2014, p. 2; Vinck, 2013). In short, it seems that who or what is humanitarian is whichever action follows these four principles with the aim to improve the living conditions of those hit by emergencies. However, in practice it shows to still be problematic to sketch the boundaries of humanitarian action.

2.1.1. The boundary problem

The question what is and what isn't humanitarian action is called the boundary problem. The demarcation of which activities fall under humanitarian action and what makes someone a humanitarian worker is not easily made and is sensitive to change. As I just discussed what is or isn't humanitarian action is closely related to the four humanitarian principles. In addition, a guiding aspect is the action-oriented aspect, one is humanitarian in their action not in e.g. thought.

Slim highlights three forces that stretch the boundaries of the humanitarian field: the actors involved, the methodology used, and the contexts in which the actions take place (Slim, 2015, p. 8). Who declares themselves to be 'humanitarian' can be a problematic discussion. That the Red Cross (ICRC) and Medicine Sans Frontier (MSF) declare themselves to be humanitarian is less confusing than the use of 'humanitarian' to describe peacekeeping missions, armed forces, or commercial companies. Within humanitarian action commonly a distinction is made between traditional actors and non-traditional actors (Meier, 2015). Traditional actors are international humanitarian organisations such as the ICRC, non-traditional actors can be all that fall outside of the first category ranging from groups of volunteers to drone companies.

These non-traditional actors are not inherently bound to the humanitarian principles as the big humanitarian organisations are. As a result non-traditional actors have a bit more interpretive flexibility in what they consider to be humanitarian. As such it becomes difficult to assess whether they are or aren't humanitarian. However, all these different traditional and non-traditional actors do have something in common. All actors are humans still, or organisations constructed by humans.

2.2. The modernist myth

Humanitarianism places a high value on human life and human dignity. As mentioned above, Sandvik and Lohne (2014) define the protection of human life and dignity that is the primary objective of humanitarian action. As such, humanitarian action is focussed on the human, "There is no greater goal beyond the person" (Slim, 2015, p. 47) for those engaged in humanitarian action. Slim refers to humanitarianism action as "a teleology of person" (Slim, 2015, p. 47), which means that each personal life is the ultimate goal of humanitarianism and nothing beyond that. If we consider the following quote from Hanson, a professor of anthropology at the University of Kansas, we can see that these characteristics of humanitarianism can be classified as humanism.

> "Humanism refers to the idea that the driving force in human affairs over that period has been the liberation and actualization of the autonomous human individual as the basic unit of society and *the locus of meaning in life* [emphasis added] and in history." (Hanson, 2014, p. 59)

What Hanson means to say, is that the discourse we now refer to as humanism places human life in the centre of its value-system and sees the human individual as an independent and self-determining agent. In addition Hanson sees our common Western world view is as humanist *and* modernist, which for him refers to a world view that sees the human individual as autonomous and the world itself and the objects in it as certain and permanent (Hanson, 2014, p. 59). As such, in the Hansons perspective on modernism the human being is independent and consistent over time. This is similar to the characterisation of modernism by Latour and Verbeek, who argue modernism to be the world-view in which the human subjects are seen separately from the objects that inhabit the world; the subject-object dichotomy (Latour, 1993; Verbeek, 2008). As with Hanson, they argue modernism holds the human being as something separate, consistent and not mutable by outside forces.

So, to what extent does humanitarianism meet these characteristics? The human centeredness identified by Hanson seems clearly present in humanitarianism as can be deduced from their consistent reference to the human as the ultimate goal. The fact that humanitarianism holds the human being as an autonomous, independent being is a bit more well-hidden. Modernism brings is characterised by a certain permanence and certainty (Hanson, 2014). When the ethics underlying humanitarianism is presented as an universal ethics (Slim, 2015, p. 35), that suggests a modernist perspective. The teleological goal of humanitarianisms being the human compliments this thought, as for something to have an inherent goal at all speaks to the kind of certainty and permanence that is meant here.

Humanitarianism has a principle-based ethics at its core, it holds central moral norms that we "should live and act in accordance with" (Slim, 2015, pp. 40–41). An ethics based in rules to be followed is generally referred to as deontological ethics (Alexander & Moore, 2016). Rule-based principles such as "do no harm" imply that to do harm would always be wrong and that it possible to without a fault identify when harm is being done. It exemplifies certainty and a permanent principle that can be unchangeably held. The deontological that is at the basis of humanitarian ethics represents this humanist modernity according to Verbeek (Verbeek, 2008, pp. 6–8). For Verbeek this is a sign of modernism as it shows this subject-object split, because a deontological ethics has its complete mode of reasoning laying with the subject, the rational being that through reasoning comes to maxims of good behaviour.

The deontological viewpoint in humanitarian ethics sees objects and subjects as clearly distinct from each other; and in doing so it ascribes agency, autonomy, and sovereignty as properties of the subject. And as we can see in the first principle of humanitarian action, that subject is the human being. And with the human as centre to the humanitarian perspective, it can be seen that humanitarianism is both humanist and modernist in its thought. And it is this centrality of the human life that leads to the one of the main points of argument in this thesis, the role played by objects as actors. I will argue in the next section that the humanist and modernist metaphysical position I have just discussed, while a widely accepted world-view, is also the reason humanitarian ethics has troubles with dealing with new and emerging technologies.

2.2.1. The introduction of other actors

The problem becomes clearer as we see how humanitarian ethics has problems the role of technology. It sees the drone as instrument that with the humanitarians using in, through application, becomes 'good'. Of course, humanitarians also discuss the risks and dangers involved in using drones, but it stays mostly limited to instrumental risks and danger. For example, the United Nations Office for Coordination of Humanitarian Affairs (UN OCHA) in their 2014 policy report 'Unmanned Aerial Vehicles in Humanitarian Response' identifies "serious practical and ethical issues" (Gilman, 2014, p. 2) with the use of drones. They specifically recommending avoiding the use of humanitarian drones in conflict settings and warning for the use of capacities offered by peacekeeping and military actors. Solutions for these issues lie in "transparency, community engagement, and guidelines for privacy and data security" (Gilman, 2014, p. 2), solutions clearly aimed at human behaviour and perception of the drone.

This focus on the drone as something separate, distinct, and instrumental is problematic as it does not take into account the full role that the drone plays in these issues. This results from a perspective on that drone that has a separation between the subject and object. Such a modernist view does not fully describe the world and the role of technologies in it. As a result humanitarian ethics becomes unable to respond to the issues that drones bring to humanitarian action.

Consider the example of a man with a gun committing acts of violence. Does it make sense to talk about the man shooting or is it more right to consider an entity like the 'gun-man'[8] shooting? As Latour explains:

> "(…) [T]he human, as we now understand, cannot be grasped and saved unless that other part of itself, the share of things, is restored to it. So long as humanism is constructed through contrast with the object (…) neither the human nor the nonhuman can be understood" (Latour, 1993, p. 136)

Here Latour points to the fact that if we see the human separately from the technologies constituting the surroundings, we will be unable to understand the human and also the technology. In case of the 'gun-man', we cannot understand what is going on unless we also consider the gun taking part in the actions that take place. It is neither the gun that is responsible to the situation, but it also cannot be said it did not contribute to the violence resulting from its use. Without the gun, after all, the resulting violence could not have been possible as easily as with the gun. To properly understand the behaviour of the shooting man, one must take the gun into account as an actor.

Similarly, we cannot consider the right- or wrongness of a humanitarian practice with drones, without considering the role of the drone. So we should indeed ask what does a drone *do* when investigating humanitarian drones. The humanitarians using drones become drone-humanitarians just as well as the drones become humanitarian-drones, it is in relation to each other that humanitarian action with drones occurs In the case of mapping drones, as we will see in the next chapter, this happens in the way drones influence the way 'reality' becomes visualised for us.

[8] This is an example originally introduced by Latour (1999) (see also Verbeek, 2005, pp. 154–155).

The drone as an actor changes the perspective on humanitarian action. If action is what makes a thing humanitarian and the drone contributes to actions as an actor, then the conclusion follows that a drone has a role as a humanitarian actor. It is not just the humanitarian mapping the aftermath of the Nepal earthquake, it is the humanitarian and the drone that map. And as such it seems everything involved with the drone could also be seen as humanitarianism, the design, the organisations behind the drone.

One of the responses to the drone question in humanitarian ethics is to ask for comparison between the drone application and the alternative solutions. For example, UN OCHA calls for more evidence "to identify the comparative advantages of using UAVs" (Gilman, 2014, p. 2). While this does indeed provide insight, if we keep the subject-object distinction in our worldview we will not go beyond the analysis of pure functionality of the drone. Whether it can make higher resolution maps than satellites or land measurers; or whether it can transport more material more quickly over distances than the standard issue white Toyota Land Cruiser. It is this artificial distinction between the subject and the object that causes the issue raised in this work, the inability of humanitarian ethics to deal with humanitarian innovation. The real question should be "what does the drone *do*?" to influence humanitarian action.

2.2.2. Multistability

However, from to the postphenomenological perspective that I am presenting in this thesis, it would be a mistake to conclude that the scripts or the shaping abilities of an artefact are "an intrinsic property of the artefact itself" (Verbeek, 2005, p. 117). The postphenomenological perspective holds that artefacts and human beings co-constitute each other, which bears with it the conclusion that there is no such thing as an artefact irrespective of the human using it (or a human seen apart from technology). This implies that technologies cannot be seen apart from their contexts in which they are used, this context-dependence is generally referred to as 'multistability' (Ihde, 1993; Verbeek, 2005, 2006).

This concept can perhaps be best described through optical illusions such as the Necker's cube or Wittgenstein's Duck-Rabbit (see below). Both pictures allow us to interpret them as multiple things; either a duck or a rabbit, or a 3-dimensional cube seen from above or below. Don Ihde makes the point that similarly to these pictures technology does not have an essence and is possible to be interpreted in many different ways, a property he refers to as "multistability". It is this multistability that shows the problems with theories such as those by Latour which depend on inscribing moral values, as multistability shows us that these inscribed artefacts can still be interpreted in multiple ways. One of Latour's example of inscribing agency in a object are speedbumps that are inscribed with safety by slowing cars down (Latour, 1999). But as multistability shows us, this interpretation is not certain; the same speedbump could also represent unsafety when interpreted as a ramp by a skateboarding child. In a similar way, the drone can be both interpreted to represent rescue as well as danger, depending on the interpretation of the people above whom its flying.

This should not, however, be misconstrued as meaning that the neutrality thesis discussed above does hold. As, according to Ihde, technologies themselves also possess a form of intentionality towards their use. Ihde brings the example of different writing materials (which Verbeek then refers to) promoting different

ways of writing, how a fountain pen promotes thinking over a certain sentence during the slow writing process whereas a word processer allows the writer to compose their texts by moving fragments around (Ihde, 1990; Verbeek, 2005, pp. 114–115).

Figure 1 Duck-Rabbit[9]

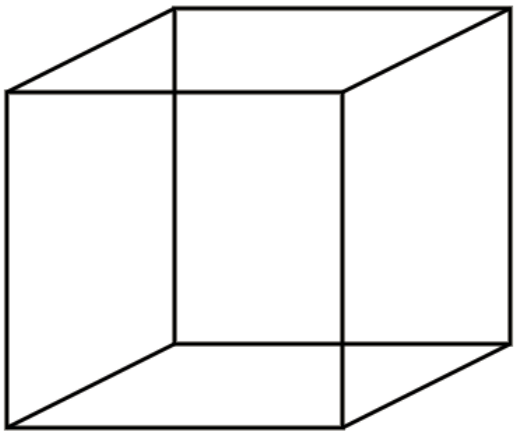

Figure 2 Necker's Cube[10]

2.3. What is a drone?

When references like #dronesforgood pass around Twitter or in conference presentations, one immediately starts to imagine all the ways in which the drone can come to the rescue. Not unlike Superman we can imagine the flying hero of our troubled times to assist in need. However, to fully appreciate the complex relation that drones bring to the table, it is import to focus on what a drone does as opposed to what a drone appears to be (Gertz, 2014). While these kinds of fantasies can be useful for those presenting the case for humanitarian drones, those in need to forward their careers as humanitarian innovators, or

[9] Retrieved from: https://en.wikipedia.org/wiki/Rabbit%E2%80%93duck_illusion#/media/File:Kaninchen_und_Ente.png (license: Public Domain)

[10] Retrieved from: https://commons.wikimedia.org/wiki/File:Necker_cube_and_impossible_cube.PNG (license: CC BY-SA 3.0)

those in need of some funding; ultimately we should be talking about what a humanitarian drone actually is, which means to talk about what a drone actually does.

A drone drones, but what does it mean *to drone* and what is *the drone* doing the droning? In investigating humanitarian drones from a postphenomenological perspective, our interpretation of what a drone is starts to change. When we start taking the drone seriously, it becomes obvious it is not 'just' the drone that we are talking about, moreover we discover there is no such thing as 'a drone' to be talking about. This is because a drone is what I will be calling a *compound technology*. Take for instance Gertz's discussion of unmanned drones for warfare purposes, here he quotes a retired US Air Force major general to say "It's about the datalink, stupid" signalling the importance of focussing on the drone as a data collection technology (Gertz, 2014, p. 107). In that entire discussion, the drone becomes the second fiddle to the datalink. Just as the Necker's cube can be seen as different kinds of cubes, similarly the drone can be seen as different kinds of technology. Where for a kid flying the drone it might be and represent their imaginary spaceship, for a pervert or intelligence officer it might represent the possibility for surveillance. Here I argue, however, that there is something more to drones than just this multistability, which is their compounded aspect[11].

When we keep talking about a drone as a self-standing technology, it becomes unclear in evaluation what it is and does. Not just because it can be differently co-constituted depending on the user and user context, but also because no drone seems the same. As such all its different applications and uses become conflated. Perhaps we are cautious for civilian or humanitarian drones, because they are so closely linked to the military drone. In framing the drone as a compound-technology it becomes clear that it is not the fact that it is 'a drone' that makes it 'do' certain things. There is a specific technological aspect, such as the datalink, that makes the drone the 'actant' worth considering. The drone is the vessel by which these technologies are embodied, it would be a distraction to focus solely on the drone itself. Whether it be a drone for mapping, surveillance, or delivery; it is not just the drone that we need to worry about but also the payload. With all these different drones and different applications, what a drone has come to represent and refer to has become unclear. As such the drone becomes a "boundary object", a loose entity that is similar and solid enough to be referred to similarly by different individuals but also difficult to analyse (see also Joerges, 1994). For the drone all different compounds can play different roles within its use context. As there is no technology-in-itself there is no drone-in-itself; there is only the drone-in-order-to as it is a technology towards a certain use context (Verbeek, 2005, p. 117). The drone becomes a carrier ; whether it be actual payloads or (e.g.) camera equipment. It is not just the multistable interpretation that can explain this, it is the different aspects of the 'drone'.

Think of modern sailing yachts. These are compound technologies in the sense that one 'yacht' will have both engine power as well as the possibility of sailing. Both these compounds of the yacht require different physical properties of design and a different skill set. There is a way in which the yacht is multistable, e.g. one can use it for leisure or transport or perhaps not for sailing at all. But there is also certain compounds

[11] It is important to note here I do not intent to make the drone into something essential and thus committing again the subject-object dichotomy, but to show how the technological emergence of a drone can be split into different parts which as such mediate us but also our relative relation to the other compounds.

within the technological artefact that are necessary for the aspects of the what makes it a yacht to come into existence.

Consider the same kinds of consumer drones being used for humanitarian mapping, holiday snapshots, and bombing missions by ISIL (Gibbons-Neff, 2017). In each collection of compounds, a new drone emerges. Through the multitude of technological features in a drone different instances of the drone emerge; its compound technologies. Therefore, it is distraction to talk about 'a drone' or 'a humanitarian drone' and it only makes sense to talk about a drone-as-something. It is the drone-as-vessel that creates the context of possibility for the drone-as-mapping. So it is not just the multistability of a drone as an artefact that shows a drone is never just *one* drone, also the drone's technical configuration can change by the compounds being included in its design. In the next chapter I will further investigate what this drone-as-compound means for our analyses of drones in humanitarian action.

2.4. Conclusion

In the introduction the question was raised "what does it mean to 'do' humanitarian action?". Humanitarian action is an action-oriented perspective on the world, with as its goal the alleviation of suffering and saving of lives. To say humanitarianism is action-oriented means that humanitarianism is something shown in actions and activities not just thoughts and prayers. That which is and isn't humanitarian used to be demarcated by clearly humanitarian organisation. However, increasingly there is a blurring of the lines in humanitarian action, inviting other actors to participate in humanitarian action.

Actors traditionally where international humanitarian organisations, whose main purpose of existence was to provide humanitarian action and do so in line with the principles of humanitarian action. Increasingly there have also been other actors getting involved in humanitarian action, the so-called non-traditional actors. This might be military, commercial parties, or volunteer groups. As these groups are not in formal ways bound to the humanitarian principles, it is difficult to assess when they are or are not humanitarian.

However, how about technology? From a postphenomenological perspective the drone can also be seen as an actor. If one looks beyond the modernistic separation of the subject and the object, it becomes clear that it is not just the subject that acts but the object also. This mean that an artefact can be an actor, the drone can be an actor. As Ihde shows with his multistability a technology is not an essential artefact but can be multistable in different human-technology relations. Also, the drone as a technology often has different *compound* technologies that show various aspects of what we see to be a drone. Both multistability and the drone-as-compound show us that a drone is not something that *is*, but rather the drone is what the drone *does*.

This will be the topic of the next chapter, where I will look into what the drones does and how it further blurs the lines in humanitarian action

3. WHAT DO DRONES DO?

When we consider the actors within humanitarian action, we cannot ignore the role of technologies. Drones such as used in Nepal change everything in their use and presence. In chapter 2 of this thesis I argued that a drone should be seen as an actor within humanitarian action. From the perspective of postphenomenology I explained how we should look at overcoming the dichotomy between the subject and the object that is so ingrained in modernist and humanist thought. As the subject and object become co-constituted in relation to each other, we talk about human-technology relations. With the drone now identified as an actor I look into what a mapping drone does, and how it might blur the distinction between traditional and non-traditional humanitarian actors.

To do this I will first explain what human-technology relations are according to Verbeek's technological mediation theory. I will then use Verbeek's framework to analyse the use of humanitarian mapping drones in Nepal. This will show what, in the case of the Nepal mapping, a drone actually does. Here I will show how the design of a drone mediates the connection of humanitarian workers with the world surrounding them. From there on out I discuss the influence of drone-derived information and in what ways drone use shapes humanitarian morality. Finally I argue that the drone blurs the boundaries between humanitarianism and non-traditional actors.

3.1. Human-Technology relations

If, as I argued in the previous chapter, technologies also have an amount of agency; the question arise of 'what a drone does'. To investigate what drones do I follow the work of Peter-Paul Verbeek. His technological mediation theory is based in the works of Don Ihde and Bruno Latour. Mediation theory deals with the subject-object dichotomy I have introduced in chapter 2 by focussing on the phenomenological relationship through which the subject and object become constituted (Verbeek, 2005). So instead of looking at the different ontological entities of subject and object Verbeek looks at the phenomena of experience that emerges from the relation between the two. This means that is only in relation to each other that the object and the subject become the phenomena that we experience. Take for example a river; it could be, a source of water, a playground for water games, or an obstacle between us and the other side. It is in co-relation to the river and me that we both become (e.g.) the annoyed traveller and the obstacle in the way of progress. This is the idea of co-constitution at the basis of phenomenology. And a bridge over that river, as a technology, 'mediates' that co-relation. That bridge changes how that co-constitution takes place, it *mediates* the relation between subject and object, towards a traveller and obstacle that can easily be overcome.

Verbeek and Ihde argue that this relationality becomes effected by technologies. Coming from Heidegger the phenomena of the tool, such as a hammer, can completely disappear as we use it in relation to our wider world; the hammer becomes "readiness-to-hand" (Heidegger, 1967; Wheeler, 2017). The postphenomenological perspective holds that artefacts and human beings co-constitute each other, which bears with it the conclusion that there is no such thing as an artefact irrespective of the human using it (or a human seen apart from technology).

The account presented by Verbeek, called technological mediation theory, builds on Don Ihde's postphenomenology and consists of several Human-Technology-World relations (represented as I-technology-world). Through the work of Ihde we can see how technologies transform our perception through mediating our relationship with the world. On the other hand, he includes the works of Akrich, Latour and Borgman to show how technology also mediates our actions or existence in the world. Transformation refers to Ihde's hermeneutic view on mediation, which discusses in what way artefacts shape the human experience and interpretation of the world. This mediation of perception happens by transforming how the world appears to us through amplifying or reducing certain aspects of experience. A telescope, for example, amplifies something far away to appear close by, but at the same time reduces our immediate surroundings as not being included in our perception. This transforming capacity Ihde calls "technological intentionality" (Verbeek, 2006, p. 365). Ihde identifies these transformations to be of low or high contrast depending on the intensity of the mediation. As such sunglasses are low contrast as they merely tint the perception of the world. As opposed to thermal imaging being high contrast as the latter severely transforms our experience of the world by giving a radically different interpretation. That transformation of perception occurs in humanitarian mapping drones seems clear as in their mapping deployments these drones amplify and reduce aspects of the world in ways that are different than our ground level perceptions. This is not just limited to the 'eye in the sky' perspective but also the technological video compounds of the drone itself transform perception also.

In addition to this hermeneutic aspect of human-technology relations, Verbeek also identifies the existential aspect of technology. That is to say "[h]ow humans appear in their world" (Verbeek, 2005, p. 196). This brings the works of Bruno Latour, Madeleine Akrich and Albert Borgmann into the considerations of artefacts and their mediation of human-world relations. Latour plays a central role with his Actor Network Theory (ANT) informing the existential aspect of Verbeek's mediation theory. Latour holds that artefacts can shape our action in the world as they are 'actants' that can do something, both the human and non-human are symmetrical in their This can be very obvious such as the fence keeping people out, or more subtle such as less obviously present escalators making it more likely for people to take the stairs. This is represented in how scripts invite or inhibit certain behaviours, Latour calls this effect of invitation and inhibition 'translation' which as such becomes a counterpart to Ihde's transformation in Verbeek's work.

Verbeek then formulates a framework based on these two aspects where a technology mediates the relation a human has with the world through transforming the perception of the world and translating their actions in the world. In the context of a humanitarian drone that would be the transformation of perception through (e.g.) a view from above and the translation of action by way of being able to reach unreachable areas with precious cargo. But these mediating abilities are not merely related to the earthly things of experiences and practices. It is through this transformation and translation that mediation theory shows a distinct ethical world view that differs quite a bit to the more principled modernist humanitarian ethics. As instead of rights and principles being violated, they are transformed and translated; some are strengthened,

and some are weakened. To put it in the language used by Martin Heidegger (1977b) technology is revealing and concealing.

Following Ihde's work, Verbeek identifies four main types of human-technology relations which show how the world gets shaped through technologies. Here I will discuss each of these relationships in the context of humanitarian drone use.

1. Embodiment relations: (I-technology) → world

Embodiment relations are those in which the technology nearly disappears in our action and perception in the world. The classic example here is how glasses mediate our perception while we are not consciously aware of them (or might even be looking for the glasses whilest wearing them). This can also be found in the engaging relation of a drone pilot, when controlling the drone through a visual interface, steering it as if (s)he would be in the drone itself (Gertz, 2014). In essence this relation is very personal and in the application of drones for humanitarian action this relation will mostly show its influence on the drone pilots. This relation becomes less relevant in more automated drone systems that do not have a pilot flying the drone as if it is an 'eye in the sky'.

2. Hermeneutic relations: I → (technology-world)

In hermeneutic relations, the technology forms a representation of the world which is then interpreted by the human being. Consider how a thermometer does not give us a sense of temperature, but instead a number which we interpret to mean something. As Ihde himself puts it, "through hermeneutic relations we can, as it were, *read* ourselves into any possible situation without being there." (ihde, phenomenology of technics 2003 p 519). A hermeneutic relationship implies that there is a need for to engage with the technology in a way that is similar to reading, the technology needs to be interpreted. This relationship can highlight some of the interesting aspects of using drones for humanitarian action. The hermeneutic relationship describes the world through the interface of technology. An example can be found in drones with thermal imaging. Hermeneutic relations are often of high contrast and require interpretation. While thermal imagery at first seems like an embodiment relationship, its use in search and rescue implies a hermeneutic relationship as it requires the interpretation of the visual images to be able to identify whether a heat pattern might be a human in need of help or another heat-artefact in the imagery. As participants in a simulation put it "[t]he hotspot was not super clear and it was not easy to evaluate the situation using the thermal view" and "[p]articipants stressed that this difficulty would be greater for someone not trained in or accustomed to viewing thermal imagery" (FSD, 2016a, p. 5).

3. Alterity relations I → world (-technology)

Whenever a technology seems to be part of the world itself in a way that it no longer mediates my experience of the word but becomes the object of my experience, then we are talking about an alterity relationship. This is the kind of relationship we have when interacting with an ATM, but also the kind of relationship we traditionally would associate with robotics. Here the drone becomes seen as a quasi-other.

Examples here can be found in the use of robots in military service, where servicemen are shown to bond with 'their' machines (Garber, 2013).

4. Background relations I → technology (-world)

When technologies no longer play a central role in the relations between humans and the world, Verbeek refers to them as background relations. This can be the central heating system heating your house, or the fridge keeping your food fresh. These technologies are seldom noticed but always present and they shape our actions and perceptions by creating the circumstances for those actions and perceptions to be present. The moment the power grid fails is the same moment we become aware of its role in our lives (or once a month as we pay the power bill). Drones as a background relation are still a less central consideration due to their lack of ubiquity, but more writ large deployments will quickly have drones taking this role. One of the main ambitions of drone developers is the provision of a logistical infrastructure for deliveries in developing nations. When this becomes an established system, it will mirror the background relation the global centre has to cargo ships, cargo airplanes, and delivery trucks. If sufficiently established, such a system could be characterised as a background relation. As of the current state of drones in humanitarian action, this is not yet the case.

To summarise, drones can be understood to mediate the relationship between the humanitarian worker and his/her humanitarian action. In relation to the human it can influence actions, perceptions, and conceptions of what is right and wrong. As such, drones are technologies that severely impact humanitarian action in their use. Thus, I argue that in order to assess the use of drone in humanitarian action, it is crucial to understand what the drone does in humanitarian action.

3.2. What *does* the drone do?

For a humanitarian worker to use drones or drone-derived materials mediates their humanitarian practice. Humanitarians can use drones in multiple ways, be it directly as operator or as user of the derived information or infrastructure. All of this, influences and is influenced by the human-drone relation. In mediation Verbeek refers to this as transformation and translation by technologies. As I presented in the previous chapter, the drone should be seen as a *compound* technology. Whenever one speaks of a drone there is a reference to a commonly understood 'boundary term' that describes the drone, but when we try to investigate the drone we should not get distracted by this reference. The drone in mediating the human-world relationship is not specifically a 'drone' but a vessel for the used technology. Moreover, in the attempt to discover what a drone does, it is equally important to consider the I that makes the I-technology-world relation. Accordingly, in this section I will first discuss what the drone does with, to, and through the humanitarian workers using it. After which I will turn the relationship around and investigate what the drone does for those it is supposed to help.

3.2.1. The hybrid drone

When talk about a hybrid approach towards drones in humanitarian action, what kind of hybrid do I mean? As mediation theory suggest it is the object and subject that co-emerge from their relation, in which case it becomes adamant to investigate how that relationship comes into being and what kind of drone it brings forth. To see what a drone does is to see and understand the mediations that occur in its use. Verbeek sees three components as those constituting the mediation; the user, the designer, and the technology (Verbeek, 2006, p. 372). The user interprets and appropriates, the designer in their design has attempted delegate certain tasks or embed certain scripts, and the technology has its emergence effect through the fact of its existence. If we look at this more closely in the context of a humanitarian drone it results in different lenses through which to analyse the drone.

While it is important to keep in mind that technologies are multistable and eventually the phenomenological subject and object only can become constituted in relation to each other, that does not mean a mediation does not come from something. Verbeek identifies three source aspects of mediation, the user, the designer and the technology itself. The technology itself brings aspects to the table of course, as it is hard to design a flying drone without flight-technologies. As such a designer also has an influence, in the design context fall the aspects of a design of which it is thought that in interaction with the user certain behaviour (or in our words, mediations) occur. Then there is the context of use, where the user interprets and appropriates the artefact and in relation to which the mediation occurs. It is also in this use context that multistability can completely negate the designer's intent. As such the phenomenon of the drone emerges out of the technology and the design (that might be a selection of different compounds) as well as the context of use and the context of design; the combination of all of which results in a multistable human-technology relation.

Figure 3: Setup for the Nepal drone deployment (Pix4D Marketing, 2015)

3.2.2. Case analysis: mapping drone use in Nepal

I introduced the topic of humanitarian drones with the deployment of drones in the aftermath of the 2015 Nepal earthquake. This has become one of the more well-known humanitarian UAV deployments. At the time the UAViators network headed by Patrick Meier worked in collaboration with Kathmandu University, drone manufacturer DJI, and mapping software company Pix4D in obtaining high-resolution and up-to-date imagery of the disaster stricken areas. Pix4D has published a short document explaining how this process works, in addition the FSD has published a case-study evaluating its success (FSD, 2016b; Pix4D Marketing, 2015). While a lot can be learned from this case with regards to humanitarian management, I will focus on the mediations occurring in the flight and data processing. The set-up of this drone

deployment consisted of (see figure 4) a DJI 3 Advanced small quadcopter drone, a remote control, a smartphone with application controlling the drones, and the Pix4D mapping software on a computer for post-flight rendering of the needed maps.

The deployment follows several steps in order to make orthomosaic maps and other derived maps or 3D models. Orthomosaic maps consists of different images digitally stitched together, which produce an aerial image that is geometrically correct (Soesilo et al., 2016, p. 25). In this case the deployment is largely set-up within a smartphone application called the "Pix4Dmapper Capture App", in which the user chooses the kind of mission that is to be flown and selects the grid area which needs to be mapped. As soon as the drone is then turned on, the mission can be launched. The system does an automated lift-off and flight, during which it is "very important to keep eye contact with the drone at all time, so it can be quickly brought back in case of an emergency" (Pix4D Marketing, 2015, p. 6). During the flight the drone follows a pre-determined path and takes photographs on a specified interval. After having followed the flight path the drone then returns to within 2 meters of the departure point where in this case it was necessary to take over control of the landing due to the narrow landing space.

After the flight the drone would either be stored or moved to another location for the next flight. Before leaving the take-off location the operators used the online Capture Cloud service to check whether the map was complete. The flight data could then at any moment be transferred to the Pix4Dmapper Pro software package which processes the images. The end results in this case were a 3D point cloud, a corresponding 3d model, and a 2d orthomosaic map. These drone-derived maps are the functional reason these missions are deployed, as these can now be used for a high variety of humanitarian activities (such as planning relief efforts).

As I have explained in the previous section, mediation theory holds that both technologies and humans are always to be understood in human-technology relations. So, what happens in these deployments and how do the different compounds of the drone play their role here? For this we can look at how in this case these human-technology relations show up. For this we come back to the mediating relations of Verbeek that I described earlier in this chapter.

If we take the work of Gertz (2014), we can see that drones can often take a form of an *embodiment* relationship where the operator feels "*as if he was the drone*" (Gertz, 2014, p. 107). However, looking at this drone deployment this does not seem to happen. The difference between the kind of military-grade drone discussed by Gertz (and Sandvik and Lohne) and the commercial drones shows in their mediations and operations as well. As the operator here rarely has full control nor visuals of the drone, the amount of embodiment is reduced. The points of interaction with the drone mainly keep to those where the drone is external to the operator. Commands are given, after which the drone 'autonomously' takes-off and executes its rounds. During this machine-like interaction, the world gets largely pushed to the background and the app and the drone become the pinnacle of attention. Here the operator-drone interaction shows a certain amount of *alterity* relation (Verbeek, 2015). The drone, as present-to-hand, is prepared for its flight at first. To initiate the mapping, the operator relates mainly to the Pix4Dmapper Capture App in interactional

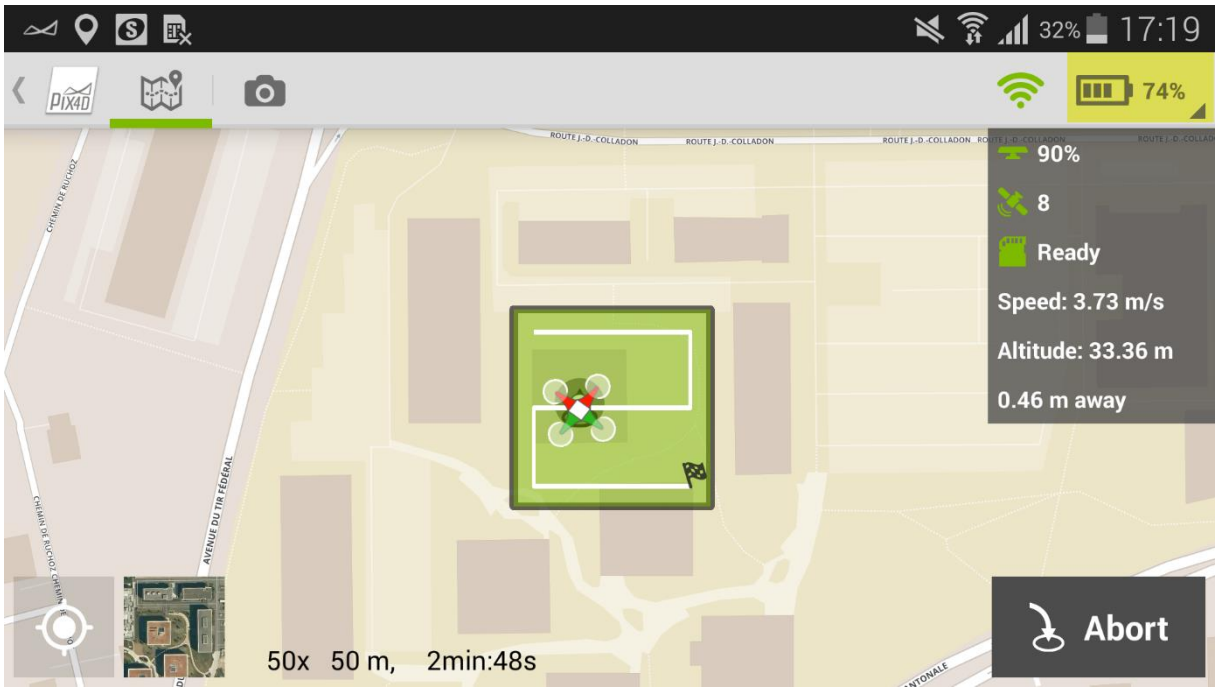

Figure 4 The Pix4Dmapper Capture App interface on an Android phone

manner. And after take-off it is important to keep an eye on the drone, for if it may go afoul. The drone here might even 'object' as one attempts to take off in a DJI registered no-fly zone[12].

At the same time, the Capture app also represents already a hermeneutic relation to the area of mapping. It includes both a representation of the geographical location that is being mapped as well as a representation of what the drone at that particular moment is doing. It shows exactly the split of the drone as compound technology by mediating the operator's relation to the world both through the drone-as-vessel as well as the drone-as-eye-in-the-sky. As can be seen in Figure , the application shows a simplified map of the area where the drone is positioned and even has the possibility to switch to a satellite view (see bottom left). Especially in areas where mapping by drones is necessary these simplified identifications are likely to be unrepresentative for the experience on the ground as building might have collapsed or roads shifted. The presentation by the app of the mappable area also represents what is possible. One of the issues run into during this deployment was the limited range and flight-time of these drones. The drones used in this case study are capable of up to 20 minutes flight time and in this particular deployment radiofrequency interference reduced flight-time further to an average of 5-minute flights (Pix4D Marketing, 2015). This made it necessary for the operators to frequently move from launch position in order to be able to map the whole area. Due to the technical limitations of the 'transport compound' of the drone, the context of the mapping practice is influenced in a subtle manner. Their presence and (limited) abilities shape the mapping practice in way that in mediation theory is the *background* relation earlier described. It is the drone-as-vessel that influences and shapes the context in which mapping can take place.

[12] See the advisory DJI Geo map with no fly zones: https://www.dji.com/flysafe/geo-map

In analysing a case through mediation theory, as I have just done, it becomes clear that the practice of mapping is influenced in several ways by the technology that is being used. So far the focus has been on the direct process of mapping, and from this case can be concluded that in this particular case the role of the drone-as-eye-in-the-sky has been less present than the drone-as-vessel. However, if we start to further investigate the goal of this drone deployment and see what it does for and in humanitarian action; then we come to conclude that the eye-in-the-sky does play a major role in the production of these drone-derived maps.

3.2.3. The humanitarian information gathering and mapping

In these mapping practices such as I just described, drones are used to gain a new perspective from above. They help with the gathering of data for humanitarian workers to base their actions upon. It is an attempt at creating maps, getting overviews in case of disaster, or obtaining information that is not accessible without their use. These activities are commonly done either by boots-on-the-ground humanitarian workers questioning the local communities and doing land surveys or, as seen more recently, with satellite imagery (Meier, 2015). As has been the topic of discussion of this thesis, drones are now increasingly used for information gathering purposes, as such drones also shape the work field of humanitarian work. In the

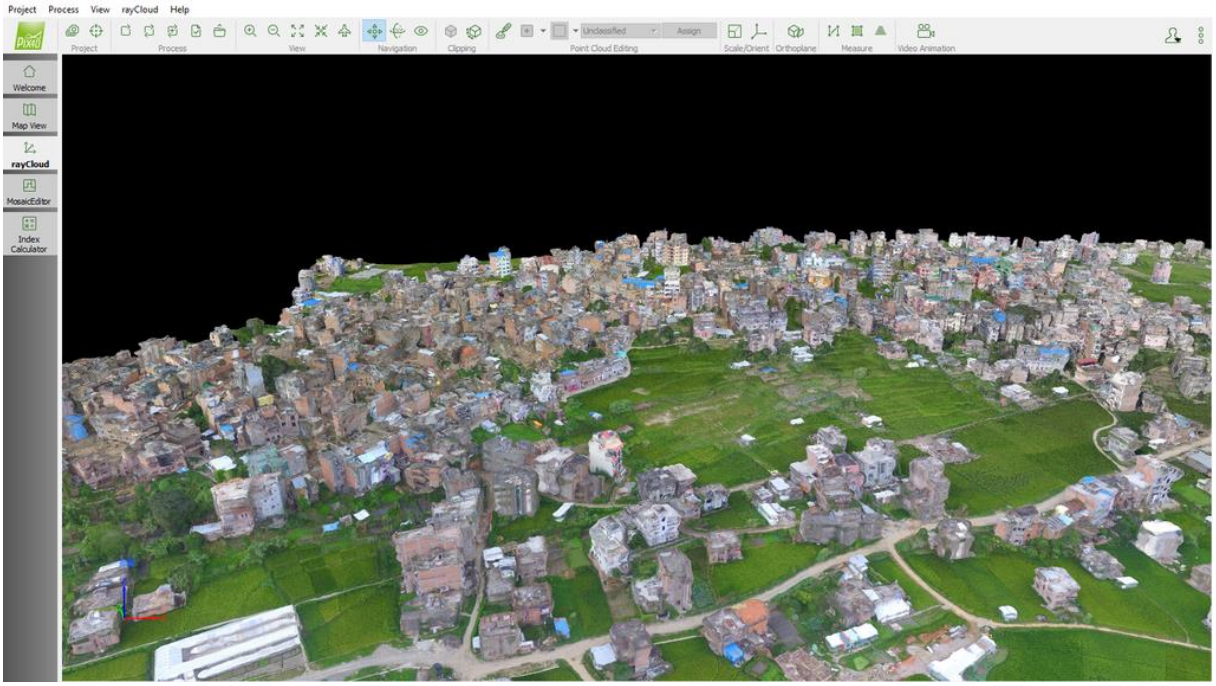

Figure 5 3D map of Nepalese city constructed by Pix4Dmapper Pro

words of Sandvik and Lohne: "generating knowledge about suffering is in itself humanitarian action"(Sandvik & Lohne, 2014, p. 10). Information that is gathered informs humanitarian action by showing, for example, that there is the need for humanitarian action. Knowledge guides action.

In case of mapping drones, that information presents itself mainly as a drone-derived artefact, the map. The map that results from these drone practices, in its influencing capabilities is also not neutral. Historically maps have never been neutral and have reflected social and political power (Foucault, 1980; Wood & Fels,

1993). Especially in the history of colonialism, maps have been a driver and a tool through which to exert and document control. And just like the drone discussed so far, the map mediates human-world relations. The physical and digital properties of the technologies used in a drone and the mapping process will result in the 'real world' being transformed into an approximation of data. This data is then presented to the user in the form of a 2D or 3D map (see Figure). Problems occur because this data is incomplete or misrepresents reality or when it is wrongly interpreted. And postphenomenology has taught us those are two sides of the same coin, e.g. incomplete data becomes problematic when it is misinterpreted to be complete. When a drone is used to do population surveys, for example, it can happen that the resulting survey is not complete. This leads to a collection of 'unseen' individuals within humanitarian action. Van Wynsberghe and Comes argue that these 'unseen' are also often the vulnerable part of the population that is forced to stay indoors; who are then missed in the canvassing of an area by a humanitarian drone (van Wynsberghe & Comes, n.d.).

This issue is, however, not unique to the drone, but is an integral part of the mapping compound of the drone. The under or overfitting of data and inaccuracies resulting from incomplete datasets are a problem that occurs in data-collection practices, with or without drone. To see how this would work in practice, consider the mapping of developing countries. As cartographer Cyrus Sinai explains in the context of the 2018 Ebola outbreaks in the DRC: "Let's say you have a village with 500 kids, and your estimate is that there are 100 … Someone could go and say: I vaccinated 100 people so I got 100 percent of them—and they didn't. Alternatively, if you think there are 400 kids and there are actually just 200, half your doses are wasted, and the records will say that coverage is at just 50 percent." (Yong 2018). It is both in the dataset and the interpretation of the dataset that these problematic situations emerge. In a way this is also the result of maps being multistable, they are being interpreted by the user.

These kinds of amplifications of errors and biases through drone mediated perception can have severe consequences as can be seen in humanitarian aids issues with the allocation of help. In order to decide where help is going to be send humanitarians uphold what they call a form of needs-based objectivity, in which "[h]umanitarian response is prioritized in proportion to people's needs, not identities" (Slim, 2015, p. 57). This is result of the humanitarian principles of impartiality and neutrality and holds that they try to let their assessment of need guide the deployment of humanitarian resources. As such misinterpretation of data can have severe consequences.

In line with this worry Raymond argues that epistemology is the biggest challenge of the humanitarian drone, how the information gathered, interpreted and assessed is where the issues arise (Raymond, 2017). In discussion of humanitarian drones as a method of remote sensing he identifies the issue that "we don't know how to translate our analogue ground based human metrics of need assessment in to what are fundamentally remote forensic indicators or metrics that don't exist" (Raymond, 2017 at 5:17). Raymond warns humanitarian agencies are not yet prepared to deal with this 'data deluge', the data can be overwhelming and difficult to process because humanitarian agencies do not know how to prioritize the information. So there is an issue both with dealing with the amount of data as well as interpreting the data itself.

The context of use as such is of upmost important in the consideration of mapping drones, as it is the existing context (the ground based metrics) that operators are used to and trained in that will frame their interpretation of drone-derived maps. Think of Wittgenstein's rabbit-duck picture, for someone who has never seen a rabbit that picture will always look like a duck. The interpretation of the drone is completely dependent on the context surrounding it. As Rosenberg puts it in relation to mediation through images "[p]eople develop habitual bodily-perceptual relationships with the images they use" (Rosenberger, 2013, p. 88). It is not just the drone and the map that mediates, the map is also multistable for interpretation by the user. That multistability can also be seen in other mapping technologies. As Patrick Meier tells in the discussion of satellite imagery: "there is absolutely nothing inherently intuitive about satellite images. Most people on this planet have not been on an airplane or a tall building. So why would a bird's eye view of their village be anything remotely recognizable?" (Meier, 2011). There is a certain amount of experience necessary to be able to interpret a hermeneutic relationship. It is how we are used to deal with images that influences how we will deal with new images presented to us. Images are co-constituted in a phenomenological sense by the habits, experiences and context of the viewer.

This multistable interpretation of the drone derived knowledge, whether it be maps or images, gives rise to one of the biggest dangers; the modernistic illusion of truth. Like a thermometer will seldomly be doubted when it shows a certain temperature, the images coming from a drone can also be too highly valued even though, as just discussed, the interpretation of that information is far from objective. The danger of the subject-object dichotomy comes in the form of objectivity. And that the notion of objectivity is present in humanitarianism, can be seen in the humanitarian concept of needs-based objectivity that humanitarian strive for. This needs-based objectivity "depends on evidence about needs" (Slim, 2015, p. 58) and it is the identification of need that is most important in remote sensing applications of humanitarian drones (Raymond, 2017). The perception of an objective world is the problem as our perception of 'reality' is mediated but "we perceive perception not as mediated and subjectively manipulated, but *as if* it were immediate and objectively true." (Gertz, 2014, p. 99). The drone mediated sense of objectivity, becomes the truth for us.

3.3. The drone reshaping humanitarianism

Humanitarian practices are deeply affected by the rise of the drone. It can change knowledge gathering practices, influences the ways in which we reach out, and the drone can bring all kinds of symbolic representations. It is these aspects of humanitarian drone use that lead to the further blurring of the boundary of humanitarian action. From a postphenomenological perspective, the drone does not only mediate the actions and perceptions of the humans it relates to, but it will also mediate the morality of their humanitarian practice. As Verbeek points out with his increasingly well-known example of how obstetric ultrasound, which has influenced our perception and knowledge of foetuses, has resulted in an increasing in abortions of children with severe and less severe birth defects (Verbeek, 2011, p. 27). The newly provided technology has severely shaped the consideration of what one could and should do. What is seen to be moral is mediated by technology and technological possibility.

In overcoming the subject-object dichotomy we start to see how humans and their value systems are not distinctly separate from the technologies they use in different practices. As such, from a mediation perspective, we talk not about violation of rights and principles but a reshaping. While at first this sounds worrisome, it is important to realise that this has always been the case with technology. Consider how modern technologies such as airplanes, radio and television, and the internet have led the shrinking of the earth to what we now refer to as a global society. All these technologies have led to a reduction of distances between human beings all around the world. And as such also shape the amount to which we now consider the world our responsibility, with humanitarian aid missions spanning the globe transforming from local practices to global interventions. Our value system transformed to include not only those suffering in our direct surroundings, but now also the global community of our peers. In a similar line of thought it is not farfetched that our value-system will be further transformed to start including other living entities as scientific consensus starts to grow that animals have similar experiences of suffering as we humans do.

Another way in which these drones can shape the humanitarian morality and practice is through their presence influencing behaviour. Perhaps one can imagine how the mere presence of a drone technology can cause a kind of technological overkill, where the presence and ease of use of a technology leads to its over-deployment for activities and cases where it might not have its merit. An analysis of the impact of the presence of a technology is done by Asle Kiran (2012) who builds on Ihde's and Verbeek's account. As we can see through analyses of the drone as technological presence, it is the potential uses that also shape the humanitarian practice. Kiran discusses how the actualities and potentialities of technologies, in technical mediation, shape our experiences of ourselves and through this constitute our subjectivity or self-understanding. The essence of Kiran's argument is that the self does not solely consist of "what it sees itself as being 'right here, right now'", a significant factor of subject constitution comes from the way in which the self sees its own possibilities (Kiran, 2012, p. 89). Don Ihde and Peter-Paul Verbeek's frameworks discuss the actuality of technologies, the mediation in-use, to which Kiran who wants to add the technological presence, the mediation by potential use, as the lens through which to investigate (Kiran, 2012, p. 78). Technology both harbours actuality and potentiality, it shows its mediation influences in action and in possible action. A technological artefact shows technological potentiality in what Kiran calls "virtual actions", the possible roles a technology can take in technological mediation (2012, p. 78). The pen here lying next to me on my notebook, is virtual writing. That is, I have the possibility to pick it up and write something down, which becomes actualised writing. At the same time the same pen also is a virtual back-scratcher, which becomes actualised when I actually use it to scratch my back. Technologies present us with many different virtual actions, most of which are outside of the actions a technology initially was designed to do. This, according to Kiran, is why we need to look beyond actuality and take into account potentiality; the impact of technology lies not only in what it is used for, but in what it is possibly used for. That focus on possible use is also one way the drone reshapes humanitarian action. Both in the positive sense, with the examples of possibilities as portrayed by Chow (2012). Or more negatively by the possibility that a drone has for the virtual action of spying.

3.3.1. Blurring the boundaries between humanitarianism, commercialism, and militarism

As the humanitarian community is struggling with the "blurring lines" (Krahenbuhl, 2011) between humanitarian action and its relation to military actors, the mediating effects of the drone in humanitarian action can blur these lines even further. Sandvik and Lohne already position the drones as a "war dividend" transferring from military to humanitarian purposes as a result from the excessive spending on the war of terror (Sandvik & Lohne, 2014). The tension between humanitarianism, commercialism and militarism from a humanitarian perspective is quite clear. To have alliances with a military actor would threaten the humanitarian principles of independence and neutrality directly and those of humanity and impartiality in-directly. Similarly, commercial partners can use the drone as a marketing method or even test out their new technologies while seeming socially responsible. However, drones are usually associated with these non-traditional humanitarian actors. It is not the humanitarian organisations themselves developing the drones, often commercial parties are involved in the different flight tests done with humanitarian drones.

Take the instance where Matternet, a drone company originally specialized in humanitarian drones (Raptopoulos, 2012; Schwartz, 2011). Matternet collaborated with MSF in a pilot to test the feasibility of delivering medical supplies in Papua New Guinea with reasonably successful results (Meier & Soesilo, 2016). However, the project never really got further than these tests. By now Matternet has started the deployment of their drone deliveries in Switzerland (Kolodny, 2017) and does collaborations with Mercedes Benz and Siroop for e-commerce deliveries (Venter, 2017). It has stepped beyond its humanitarian aims and pursuit its commercial possibilities after a try-out in disaster-stricken areas. In such a manner humanitarian action can be used as a test ground in advance for future deployment of the technology in the global core. The company, originally created and marketed towards a humanitarian impact seems to have drastically changed course. As dual-use seems to imply dual-income, "limiting dual-use is therefore not in the natural interest of the developers" (van Wynsberghe & Nagenborg, 2016).

Industry seems to recognise the potential of the humanitarian drone as the drone industry's lobbying group (UAVS) recommends that "drones deployed in Britain should be shown to "benefit mankind in general", be decorated with humanitarian-related advertisements, and be painted bright colours to distance them from those used in warzones"(Sandvik & Lohne, 2014, p. 7). That the deployment of their drones in humanitarian action is valuable for private companies, shows in the fact that drone services are often provided for free of charge (Soesilo et al., 2016). As the push for humanitarian drones seems to be in part driven by the industry's need for legitimacy and moral economy, there lies a risk of the humanitarian sector becoming a "co-constructor of the UAV industry's moral-economy narrative" with all effects that follow from that (Sandvik & Lohne, 2014, p. 7). Because it is so unclear whether non-traditional actors are humanitarian the "humanitarian drone narrative" helps. It gets them associated with humanitarianism.

The blurring of those boundaries can originate from the hermeneutical relationships with the drone, when they are not identified as mediations but as objectivity. An example of this would be the 'surgical strike' narrative in armed military drone, a modernistic view of the drone where the drone shows the world

detailed and clear and the strike is done methodologically. In hermeneutically mediation the human-world relation, drones can change perceptions of what is going on on the ground in quite a transformative manner. Especially because hermeneutical relations require interpretation, there is the risk that the different users do not see how their interpretation of that hermeneutical relation is not the only interpretation. As such mapping drones play into the hand of a near modernistic narrative where they give the illusion of showing something 'objective' of the world, and as such strengthening the 'subjective' aspect of the human-technology relation, that is the interpretation you have given to the relation. An interpretation which is heavily dependent on the use context and your habits.

As such the hermeneutic relation of the drone can blur the distinctions between the different actors, because they can all seem to be doing humanitarian action to themselves all the while they are further propagating their own convictions. With the increase of knowledge and perceived certainty, the attitude towards humanitarian action changes. In that way every opportunity to improve humanitarian action is often seen as a moral imperative, to avoid that "many who could be helped or saved by humanitarian drones will instead perish or languish in poverty" (Chow, 2012, p. 2). To see is to know, to know is to act, and to act is to be humanitarian. And because the drone is such an accessible and easy to use technology, this also leads to a lot of people able to see, to know, and to act. Thus, to be 'humanitarian'. For people that have no training or experience within humanitarian action this can lower the bar to get involved.

3.4. Conclusion

In chapter 2 the topic of humanitarian drones as actors was introduced. In this chapter I used the mediation theory framework by Verbeek to analyse the humanitarian drone. By looking at technologies as mediating the relation between the human subject and the world, it became possible to notice how a technology has a certain agency in influencing that human-world relation. In the words of postphenomenology, the subject and object become co-constituted in relation to each other. Technologies mediate these relations by transforming our perceptions of the world and translating our actions in the world. Four human-technology relations show how technologies mediate our relations to the world; embodiment, hermeneutic, alterity, and background radiations.

I discussed the deployment of DJI mapping drones in Nepal through this lens of mediations. The drone mediates the relation between the humanitarian and the humanitarians surroundings both as the drone-as-vessel as well as the drone-as-eye-in-the-sky that documents the mapping deployment. The drone translates the behaviour of its operators, for example through its flight time and range. It also transforms the perception of the area, not only by its from above perspective but by what it does and does not see. Maps are, just as drones, not neutral and possess a political power in shaping the geographical surroundings. The knowledge which the drone and the maps seem to give is not certain or 'objective' but can sometimes be interpreted to be so. The interpretation of these maps or the situation on the ground then can seem objective, but it is still fundamentally mediated through the drone but also by ourselves; this illusion of a certain truthful image then can become very dangerous.

Through all this, the use of humanitarian drones can reshape humanitarian morality by influencing the conception of human value and the distance towards humanitarian assistance. And through the knowledge producing aspects of the drone and its presence can lead to an overactive humanitarian attitude of interventionism. Which in turn again can lead to the blurring of boundaries between humanitarianism and commercialism and militarism.

4. CONCLUSION

In 2015 Patrick Meier and his organisation UAViators flew in Nepal, this deployment has been investigated in this thesis through mediation theory. In humanitarian action the possibilities of the drone have not been ignored, and increasingly international humanitarian organisations are investigating the use of drones for all aspects of their humanitarian work. Following the humanitarian drone narrative, it becomes attractive to see the drone as a neutral tool that is used by good people (humanitarians) in a good practice (humanitarianism). However, this is not without issues. Technologies aren't neutral objects in the hand of human subjects.

In this thesis I set out to investigate that influence by the mapping drone. The main research question was *"How do mapping drones reshape humanitarian practices and perception and as such blur the distinctions between humanitarianism, commercialism, and militarism?"*.

What does it mean to 'do' humanitarian action? Humanitarian action is an action-oriented perspective on the world, with as its goal the alleviation of suffering and saving of lives. To say humanitarianism is action-oriented means that humanitarianism is something shown in actions and activities. Humanitarianism has a principle guided approach towards ethics focussed in the four main humanitarian principles (ICRC, 2015). In that perspective to 'do' humanitarian action means to follow these principles in actions aimed at the saving of lives of human beings.

What makes a drone a humanitarian actor? The drones used to map our world our deeply influencing our relation with the world. That makes them value-laden and political. As I have argued in chapter 2, we can start to see the vast manners in which drones become actors in humanitarian action if we take a perspective other than making a strict division between subject and object. In this thesis I propose the use of postphenomenology as a way to look beyond the subject-object dichotomy and investigate the role of the drone. Humanitarian ethics itself seems mostly to hold on to the subject-object dichotomy. In doing this it becomes difficult to investigate in what ways a drone really influences humanitarian action.

The modernist metaphysics that is upheld by humanitarian perspectives on technology are deeply problematic. The distinction between objects and subjects is an unproductive view that either pushes the drone aside as irrelevant or completely gives in to its shaping abilities. As Ihde shows with his multistability a technology is not an essential artefact but can be multistable in different human-technology relations. A drone is not an essential artefact but emerges from intricate human-technology relations. Moreover, what we have come to refer to as 'a drone' is actually a collection of technologies, some of which interchangeable in functionality. This makes the drone a *compound technology*, that is a technology that has distinct features which can be separately analysed and have a sort of mediating effect on one another. In order to be able to understand the drone, one needs to understand what the drone does in bringing the world into being for the humans involved.

What does a mapping drone do? In my analyses of the 2015 deployment of a mapping drone in Nepal I showed how humanitarian-drone relations emerge in the use of drones in humanitarian action. It specifically highlighted how the drone can be seen as (in this case) two separate compounds that mediate the world and

each other in different ways. For instance the drone-as-vessel, by its technical limitations of 5-20 minutes flight time, mediates the connection the operator has to the local surroundings as they are forced to keep moving around to different take-off and landing spots to be able to map a significant part of the area.

More interestingly, mediation analysis showed how the drone itself might be a distraction from the drone-derived map it produces. Even though the drone is indeed present in the air during deployment, a majority of the humanitarian-drone relations occur more passively, with humanitarians using drone produced end results. So, there can be made a division in drone deployment between those directly mediating the relation between humans and the world (cargo drones, search and rescue) as opposed to those that do so indirectly by way of a constructed end product (mapping). It is the maps and information gathered by the drone that significantly influence humanitarian practice through their information. As Sandvik and Lohne put it "generating knowledge about suffering is in itself humanitarian action" (Sandvik & Lohne, 2014, p. 10). This shows once more how a sophisticated technology that is entering a new contextual space, can have an immense impact on all those involved. In order to be able to understand these maps requires a specific contextual knowledge or practice. In that sense the whole aspect of multistability emphasizes the need for training and practice to develop the habitual context that will co-constitute these kinds of technologies in a certain way (Rosenberger, 2013).

How do mapping drones blur distinction between different (humanitarian) actors? The distinctions between different humanitarian actors are already blurring (Krahenbuhl, 2011; Slim, 2015), but the humanitarian drone making these distinctions even more unclear. The drone itself, brings (new) non-traditional actors to the table. The military background as well as the commercial parties that develop them and sell them as a product or as a service. The hermeneutic relationship that the drone fosters also provides a certain perspective through which the blurring of different actors can become more pervasive. Because a hermeneutical relationship requires interpretation it brings with it the danger of 'misinterpretation', that is interpretation without realising that the experience is and interpretation and thus seeing it as an objective truth. This allow different actors to further harden in their view of their actions being indeed humanitarian.

So, *how do mapping drones reshape humanitarian practices and perception and as such blur the distinctions between humanitarianism, commercialism, and militarism?* It can be concluded that mapping drones do reshape humanitarianism. The drone changes humanitarian knowledge practices, which form the basis for humanitarian decision-making and humanitarian action. In addition, because of the large amount of actors directly and indirectly involved in drones it increases the blurring between these actors and also gives the possibility of getting legitimization of the use of these humanitarian drones to make an organisation or companies be 'humanitarian'.

4.1. Recommendations for further research

This short investigation into the humanitarian drone has been limited in its depth, extend, and applicability to humanitarian drones. However, several recommendations can be taken from the work done. For further academic study this thesis has highlighted an issue within humanitarian ethics, namely its distinct modernist metaphysics. In order to be ready to respond to not only the role of technology in humanitarian

action but also the complex humanitarian field in general, further investigation and development of a posthumanist humanitarian ethics could be done. This alternative humanitarian framework would better be able to deal with technologies as actors and could lead to a critical reassessment of what the aim of humanitarian action is once it become more difficult to define the human.

Furthermore, this study was limited in its analyses of humanitarian drones to existing case-studies and literature. In this available literature there is still a gap of phenomenological analyses of drone use, most literature is focussed around the politics or risks and benefits of drone use; in that regard little work has been done to investigate the actual drone practice. A more thorough and partly empirical informed investigation of the different kinds of humanitarian drones would be beneficial.

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6. ATTRIBUTIONS

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https://unmanned-aerial.com/team-heads-to-nepal-to-teach-drone-mapping-for-disaster-response

7. APPENDIX A: HUMANITARIAN PRINCIPLES

"The Fundamental Principles of the International Red Cross and Red Crescent Movement*

The Fundamental Principles were proclaimed by the 20th International Conference of the Red Cross, Vienna, 1965. This is the revised text contained in the Statutes of the International Red Cross and Red Crescent Movement, adopted by the 25th International Conference of the Red Cross, Geneva, 1986.

Humanity

The International Red Cross and Red Crescent Movement, born of a desire to bring assistance without discrimination to the wounded on the battlefield, endeavours, in its international and national capacity, to prevent and alleviate human suffering wherever it may be found. Its purpose is to protect life and health and to ensure respect for the human being. It promotes mutual understanding, friendship, cooperation and lasting peace amongst all peoples.

Impartiality

It makes no discrimination as to nationality, race, religious beliefs, class or political opinions. It endeavours to relieve the suffering of individuals, being guided solely by their needs, and to give priority to the most urgent cases of distress.

Neutrality

In order to continue to enjoy the confidence of all, the Movement may not take sides in hostilities or engage at any time in controversies of a political, racial, religious or ideological nature.

Independence

The Movement is independent. The National Societies, while auxiliaries in the humanitarian services of their governments and subject to the laws of their respective countries, must always maintain their autonomy so that they may be able at all times to act in accordance with the principles of the Movement.

Voluntary service

It is a voluntary relief movement not prompted in any manner by desire for gain. Unity

There can be only one Red Cross or one Red Crescent Society in any one country. It must be open to all. It must carry on its humanitarian work throughout its territory.

Universality

The International Red Cross and Red Crescent Movement, in which all Societies have equal status and share equal responsibilities and duties in helping each other, is worldwide."(ICRC, 2015, p. 18)