

# Reassembling operative policing: The introduction of drones in the Norwegian police

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## Abstract

Drones are increasingly being used in various areas of society, including in the police. The drone and its sensors make it possible to collect live images of people, places and situations that are otherwise unavailable or hard to reach. Adding to the already complex assemblage of operative policing, what happens to policing when drones are introduced? Drones provide new forms of information to the police, connecting areas that were previously disconnected, and disconnecting what was previously connected. Recently, a small one-year trial with drones was carried out by the Norwegian Police Service, resulting in drones becoming a permanent fixture in the force. Data for this article were collected through approximately 380 h of ethnographic fieldwork during the trial period. This article explores how drones establish new assemblages within police practices and thus work as reassemblers of operative policing. The technology forms new entities and connections on multiple levels within policing, thus also constructing new dilemmas, as the drone can act both as a problem-solver and a troublemaker.

## Keywords

Drones, Policing, Assemblages, Decision-making, Ethnography

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## Introduction

Remotely piloted aircraft systems, commonly called drones, have been used for more than a century (Custers, 2016). The technology is now becoming affordable and is expanding into new areas of society, including policing. Drones combine three forms of technological innovation: digitalisation; the production of reproducible and distributable images; and, because they are airborne, a breach in the connection between what used to be symbiotic – the camera and the street level (Choi-Fitzpatrick, 2014). By distributing live images of ongoing events, the drone facilitates new connections and has been described as a prolongation of human senses (Kaufmann, 2016). Drones give the police gaze, a term describing how officers visually make sense of and sort their surroundings (Finstad, 2000), a new position from above and afar (Klauser, 2021). Drones establish

new connections within policing. These connections are explored in this article, where actor–network theory (Callon, 1990; Latour, 2005; Law, 2007) is used as a theoretical framework and methodology for the analysis of data from ethnographic fieldwork during the Norwegian Police Services' first drone trial period. This framework focuses on the agency of material objects and technologies, thus regarding technologies as not only tools used by people, but also actors that shape and define practices. Within actor–network theory, the focus lies in how networks, consisting of both human and non-human components, work as

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entities shaping social realities. These networks are often referred to as assemblages (DeLanda, 2016; Law, 2007; Müller, 2015; Sassen and Ong, 2014). The term ‘assemblage’ refers to both to a process and the result of a process (Ervik, 2017; Law, 2004): ‘The action of fitting together a set of components (*agencer*) as well as to the result of such an action: an ensemble of parts that mesh well together’ (DeLanda, 2016: I).

This article establishes a theoretical framework for studying the use of drones in policing and the dilemmas created. It argues that drones constitute new assemblages by drawing together previously separate, and constituting new, entities: drones work as reassemblers of policing. Three forms of assemblages are identified and scrutinised: the legal framework of policing, the human–technical link of individual officers and drones, and sense-making in police operations.

## Background

Drones polarise opinion, and whereas some have embraced them with ‘enthusiastic acceptance’, others face them with ‘relentless opposition’ (Završnik, 2016). Many scholars find drones problematic, a critique often connected to their military origins, where they have also been used with lethal outcome (Bergen and Rowland, 2013; Chamayou and Lloyd, 2015; Davis, 2019; Hazelton, 2012; Pugliese, 2013; Sandvik, 2017; Stelmark, 2015), and where the technology has been regarded as dehumanising (Wall and Monahan, 2011). When drones are used in civilian society, such as in the police, some fear a subsequent militarisation of police forces (Bergen and Rowland, 2013; Choi-Fitzpatrick, 2014; Salter, M 2013; Sandvik, 2017). Nonetheless, Choi-Fitzpatrick (2014) argues that drone technology could also be used for the public good, a position highlighted by several scholars (Jumbert and Sandvik, 2017).

When the police employ drones, the context is prevention, detection, and deterrence. Although the police can be engaged in policing of the drone, i.e. working against unwanted drone use (Fox, 2019), this article focuses on policing with the drone, i.e., using the drone in policing operations. Engberts and Gillissen (2016) show that within policing, drones can be used as a tool, for sense-making, information gathering and surveillance (Hiltner, 2013; Talai, 2014; Ullrich and Wollinger, 2011). Sakiyama et al. (2017) point to the potential for drones in:

[...] search and rescue of missing persons, aerial photography for crime scene investigation, detection of criminal trespass and other criminal activity in public places, identifying traffic violations and responding to automobile accidents, locating hazardous materials without endangering human lives and

providing on scene fire or weather conditions to assist rescue workers in emergency situations.

Still, drones present multiple legal and moral dilemmas (Cohn and Tutu, 2015; Di Nucci and Santoni de Sio, 2016; Završnik, 2016). The most controversial is the question of arming drones and robots, highlighted in 2016 when a man was killed by an armed robot in Dallas, and in 2022 when San Francisco decided the police could use armed drones, a decision that was later reversed (Hambling, 2022). Other critical points have been made concerning excessive use against minorities or marginalised people (Finn and Wright, 2012), safety aspects (Rowe, 2014) and privacy concerns (Finn and Donovan, 2016).

As Lum et al. (2017) point out, the outcome of any technology is influenced by local institutional cultures, practices, legal regulations and technical competences, thus the use of drones needs to be scrutinised in the concrete settings in which they are used. Little empirical research has been done on the use of drones in the police (Klauser, 2021) and this article offers the first insight into drone use by the Norwegian Police Services. The national context is relevant because the Norwegian police differ from many other police organisations. This difference derives from the tradition of policing by consent, has an ideal of a non-military approach and restraint in the use of force (Maillard, 2023; NOU, 2017). There is a good representation of women (Jon, 2021), and a high level of public trust in the police (Kantar Public, 2022; Maillard, 2023). Exploring the use of drones within this context provides insight into the mutual shaping of technology, policing and society.

## Testing drones in the Norwegian police

In 2018, the Norwegian Police Directorate initiated a one-year drone trial (2019–2020). This was the first national initiative exploring the use of drones in ordinary police work, and included the establishment of regulatory frameworks, training, systems and registrations, as well as an evaluation of the outcome. Three of Norway’s twelve police districts participated in the trial. These covered a variety of settings: cities, smaller towns, rural, and coastal areas. Six officers from each district were trained as pilots. Their training began with a programme and an examination held by the Civil Aviation Authority. They were then trained for police-specific drone use by the Police Helicopter Services. The one-week course covered a range of topics: legislation and regulations, technical and physical aspects, risk assessment and mitigation, as well as practical training. The practical tests ranged from an initial examination of the contents of a bucket to complex scenarios, such as operating the drone from a moving

vehicle. A final examination including a practical skill test and a case-based risk assessment concluded the training. Officers were then certified as RO3 pilots, the highest level within civil drone use, authorising them to conduct civil aviation on behalf of the state (The Norwegian Ministry of Transport, 2015). After completing the course, officers returned to their ordinary work in the districts. They then had to maintain their skills and log and assess use of the drones. The following evaluation resulted in the Police Directorate making drones a permanent fixture in the police.

### *The drone technology used in the trial*

Drones range from huge airborne carriers of weapons across continents, to tiny nano-drones manoeuvring silently in narrow spaces. The agency, capabilities and capacities of drones derive from the sum of their materiality, sensors and software. During the trial period, two types of quadcopter drones were used: a DJI Mavic Enterprise, a smaller, quite inexpensive drone, approximately 30 cm in diameter, weighing around 1 kg and with a battery capacity allowing for 20–25 min of flight time; and a DJI Matrice, with a diameter of around 80 cm, weighing 6 kg, with up to 45 min flight time. The sensors were cameras with zoom, thermal cameras providing night vision and detection of temperatures, a speaker and a spotlight. The software was ordinary, commercial software developed by DJI, and thus not developed especially for policing purposes. In summary, and compared with technologies developed for specific purposes, the drone technologies were not very complex, and were used mostly for sensing (observation, monitoring and detection), and to a small degree as tools (use of aroma or light, or against other drones) (Engberts and Gillissen, 2016).

### **A conceptual framework: Policing as assemblages, drones as reassemblers**

This article empirically explores how drones influence various areas of policing. Drones are regarded here as knowledge-production devices, where knowledge is understood as the result of socio-technical processes (Law, 1986, 2004; Skjølsvold, 2015). Drones provide images and film used as information and as the basis of decision-making. Information and knowledge is sometimes regarded as two different things, but I here make no distinction between them, as information *is* knowledge (Ericson & Haggerty, 1997: 84). In producing knowledge, both the police and the drone play an active part, in what is here seen as co-production of knowledge (Jasanoff, 2004).

This article uses the term assemblages, inspired by actor–network theory and assemblage thinking, where it is used in very similar ways (DeLanda, 2016; Law, 2007; Müller, 2015; Sassen and Ong, 2014). When studying how drone technology influences police practices, this framework highlights how both human and non-humans, such as technologies, have agency and the capacity to act, and together produce practices and realities (Callon, 1986, 1990; Jasanoff, 2004; Latour, 1987, 2005; Law and Singleton, 2005, 2012). Together, these actors constitute networks, assemblages, entities consisting of multiple parts, where some things are included and others left out (DeLanda, 2016).

Assemblage is both the act of putting things together, and the result created by such acts (DeLanda, 2016). In this article, I explore how the drone conducts such acts, by connecting what was previously not connected, and show what assemblages are then created. Drawing on these theoretical perspectives, this article argues that drones work as reassemblers of incident-driven policing: they may reveal existing connections between the parts of the assemblages, breach old connections and establish new ones.

In this article, three assemblages constituted by the drone are identified. The first is the legal regulations of policing, where new regulatory frameworks become relevant as drones are used. The second is the human/technology assemblage, the merging between the human police officer and the drone. The third, and in this article the most significant assemblage, is the operation/technology question of how the drone influences sense-making in police operations.

Realities are complex and messy (Law, 2004; Salter, MB, 2013), and in policing, understanding of a given reality can change rapidly as new information becomes available (Lundgaard, 2021). Focusing on incident-driven policing, the operations can be regarded and analysed as more or less stable assemblages, with ‘patterns of discontinuity between absence and presence’ (Law and Singleton, 2005: 331). This means that an incident is an assemblage made up of what is present and what is absent, where both are constitutive. Often, the police have limited information when they are notified of an incident. Thus, both knowledge and non-knowledge, certainties and uncertainties, are determinant in decision-making (Daase and Kessler, 2007). For the police, the situations they manage consist of the presence and absence of many things, such as sites, humans, technologies, information, objects and regulations. This is fundamental in policing: decisions are made on the basis of continuous understandings, the establishment of certainty and uncertainty or, in other words, more or less stable assemblages. As the incidents themselves are evolving, so are the police’s

understanding of them. Securities and insecurities are thus constructed in social practices (Aradau et al., 2015; Daase and Kessler, 2007). Live images are often believed to be useful and less ambiguous than other forms of information but, as this analysis shows, this does not necessarily result in clarity and certainty. This article explores how such fluid assemblages are produced when the drone and the information it provides are added to an already complex assemblage.

## Methods

This is an ethnographic study of the domestication process of a new technology (Gundhus, 2006; Tjora, 2009), exploring how drones find their place in police practices. Method follows theory, and Latour (2005: 12) encourages researchers within actor–network theory to ‘follow the actors themselves’, similar to Law when he highlights the need for empirical data in order to ‘explore and characterise the webs and the practices that carry them’ (Law, 2007: 2). Ethnographic methods are suitable when the focus is on practices (Brewer, 2005; Salter, MB, 2013), and when little research is done before (Hagan, 2013).

In this project, the researcher followed the drone trial over the course of two years, collecting data through 380 h of participant observation. This includes training of the officers, later following drone pilots on patrol, in police investigations and in the policing of public protests. In total, 270 h were spent in the three districts (110, 100 and 60 h), the remaining hours include the initial training and the handling of seven public protests. In the Norwegian police, there are organisational boundaries between investigative, preventive and operative policing. This article mainly uses data from operative policing, i.e. meaning patrols and units whose work is mostly incident-driven, and who are responding to an operational leader (sergeant) in the emergency control room.

During the fieldwork, the researcher engaged in conversations with the pilots and their colleagues. The researcher was thus situated in the same place as those studied (Law and Singleton, 2012), providing an understanding of the officers’ perspectives, their ways of thinking and reasoning (Fassin, 2013). The empirical data used here showcase situations in which the drone’s own agency becomes detectable. The vignettes come from the researcher’s observations of ongoing events and of recorded material from the drones. As in many ethnographic studies, there was no clear divide between the collection and analysis of data (Hammersley and Atkinson, 2019). Field notes were taken and written up, and the coding was then done manually, going back and forth between the field notes and the theoretical literature, asking what assemblage is this, and how is it affected by the drone? The conceptual framework presented above is

used for exploring drones as reassemblers, as well as the coproduction of certainty/uncertainty. Vignettes are presented and used as critical cases, meaning as ‘having strategic importance in relation to the general problem’ (Flyvbjerg, 2004). These were incidents where the drone contributed to the decision-making, and through them, the coproduction of knowledge in police operations was explored.

## Reassembling frameworks and functions

This article explores three assemblages influenced and partially created by the drone. The first is the new legal assemblage created when rules and regulations of airspace and policing merge. The second is the drone/officer assemblage, where the integration of several police functions in one individual is problematised. The third is the socio-technical assembling of decision-making in police operations, showing how promises of the technology are challenged in practice.

## *Reassembling the regulatory frameworks for policing*

Technologies can be as governing as formal laws (Jasanoff, 2016), but new technologies can also create new connections between existing legal frameworks. When the trial period started the police had to map laws regulating drone use with laws regulating policing, as well as establishing their own internal regulations. Drone use thus reassembles all these regulations in one assemblage, shaping police practices in new ways. This section explores regulations of policing and of airspace as they encounter policing.

Understanding the regulations for drone use was central to the pilots’ training, and throughout the trial there was a mutual focus on ‘keeping well inside the borders’ to avoid negative incidents that could influence the decision on the future of police drones. It thus became important not to challenge the regulations, especially those protecting the right to privacy, limiting the police’s right to film, record and store information about individuals (Personal Data Act, 2018). The question of when these measures can be used is linked to an important distinction in Norwegian policing, where the intention for gathering information defines which legal statutes are in action. When used for investigative purposes, regulations are stricter and require judicial approval in accordance with the Criminal Procedure Act (1981), whereas drone use for operational purposes or crime prevention is mainly regulated by the Police Act (1995), which provides the police with much room for discretion in their practices (Gundhus, 2017).

Questions of legality arose throughout the trial period. Conflict between the drones’ affordances and the Personal Data Act was shown when pilots experienced were asked

by colleagues to conduct potentially useful observations – for example, to check whether a person of interest was inside an apartment – and had to decline because it would be a form of surveillance requiring approval from the police prosecutor. Others had to request clarification from legal authorities to ensure their use was correct, because the practical use at times challenged the clear divide in the law. For example, which legislation would have prerogative, and with what effects in policing practices, if police, when recording film under the Police Act, observe criminal activities that would require prosecutorial approval.

The legal regulations for policing are extended because drones are defined as aviation, and their use is limited by national and international airspace regulations and agencies. Many agencies, seldom involved with policing, are involved, such as Avinor, the Civil Aviation Authority, the International Civil Aviation Organization and the European Union Aviation Safety Agency. They have strict standards and systems, developed for the management of national and international infrastructures for large aerial systems, such as planes and helicopters. The drone thus connects the police and street level to airspace and facilitates the establishment of a new regulatory assemblage where situations may arise in which policing authority is required to comply with the priorities of authorities other than the police. When the police adapt to this new assemblage, a breach with the autonomy of the police can arise. Whereas the police often operate alone, they now may need to notify various aviation agencies before initiating the use of the drone, and even though their request was rarely, if ever, declined, another authority became part of, and enabled, policing.

For policing, drone use thus generates a more complex legal assemblage. The extensive room for discretion in many parts of the Norwegian police is limited because the drone reassembles multiple legal frameworks. The regulations of surveillance, of the right to privacy and of airspace regulations are strict and limiting, and leave less room for discretion, because the complex regulatory assemblage framing drone use leaves less room for individual considerations and officer autonomy. Together with the affordances of the technology itself, there is more control with the front-line practices. Gundhus et al. (2022) have described such as shift in other parts of policing, where digitalisation causes more standardisation and control, leading to what they call a narrowing of police discretion. Remembering Jasanoff's (2004) notion of technologies as equally governing as the law, the mutual interactions of law and technology can become even more substantial.

### *Reassembling the functions of the police officer*

When humans and technologies merge, new assemblages are constructed, and these can act in ways the two parts cannot do

when separate (Haraway, 1991; Johnson [Latour], 1988). In the trial, the police districts chose officers they deemed suitable as pilots, and the officers kept their primary functions after being trained as pilots. The districts selected six officers each, based on their own criteria. Among the 18 selected, were a variety of functions: forensic technicians, control room officers, tactical command officers, digital investigation officers and patrol officers, the latter being the largest group.

Using drones, the drone pilots, who are already trained police officers, become more complex assemblages. In these new assemblages, where technologies and humans merge, the number of functions within the individual officer increases. Some were already specialised officers and including the role of drone pilot caused some concerns. Officer A can serve as an example, he is both a sharpshooter and trained as IP3, making him part of the district's anti-terror unit, and now he is also a drone pilot. He believes that in some situations, the role of a sharpshooter could become incompatible with flying a drone, and he would have to choose between the functions. Officer B works in a control room and can easily be asked to fly the drone for planned events, but should he be in the control room when the drone is needed, the current staff and operations in the control room would determine whether he could be omitted. A third pilot, Officer C, is a tactical command officer who leads all police on site during larger or critical operations. He believes it would be impossible to combine being a tactical commander with flying the drone, as this would cause him to lose the needed control of the operation. Among the previously specialist officers, many experienced such conflicts, but those without specialised functions also faces dilemmas when choosing whether to instigate drone flight, asking the question of what was more crucial in the current operation: eyes in the sky or hands on the ground?

These conflicts illustrate how the drone technology demands attention, and that the human/drone assemblage is not always compatible with other police functions. Drone technology requires substantial human resources, both physical and mental, and often not only from the pilot, but also from a second officer working as a watchman, communicating with the control room or coordinating other officers on site. This demonstrates that dilemmas and conflicts can arise within the socio-technical assemblages of which the drone is a part. As the officers gain agency through drone use, and can describe and thus define situations and make their perceptions matter, this is only the case if the drone is in the air, and when it is, other functions are hard to maintain. In one human assemblage there can only be a limited number of police functions, and not all of them can be combined. These experiences challenge one of the core arguments in favour of drones, the presumed freeing up of human resources (Bolman, 2017). When in the air, the drone puts limitations on the pilot. This concern was also emphasised in the internal evaluation of

the trial. When drones were made a permanent feature after the trial period, the directorate asked for ordinary patrol officers to be trained as pilots, and they imposed a divide in the training of investigators and operative police. In the future we will thus see more differentiation between the various functions in the police, in their training and in the technologies used, underlining the notion that being a drone pilot is not always compatible with other special functions.

### Reassembling police operations

The drone constructs new entities within policing. As shown, this includes legal assemblages, as well as techno-human assemblages, but the most complex assemblage it influences are the often-dynamic incidents the police face in their operations.

Arguably, the most complex assemblage the drone reassembles is that of police operations. Just as with other 'silver bullets', drones are a technological innovation promising to handle complex problems in an easier and more effective way than was previously possible (Marx, 1995). The use of technology aims at enhancing efficiency (Lum et al., 2017), and drones promise increased safety, precision and effectiveness (Bolman, 2017), but as we shall see, the practical outcome might vary. Managing uncertainties is central in a variety of policing operations (Crawford, 2011; Innes, 2006; Lee and McGovern, 2016), thus the drone's promise of generating more certainty is welcomed. The sense-making processes in policing are complex (Lundgaard, 2021, Weick, 1995) and various information is gathered and combined into an understanding of the situation, a more or less stable entity (Law and Singleton, 2005). Understanding the situation is like solving a jigsaw puzzle, where new pieces of information change the understanding of the situation Lundgaard, 2021. The aim of drone use is better and more certain information, contributing to a shared situational awareness (Suchman, 2017) and thus creating a more solid basis for decision-making. In other words, the goal is to construct a coherent and solid assemblage to which the police can respond adequately, and here the drone is what collects and makes available new information. The following shows how drone images can reveal knowledge that is otherwise unavailable, thus changing the understanding of a situation, but also how such images can establish new uncertainties. Thus, the drone reassembles the pieces of the puzzle, and becomes an important actor in police decision-making. Specific aspects of the reassembly of policing operations are discussed in more detail below.

#### *Taking in invisibilities*

Just after the newly authorised drone pilots had returned to their districts, they experienced what they deemed a success

story, here presented to the researcher using video while explaining:

In the harbour, a large trawler is on fire. Heavy smoke is spreading and there is fear that containers of gas onboard could be explosive. The situation demands police and firefighters to keep their distance. With the drone they can get close while staying away: They use it to examine the boat's moorings, a hole in the fuselage, and for checking the gas container on the deck. It is deemed harmless, and they re-evaluate the physical distance needed.

The wind blows the smoke towards the city's hospital area – could evacuating parts of the hospital become a necessity? The drone images show the direction of the smoke, as well as its reach towards an unproblematic height. They conclude that there is no need to plan for evacuation.

Flames rise at the front of the trawler, towards which the firefighters steer the water jet. The rear end of the boat is invisible, covered by smoke. As the drone operator turns on the infrared camera, another fire, further from the front, is revealed. There are two fires, only one was visible. Now, they pump water towards both.

This incident became a showcase for the potential of drones, because it revealed significant aspects of the incident that were otherwise hidden. As the police assemble information and construct their understanding of the incident, and thus the basis for their decisions, the drone included invisibilities into this assemblage. Such invisibilities may be hidden areas (the core of the fire) or dangerous or hard-to-reach places (the deck of the boat). Similarly, previously unavailable information was made available when the drone was used in the search for a body in a deep and narrow cave, and enables police to examine the state of a landslide from below before deciding whether it was safe for people to enter. In a similar way, sensors can provide knowledge otherwise unavailable:

The officers show me a recording from their training in the mountains. A person is hiding under fabric with camouflage, but the thermic camera reveals that the fabric is visibly warmer than the surroundings, revealing the presence of 'something'. The path to the site is also visible, as the footsteps cause dents in the snow, the variation of temperatures below the surface is exposed.

These cases show us how the capabilities of the drone and its cameras exceed those of the human. A small drone can explore narrow spaces, and a thermal camera can reveal what the human eye cannot see. The drone not only mimics human senses, but exceeds them (Kaufmann, 2016). The drone incorporates into the assemblage the

unseen or in other ways concealed. Thus, the situation or operation is reassembled, and otherwise hidden information is included and becomes a determinant part in the police's sense-making processes. Here, the drone is decisive, and the information it presents cannot be ignored. As Kaufmann (2016) states, this makes the drone a powerful actor in deciding what is an emergency, and it demands that new aspects must be taken into consideration.

### *Fight or battle? Reassessing an understanding using drones*

Live images collected by drone can challenge the existing understanding of a situation, causing a reassessment of the need for police intervention. This vignette is from a week-long experiment where, instead of having the drone in their vehicle, the drone pilots, and the researcher, were located on a roof in the central area of a large city, and attempted to use drones in as many incidents as possible during their watch:

Over the radio, the control room reports that a woman is observing a large group of aggressive youths in the street and fears they will start a fight. She calls from a central area of the city, with a diverse population and many ethnic minorities. Several uniformed units are directed towards the area.

The drone operator launches the drone, and it arrives on site before the patrols. The images show two groups of agitated young people, opposite each other. In the middle, two individuals are getting closer to each other, hunching down. One holds something in his hand. The officers watching the images are concentrated, there is tension in the air; could it be a knife?

The drone pilot zooms in on the item, and the officers realise what they are watching: The youth are rapping and dancing, and the main rapper is being filmed by the person opposite. Everything is friendly, though lively. The pilot reports his understanding of the situation to the control room, who demands the uniformed patrols to abort, while a single civil unit passes by just to make sure everything is as it should.

The perceived situation was at first a dangerous entity, but the images from the drone demanded its reassembling. Had the drone not presented these images of the battle, several uniformed police vehicles would have approached a group of minority youth, anticipating an encounter with a violent fight. The drone revealed a different story from that of the caller, providing contrasting clarity to the police's understanding of the situation. Here, there were contesting perceptions between the caller and the drone pilot. The situation started as a potential knife battle demanding numerous uniformed patrols with sirens and

blue lights, but ended up being understood as an unproblematic rap battle. There is always some uncertainty in emergency calls to the police, and when only one caller provides information of an incident, his or her understanding becomes determinant, and any biases follow through to the sense-making process (Lundgaard, 2021). The connections between the various parts of an assemblage are important, because one part influences the next in a chain of translations (Callon, 1986; Latour, 1999). Interpretations of incidents are translations shaped by both humans and technologies (Callon, 1986; Latour, 1987). Here, the drone reduces the number of translations. First, the chain involved a situation, a woman, the telephone, the control room, their systems, the radio and the patrols; the drone reduced this to one situation, consisting of the situation, the drone and the officers. Reducing the number of human actors involved in the translations can also reduce the number of times the information is modified, displaced and translated within the assemblage, thus changing, and potentially reducing, the possible uncertainties and biases occurring along the path. Still, as the next section shows, there can also be uncertainty arising from the use of technology, and the information reassembled is not always clear and unambiguous.

### *The drone as troublemaker*

For information to be useful in decision-making, the pilot must interpret the images from the drone. Here, the pilot is showing the researcher recordings from a previous operation:

The drone images show the ocean, the police are searching for a body from a possible drowning. The camera focuses on the shallow waters: 'You can see that that is a person?' the pilot asks me. I confirm. The images show what looks like a torso, two legs and arms raised above the head. He says that was his initial understanding as well, but upon inspection by an officer on site, it turned out to be an assemblage of rocks and seaweed. 'Looking at the ocean through the drone, it is hard to judge scale, distance, and the size of things such as rocks', he says, telling me about several unsuccessful attempts of using the drone above water.

The drone collects images, but interpretation of these images is done by humans. At times, there is little ambiguity, but often that is not the case. Information becomes the basis for decision-making, and unclear information can manifest itself in the assessment and subsequent actions. When information is deemed uncertain, it can be hard to decide what emphasis to place upon it:

The police officers tell me of a recent search for a man hiding. Two locations are of interest. In one, signals from the man's cell phone are connecting to an antenna nearby. In the other, the drone's thermal camera discovers something of bodily temperature in the forest, but it is hard to judge if it is a human or an animal. How should they decide in which area to conduct the actual search?

Here, two technologies provide information, but neither provides clarity. The images add new uncertainties to the assemblage. Such uncertainty can be used as a reason to intervene, but also to wait, because human assessment is always crucial for establishing situational awareness (Suchman, 2017). In the following case, the images were perceived as revealing a possible danger, where the subsequent police response ended in a physical clash between the police and some political protestors. Here, the incident commanders, the pilot and the researcher were on a hill from where the protest could be seen with by eye, but where the drone was used to observe from different angles, more hard-to-see places and various details:

A small, controversial group is holding a political gathering in a public area. This is one of many such gatherings, which often attract counter protests. At times these have ended violently. A larger group of counter protestors has gathered today as well, as has a third, small group that has shown up to support the freedom of speech for the first group. The counter protestors hope to drown the speeches in noise, singing, shouting slogans and playing instruments.

From above, the drone is watching. Through the camera, the pilot notices that one of the counter protestors is holding a small device in his hand, continuously directed towards his opponents. The pilot zooms in on the device, but it is hard to tell for sure what kind of item it is. The officers believe it is possibly a laser, which could cause permanent damage if pointed at eyes. The police decide to intervene and to get a hold of the person holding the item. In the attempt to arrest him, other protestors turn aggressive towards the police and officers are subjected to violence. They withdraw, and when a second response is initiated, it causes aggression. Several arrests are made, and some protestors are injured.

Later footage, shot by various people among the different groups, reveals that the item was not a laser, but a noise-making device, used to drown out the speeches with sound.

The images are perceived as showing potential danger. Despite uncertainty, the consequences, should the item be a laser, are seen as too great a risk. The incident illustrates the limitations of drone technology. Its sensory apparatus (Kaufmann, 2016) is here more limited than that of humans. Although there are eyes in the sky, there are no

ears. The drone here presented unclear images that could not be disregarded, and its role in assembling the information available shaped the decision-making process and the police response, which here was confrontative and hard.

These examples point to three possible problems in the use of drone images: first, the images are misleading; second, information from different technologies are conflicting; and third, the uncertainty is used as a reason to intervene. The technology provides and presents information that needs to be assessed. Scarce, limited or conflicting information causes unstable assemblages, which can become a reason either to intervene or not to intervene. When the drone is used for sense-making, information gaps become significant, and the technology thus facilitates human bias or error.

### **Concluding remarks and lessons learned**

The main argument for using drones in the police is to collect important information and gain a better basis for decision-making. This ambition can be seen in the techno-optimistic slogan safety through certainty – drone operator, embroidered on informal patches bought by the pilots. The optimism was shared by the Minister of Justice, who was introduced to the drones, and expressed: 'This provides fantastic opportunities [...] What we have seen here is that you can respond and get a lot of information in a very short time' (Grut et al., 2020). Some police believed drones would change policing fundamentally, others saw it as a useful tool, but all considered drones to be obvious for future policing. One officer stated, when exploring photogrammetry in forensic documentation, 'I find this very cool – it feels like the future!'. Early in the trial period enthusiasm was evident, later officers remained positive, but became aware of the limitations of the technology, although many also had ideas of what the development of drone technologies could bring to policing in the future. The continued positivity derived from the experienced availability, amount, quality and transferability of the information the drone provided.

Exploring the role of drones asreassemblers in policing provides a different perspective on these practices. By doing so, this article establishes a framework for understanding the role of drones in policing, and the dilemmas and controversies connected to drone use. When establishing new assemblages, the drone also reveals existing police structures, and the potential conflicts embedded within them. In the legal assemblage, potential conflicts between different legal regulations come into play in the concrete drone practices. In the assemblage of the human/drone, inclusion of the drone highlights the limitations in police functions, showing us how the other functions of the officer are pushed aside as the drone takes all their attention.



The third and most complex assemblage shows us the limitations of the promises of the technology, and the idea that the drone necessarily removes unclarity. Using the drone requires technical skills but using the information it provides requires training in the ability to judge the images. Live images are often perceived as adding clarity and removing uncertainty, and drones promise precision (Bolman, 2017). This way of thinking about the drone and its agency misses the crucial aspect of how humans perceive and assess the images the drone provides, and the risks and uncertainties deriving from these processes. Understanding drones as reassemblers of policing is thus an invitation to further explore the micro practices they establish, their significance and therefore also the larger question of the agency and influence of technologies in police operations. Technologies that are meant to solve problems can end up causing new ones, and the drone is both a problem-solver and a troublemaker. To avoid such potential conflicts in understanding the role drones play and mapping the connections they establish may be fruitful for police and policymakers planning the future of drones in policing.

The data from this article are from a short trial period, and following drone use in the future may provide knowledge on how the domestication of such technology (Gundhus, 2006) takes place within the police. Technological innovations provide both new possibilities and new risks, and, because both the hardware and software for drones develop continuously, there is a need to keep the research up to date with the current technology, asking questions concerning the legal, practical and ethical aspects of drones in the police (Engberts and Gillissen, 2016). What type of information the drone provides, how this is processed and what role it is given is not as straightforward as one might believe. Although at times it can provide increased clarity, it does not necessarily provide certainty. For police practitioners there is thus a need to explore and discuss what information the drone provides, how it is understood and how the police themselves influence these understandings.

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