1 What is responsible drone journalism?

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Introduction

A drone is a flying vehicle that is remotely piloted or programmed to perform autonomous actions. In journalism, drones are often referred to as flying robots or camera drones. More formally, they are known as unmanned aerial vehicles (UAVs), unmanned aerial systems (UASs) or remotely piloted aircrafts (RPAs). News events such as protests, floods, fires, warfare and underwater operations exemplify only a snippet of what might possibly be covered in outstanding ways with unmanned aerial vehicles available to reporters.

Since 2011, news outlets on all continents have gradually embraced the options for disseminating imagery captured by camera drones. With drones being available to anyone who is interested, professional photographers and civilians have immersed themselves in a disruptive technology that is growing into a global, multibillion-dollar industry. With new opportunities for drone experimenting, hobby pilots and data techies from a multitude of backgrounds are also attracted to the drones. This attraction, in turn, encourages further exploration of drones as a newsgathering tool, although the experimenting sometimes appears to be prompted more by the possibilities of technology than the requirements of journalism.

In this book, we explore how the rapid expansion of dronalism – the process of doing drone journalism (Goldberg et al., 2013) – challenges established journalism at its roots. In particular, we investigate the opportunities and obstacles confronting what we have termed *responsible drone journalism*. The concept of responsible drone journalism merges responsible journalism with drone journalism. But, as we shall explore, it does more than that.

When collecting data for this book, we were immersed in the most stunning video captures, for instance, of San Francisco day and night: www.youtube.com/watch?v=0vJJ4-vgkUk. Turo experienced the joy of students who posted the first successful videos from a solo drone in the Finnish fields. We watched hours of video clips demonstrating that in the future, drone giants like Global Hawk might not be the worst autonomous warfare

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vehicle, although it might spend more than 30 hours in the air. The growing investments in micro or even nano-drones, barely the size of insects, open up possibilities for new kinds of urban military attacks.

At this point in history, though, politicians and entrepreneurs across the globe seem to focus predominantly on the adventurous growth prospects of the emerging civilian drone industry. In a high-tech country like Norway, commercial and civil uses of drones are promoted as the country's new oil – products made for the international market. Drones are launched as the ultimate, complementary solution in fields as different as military espionage, electricity networks inspection and undersea iceberg identification. The Norwegian drone industry, for instance, currently employs 10,000 people but envisages employing nine times as many within three years.

Internationally, the first drone taxis are about to be available for public hire. Drone taxis might actually resolve some of the problems with traffic jams in densely populated cities. Drone taxis should be fairly easy to regulate in accordance with existing aviation rules. Due to their size, they are visible from a distance, and they create enough noise for people to become aware of their movements.

Multiple perspectivizing

In journalism, drone technology exemplifies what is defined as a disruptive innovation (Bower and Christensen, 1995; Christensen, 1997; Christensen and Raynor, 2003). With camera drones, reporters are not dependent on renting helicopters or cranes to get aerial imagery; even though camera drones in several respects are still inferior to mainstream technologies such as helicopters, drones are quicker and cheaper to use, and they can easily provide videos from areas that were previously visually inaccessible (Gynnild 2014b).

Existing research on drone journalism indicates that authors are typically concerned with ethical issues such as privacy and safety on behalf of journalists (Culver, 2014; Cruz Silva, 2016; Gynnild, 2014a; Tremayne & Clark, 2014). Empirical studies demonstrate how drone reporters are stretched between technological opportunities on the one hand and professional codes of conduct on the other. A growing community of drone startup enthusiasts, in contrast, extends the notions of what visual journalism is or should be (Giones & Brem, 2017); educators are increasingly grappling with unexpected issues when designing drone courses in higher education (Marron, 2013). The long-term consequences of this agency are particularly interesting especially since camera drones constantly put the limits of Press Freedom around the world to the test (Lauk et al., 2016).

In the larger picture of a drone society in the making, lawmakers and government officials grapple with intricately logistical problems of unmanned

aerial vehicles in lower airspace; international aviation rules are contested by governmental differences in the ways military, commercial and civilian uses of drones are perceived, and thus how various regulatory mismatches ought to be aligned. Commercial uses of drones, of which journalism constitutes a small but crucial part of the puzzle, are instigated by surprisingly large national variations in the regulatory perceptions of privacy (Silva, 2016). In his examination of the relationship between technology and culture, Howley (2018) argues that "media discourse plays a decisive role in shaping these new technologies, understanding their applications in various spheres of human activity, and integrating them into everyday life" (p. xv).

Based on our investigation of civilian drones during the last seven years, we propose that such remotely controlled, unmanned aerial vehicles are soon going to be a natural and ubiquitous part of our lives. Our digitally structured, steered and surveilled society will have to learn how to relate to unmanned aerial vehicles of all sizes, whether we like it or not. It is a fact that these vehicles are used for a great variety of purposes. Drones are no longer a military tool used mostly by allied forces in the Middle and Far East. Whether we live in big cities in the West or in remote areas of the world, as humans and citizens we will most likely be prompted to engage with the flying robots in ways that would have been unthinkable only a short time ago.

Imagine heavy traffic and logistics to be resolved, not only in the streets but in the lower airspace, up to 120 meters above ground as well. Imagine drones becoming just as common as cars and motorcycles; imagine drones taking over human work in domains as diverse as power-line inspection, humanitarian relief and espionage.

Imagine civic drones passing borders with all kinds of packages – and potentially with people, too. Female activists fly contraceptives to sisters in need in Catholic countries, while criminals use drones to smuggle weapon and drugs. Drone sports events will be organized in local, national and international levels and drone taxis can fly you over the traffic jams. These examples are not future scenarios. They are reality, even though it might still take years to implement drones fully into societies' communication and transportation systems. Even though global society is still at an early stage of drone development, we have analyzed enough data to be convinced that drone technology alone might turn the global society, as we know it, upside down.

First, we take as a fact that drones are here to stay. Second, since we claim that the disruptive use of civic drones challenges established journalism at its roots, we wanted to discuss and propose the various ways that these challenges might be responsibly encountered and possibly overcome. With the pace demonstrated by the rapidly expanding global drone industry, there seems to be no way back. But there might be several ways forward.

The case of micro air vehicles (MAVs)

In the aftermath of the first wave of enthusiastic experimenting with camera drones in journalism, new questions arise, including this one: in what ways might, or should, news professionals relate constructively to future swarms of micro air vehicles (MAVs)? These mechanical insects and insect swarms are developed by the military and constructed to work in urban areas. This technology has already grown to the point where drone insects, individually or in swarms, can operate within and outside of buildings and be equipped with suction cups. They can crawl, climb and be airdropped or hand launched. Once in place, according to marketing videos from the US Air Force, these invisible machines can be on missions that last for days and weeks. They are supposed to be able to tap energy from power lines or harvest energy from sunlight and winds. According to the video clip, which is one of several carrying the same message, the system "remains robust even when GPS is unavailable." When operating in swarms, the MAVs can oversee or attack large areas in no time.

But anyone with some knowledge of MAVs knows that micro-drones might be capable of more than filming. They might carry chemicals or sensors that detect chemicals, depending on their mission as autonomous agents. Just like the larger drones, MAVs serve the goals established by humans. When MAVs operate individually and autonomously, though, these micro machines are invisible to the human eye and noiseless. They are too small to be regulated by aviation rules, but they could, for instance, easily fly into an office and glue themselves to a place under a president's desk. As advanced sensor platforms, even nano-drones and micro-drones are equipped for collecting multiple layers of data. They are easily integrated with other technologies and are thus capable of remotely piloted mass surveillance. It is likely that these tools are going to be adopted by journalists, too. Responsible drone journalism appears to be a complex field indeed.

As researchers and journalists engaged in dronalism, we are obliged to find out more about drone technologies and their potential uses. The time is over for the one approach to drone development that is either high-tech optimistic or high-tech pessimistic – either critical or constructive. The time is here to find out what is really going on within these polarities from multiple perspectives.

We firmly believe that journalists, along with researchers and educators, at this point in time have a crucial opening to explore, inform, influence and impact on the further direction and governance of the ongoing evolution of drones in a responsible manner. Even though the use of civic drones remains a predominantly local and hyperlocal phenomenon, drone issues

are of increasing concern to humans nationwide as well as worldwide. But to steer the flying robots in wanted directions requires new kinds of insights in tandem with an informed willingness to act and to take new kinds of risks. Thus, we propose that the term responsible drone journalism has a double meaning.

The aim of this book is thus fourfold: 1) to provide a conceptual overview, along with "down-to-earth" illustrations/cases of the multifaceted uses of camera drones in journalism; 2) to discuss aviation laws and the regulatory challenges of dronalism; 3) to discuss ethical dilemmas and raise awareness about privacy, transparency and surveillance aspects of using drones as a journalistic tool; and 4) to report and discuss in what ways drone technologies might be responsibly incorporated into higher education.

The responsible research and innovation approach (RRI)

In this book, we therefore suggest that taking action in accordance with the ideas and tools of responsible research and innovation (RRI) is one way to go. RRI is a methodological framework that helps to facilitate the co-creational, collaborative resources of universities, industry, education and civic society (Owen et al., 2012; Stilgoe et al., 2013; von Schomberg, 2011). The approach is closely linked to Horizon 2020 and to governance research efforts to develop a responsible technological growth in countries within the European Union. The framework is rapidly spreading to other continents and countries as well.

Proponents of the RRI approach aim to find sustainable solutions to the grand challenges of our time by filling in what is referred to as the responsibility gap from the lack of governmental control in a free market. Thus, seen from a visionary journalism perspective, the theme in this book addresses the grand challenges of knowledge and of security in society through a drone lens.

It should be mentioned here that the research project that was the breeding ground for this book, ViSmedia, www.vismedia.org, is derived from a responsible research and innovation approach. In the ViSmedia project, it is our job as researchers to explore the ideas of the RRI framework and to investigate how they might be adopted and adapted in emerging fields such as drone journalism. It has taken a good deal of time to get on the inside of these ideas. And at the same time, we find that the responsibility aspect of journalism innovation does have much to offer.

In the seminal work on responsible research and innovation, Owen and Stilgoe, the most prominent spokespeople of responsible research and innovation, suggested that the RRI approach is built on four pillars (Owen et al., 2012; Stilgoe et al., 2013) for action. These pillars, as discussed by Stilgoe

et al., are *anticipation, reflexivity, inclusion* and *responsiveness*. They point to different stages in responsible research and innovation processes, and require from the people involved that they, too, ask what-if questions at every stage of the process.

In a civic drone context, these four pillars might be considered idealistic requirements of responsible learning among stakeholders using and developing a technology. To work responsibly with technological innovations means that people involved should not only explore what is technologically possible to carry out; any innovational process should be accompanied by systematic reflections and deliberation on what might happen in a diversity of contexts. Anticipation in the form of foresight and scenario building plays an important role. The RRI approach prompts participants to reflect critically on the long-term consequences of their developmental actions and to identify unexpected issues that might surface on the way. The responsiveness dimension prompts participants to be flexible about changing course during any project, in response to the processes of ongoing reflection and deliberation.

The dilemma of governance not being able to control what individuals do with the new technologies actualizes the framework of responsible research and innovation. The so-called normative anchor points that should be reflected in the production processes of new technologies, according to RRI, are that the products should be ethically acceptable, that they should contribute to sustainable development and that they should be socially desirable (Owen et al., 2012) – whatever that means to journalism. These anchor points might seem appropriate and accurate at first glance, but they are challenging to define and live up to in practice. As defined by Stilgoe et al. (2013: 1570): "Responsible innovation means taking care of the future through collective stewardship of science and innovation in the present."

A requirement to researchers following the tenets of responsible research and innovation is, moreover, that the research is carried out in collaboration with a variety of stakeholders. Co-creation is meant to ensure that investigations are relevant and applicable to people involved and that the research efforts capture what is actually going on in a field. Advocating responsible research and innovation in the context of drone journalism means to engage actively in ongoing developmental processes of a visual technology in the making. That is, if not a grand challenge, at least a great challenge that needs the format of a book to be properly explored.

The double meaning of responsible drone journalism

So far, drone journalism has been associated predominantly with the use of camera drones as a newsgathering tool. More specifically, drone journalism

is considered a simple means to provide imagery from above; it is a new feature of visual storytelling. This emerging use of camera drones by journalists was first described in blogs from the Poynter Institute of Journalism shortly after the turn of the millennium. In 2004, Larry Larsen suggested that journalists could start using a newly launched consumer level "Predator Spy Plane" to cover stories from the air, and a month later he mentioned a spy satellite that could be bought by reporters for a low price.

But even though the ideas for a new data collection tool were pointed out more than two decades ago, the term drone journalism appears to have emerged several years later.

In this book, we propose that, in the future, the term drone journalism will include the coverage of drones as a news beat just as much as it will refer to the visual data gathering. Huge resources are now being invested worldwide in innovative military and civilian use of drones. These investments signal that in the near future, drone robotics and autonomous agents might change society in currently unimaginable ways.

We propose that drone journalism is an emerging dimension of computational exploration in journalism (CEJ): the "innovative processing that occurs at the intersection between journalism and data technology" (Gynnild, 2014a, p. 715). Computational exploration in journalism refers to the experimental collection and selection as well as the dissemination of algorithmic data by new technologies. We further propose that in order for journalists to become invested in covering drones as a news beat, reporters should get a chance to experiment more with the technology. Journalists are more likely to open up for issues of innovation if they have carried out some kind of experiments themselves; journalism innovation leads to innovation journalism (Gynnild, 2014a).

The value of such direct experience, exemplified now by an explosive interest in drones as a journalistic tool, will hopefully manifest itself in a broader investigative coverage of drone technologies in general. The emergent uses of drone technologies might be seen as an early marker of a paradigm shift in which society moves from being human-centered to becoming steered by ideas of robotics, artificial intelligence and autonomous agents. As such, drone journalism is apt to highlight more than the concerns and processes of a single new technology in the making. At a larger scale, it might help to identify crucial issues to be considered and acted upon when available resources are increasingly being allotted to high-tech innovation in society.

An American organization, the Society of Professional Journalists, stresses that journalists are expected to seek the truth and report it, minimize harm, act independently and be accountable. These four aspects of journalism responsibility, and similar guidelines, are found in most Western countries. Up to this point in media history, responsible journalism has thus basically

referred to journalistic codes of ethics. With fake news becoming the new buzzword after the US presidential election in 2016, the implications of responsible journalism indeed need to be more thoroughly investigated and explicated – not only to journalists but also to the general public.

So what is responsible drone journalism? Based on the research findings in this book, we offer a definition that takes into account the double meaning of the concept:

> First, *responsible drone journalism* refers to using drones as a journalistic tool in alignment with ethical and legal requirements, enhancing transparency and promoting informed reflection, deliberation and foresight among citizens. Second, *responsible drone journalism* refers to covering drones as a news beat by investigating implications of using drones in society as a whole.

It is time for journalists to do more than passively observe what is going on or adopt the perspectives of the industry. It is time to act on the observations. By asking critical, investigative "what if" questions on the outcomes and consequences of drone innovation, news media have a unique opportunity to influence a debate on drones that is still missing. What-if questions are open-ended with a built-in constructive and creative approach to problems. Such questions might help to uncover how the emergent challenges posed by drones might best be handled by society. Ideally, such constructive, thought-provoking approaches to phenomena are at the base of quality journalism. But way too often, in the constant flow of short-lived digital messaging, discussions about the outcomes of constructive and creative risk-taking actions with new technologies are lost, nonexistent or sometimes simply forgotten.

Drones as a ubiquitous tool

When new technologies are surfacing, mapping the field is the first step to stimulate foresight of what might happen at a later stage of development. To find out what is actually going on, data have to be empirically grounded to the extent that predications can be made. But mapping a field where the actors, products and legal regulations are in constant flux requires researchers to confront new challenges. It also highlights the need for moving from a descriptive to an analytical level in order to understand what is happening. To pay justice to these complexities, the reader will find that a number of qualitative approaches are used in this book, from descriptive case studies to innovation pedagogy, conceptual overviews and philosophical discussions.

So under such circumstances, what would responsible drone journalism in the making be like? What would it be capable of, for instance, if advanced drone technologies are used not to help, but to harm people – within the civic realm? These are the questions that will be investigated and discussed from multiple vantage points in this book.

New cultures of learning

Developing responsible drone journalism evidently exemplifies what Thomas and Brown (2011) have termed a new culture of learning. In this new culture, most actors involved, professionals as well as non-professionals, are within a realm of constant exploration of what was previously unthinkable, for instance, learning to build and fly drones through an Internet forum. We are talking about options for immersing not only oneself, but large communities, in new cultures of learning where the authors suggest that "the classroom as a model is replaced by learning environments in which digital media provide access to a rich source of information and play, and the processes that occur within those environments are integral to the results" (Thomas & Brown, 2011, pp. 37–38).

When dealing with new technologies, human openness and willingness to learn from taking risks is just as important as "handling" the tools at a technical level. In the new culture of learning, Thomas and Brown claim, participants do not learn so much *about* the world as they learn through engagement *within* the world. More specifically, in the new culture of learning "the point is to embrace what we don't know, come up with better questions about it, and continue asking those questions in order to learn more and more, both incrementally and exponentially" (p. 38).

This holistic approach to learning fits well with our own experiences. While academic research in dronalism is still quite limited, there is an impressive amount of empirical data available on the Internet. A multitude of learning experiments going on inside and outside of higher education are shared in Internet forums as well.

Journalism is often referred to as a signature institution. What emerges in journalism at an early stage is later adopted and adapted by other institutions in society. Typical examples are the early adoption of new technologies such as offset printing, mobile phones and digital cameras. Another more human example is the gradual, yet early, substitution of staff with freelancers and stringers. However, news organizations have tended to be followers or even laggards when it comes to innovative uses of simple Internet-related technologies. Social media such as YouTube, Facebook, Instagram, Snapchat and lately Jodel have been adopted by young people long before the news media got interested. At the same time, news media still seem to be in an early adopter position when it comes to camera technologies. They have

typically been pioneers in using the latest equipment for news photography throughout the decades. Journalists tend to be pioneering actors in camera drones as well as in virtual reality exploration. And maybe that is perfectly reasonable given that such gadgets do require some financial investments. It took, for example, decades before mobile phones, such as the iPhone or Nokia Communicator were adopted by teenagers.

Whereas drone journalism is typically considered a disruptive means to provide images or video clips from above, so far there appears to be less interest among researchers as well as journalists in drone journalism as a news beat. Thus, most of the empirical data analyzed in this book is found not in the legacy media but elsewhere on the Internet. Based on these experiences, our advice is to search for open and closed forums in social media for more factual knowledge on drones.

The nexus of these four perspectives is the ubiquitous options for learning provided by the digital turn and the Internet. Thomas and Brown (2011) suggested that this new culture of learning is characterized primarily by learning in the collective. Following their argument, the acquisition of new knowledge in an emergent field such as drone technologies would be based on three principles. First, the authors claim that "the old ways of learning are *unable to keep up* with our rapidly changing world." Second, the new media platforms to a large extent facilitate peer-to-peer learning. Third, "peer-to-peer learning is amplified by emerging technologies that shape the *collective* nature of participation with those media" (Thomas & Brown, 2011, p. 50).

The authors point out that the fundamental difference between a collective and an ordinary community is that collectives cannot be passive in the same ways as communities can; Thomas and Brown (2011) claimed that whereas people in a community "learn in order to belong," people in a collective "belong in order to learn" (p. 52) At the same time, collectives do not have any centers and often very few rules; people are free to participate or not to engage in the collective whenever they wish.

In a previous study of journalism innovation that leads to innovation journalism, Gynnild (2014a) identified three different learning arenas for computational exploration in journalism: the newsroom approach, the research approach and the entrepreneurial approach. While these arenas were easy to distinguish when it came to further development of data journalism, the current study suggests that the collective learning that goes on in the drone field is qualitatively different. The fast pace in which formal and informal exploration of drones collapse into collective networks is striking. In a very short time, new collective networks resolve challenges that would previously have been very difficult to handle technologically. Simultaneously, of course, the rapid development of such technologies makes it very hard to control by legislative means locally as well as globally.

One might argue that responsible research and innovation is a typically European strategy for innovation. Silicon Valley's so-called free entrepreurial model for innovation is different in the sense that its starting point is a general reluctance to follow or obey any instructions from the government. Moreover, the Chinese authoritarian model for innovation represents yet another model.

Therein lies the challenge for dronalism as a newsgathering tool and as a news beat. In the words of Owen et al., "Responsible innovation requires a capacity to change shape or direction in response to stakeholder and public values and changing circumstances. . . . We must therefore consider how systems of innovation can be shaped so that they are as responsive as possible" (Stilgoe et al., 2013: 1570).

Implications of responsible drone journalism

In the following chapters, the implications of responsible drone journalism are up for debate. We first explore the phenomenon from global sensoring and lawmaking perspectives. Next, we discuss burning issues of societal transparency and surveillance followed by reporting from pioneering educative projects in drone journalism in different parts of the world. Finally, we mount the responsible drone journalism debate into a set of three tentatively interrelated scenarios.

In Chapter 2, Astrid Gynnild and Turo Uskali zoom in on drones as an aerial sensor platform in journalism. Airborne sensors provide journalists, drone operators and ordinary citizens with breathtaking opportunities for data collection and advanced storytelling. We ask in what ways is civic drone use reported in the media? What stories are told; what challenges are identified? In what ways do journalists experiment with the flying robots? The chapter provides an overview of recent trends and developments of drone journalism globally, and variations and threshold events across continents are discussed. The global history of drones as a disruptive journalistic tool is traced back to the Occupy Wall Street Movement in the US in 2011, when the activist Tim Pool and his friends managed to live-stream drone videos from inside the Occupy camps in New York.

In Chapter 3, David Goldberg dives into the recent changes and discussions on drones and aviation regulations in Europe and the US. The technological opportunities raise a host of regulatory, monitoring and logistic dilemmas that are waiting to be resolved. Goldberg focuses on what he calls two undernoted aspects of dronalism. Goldberg points out that newsgathering is protected under Article 10 of the European Convention of Human Rights. Even if it is remunerated, drone journalism is not an ordinary commercial activity. Goldberg also discusses the enforcement of the norms,

whether by regulators, police and courts, as the norms are what really matter day-to-day for operators using their aircraft for dronalism.

In Chapter 4, Deborah G. Johnson and Astrid Gynnild bring the dilemmas of camera drones as autonomous agents to the fore. Controversial aspects of privacy, transparency and surveillance in journalism are discussed. Even though the drones as unmanned aerial vehicles are considered as autonomous agents, similar to autonomous cars and trains, there are humans operating behind the scenes. So what does the idea of unmanned vehicles actually imply? The chapter investigates the dilemmas of hidden or invisible human agents in journalistic storytelling and how their intent or purpose with drone actions best can be identified and understood.

In Chapter 5, Turo Uskali and Astrid Gynnild discuss practices and experiences of a pioneering Nordic journalism school in Finland that has systematically developed a drone journalism course for MA students. From there, the chapter extends to the evolution of drone journalism education at American universities. It emerges that an underlying vision of drone journalism education is to foster the building of innovative mindsets among journalism students. Further comparisons suggest that dronalism serves as an eye-opener to the core challenges of news journalism. The hands-on training requires from teachers to take on roles as peer-to-peer explorers, gardeners and player-coaches. Finally, the chapter suggests three models for drone journalism education.

In Chapter 6, Lars Nyre, Frode Guribye and Astrid Gynnild highlight the implications of introducing drones as a high-risk technology in higher education. A programmable camera drone was the main tool for a design experiment in a practical course at a Norwegian university. The pilot study suggests that the perceived risks of using the drone triggered students' creativity and willingness to explore the tool, whereas administrators and teachers were hesitant and careful to the extent that students' creative momentum was slowed down. The chapter discusses the relationship between technology, risk and learning, and proposes four learning principles that should characterize what the authors term responsible innovation pedagogy.

In Chapter 7, Turo Uskali and Astrid Gynnild propose three scenarios of responsible drone journalism in the light of the responsible research and innovation framework. The chapter sums up the implications of the previous chapters. The main variables are aviation regulations, learning environments and governance investments. The authors identify the use of satellites as a potential next step of drone journalism. For journalists to send satellites to the sky means that existing local and hyperlocal data gathering by drones might be replaced, or extended into, a much larger scope – robotic eyes from space.

The book is written for multiple audiences: journalists, journalism students, media researchers, technologists, politicians, lawmakers, drone developers, and citizens who grapple with the evolving and disruptive uses of civic drones. The edition springs from the ViSmedia project at the University of Bergen, with partners in Finland and the United States. One of the primary aims of the project is to contribute new insights regarding the grand challenges of knowledge and security in modern society.

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