Don't Drone? Negotiating Ethics of RPAS in Emergency Response

Xaroula Kerasidou
Mobilities.Lab, Lancaster University
x.kerasidou@lancaster.ac.uk

Monika Büscher
Mobilities.Lab, Lancaster University
m.buscher@lancaster.ac.uk

Michael Liegl
Mobilities.Lab, Lancaster University
m.liegl@lancaster.ac.uk

ABSTRACT

This paper explores discourses of automation as a key ethical concern in the development of Remotely Piloted Aircraft Systems for disaster response. We discuss problems arising from 'humanistic' dichotomies that pit human against machine, military against civil uses and experts against laypersons. We explore how it may be possible to overcome human-technology dichotomies.

Keywords

Automation, drones, responsibility, RPAS, posthuman phenomenology.

INTRODUCTION

Aerial drones, which as weapon systems have almost iconically represented the war on terror, are facing increasing demand in many civil (and commercial) domains, among them unsurprisingly emergency response. In response to this trend, regulatory bodies like the EU Commission have been stressing the need for the development of a common (EU wide) regulatory framework – integrated into harmonised European Air Space regulations (EU Commission, 2014a). A key motivation is to provide the legal certainty necessary for encouraging investment by European enterprises in this up and coming market. At the same time, EU policy makers seem to identify apprehension on the part of the citizens, which needs to be addressed through strict regulations. Among the sought for regulatory re-assurances is one that stipulates that piloting will not be automated. The reasoning that underpins this decision as well as the 'renaming' of 'Unmanned Aerial Vehicles' (UAV) or 'drones' as 'Remotely Piloted Aircraft Systems' (RPAS) are problematic. They reflect attempts at "humanising" technology by positing complete human control and framing issues of responsibility within a dichotomy of technology vs. human. The problem with this is that it disregards the fact that the human and the technical augment each other in ways that distribute agency and responsibilities within a socio-technical assemblage. For example, there are many processes and practices which need to be automated *in order to* be safe when flying RPAS.

Drawing on experiences of addressing ethical, legal and social issues (ELSI) through collaborative design in the Bridge and SecInCoRe projects – two interdisciplinary projects concerned with the design of new technologies for multi-agency and cross-border disaster response and management[i] - we seek to overcome human-technology dichotomies. Exploring the phenomenology or different modes of embodying human-drone agency assemblages, this paper introduces notions of post-human, relational ethics and distributed responsibilities and sounds out what this might mean for ethical and societal implications in innovation and design projects, as well as efforts of regulating RPAS.

Short Paper – Ethical, Legal, and Social Issues
Proceedings of the ISCRAM 2015 Conference - Kristiansand, May 24-27
Palen, Büscher, Comes & Hughes, eds.

ECONOMIC INCENTIVES AND REGULATORY ISSUES

A European Summit in 2013 called for action that would enable the progressive integration of civil RPAS into civil airspace from 2016 onwards (EU Commission, 2014a). Identifying 'A new era for aviation', the EU is seeking to respond to calls from the service and manufacturing industry to remove regulatory barriers, harmonise the relevant operational rules and develop a common regulatory and policy framework in order to provide the legal certainty necessary for investment by European enterprises. Beyond their much talked about military use, RPAS technologies have been progressively maturing and are already used in some civil and commercial settings such as environmental monitoring, security, emergency response, surveillance and recreation.[ii] Yet, it is their potential to offer new services, novel applications and consequently further economic growth opportunities that has captured the European Commission's attention. Likened to the internet technologies of the early nineties, the promise is that RPAS technologies can offer 'a myriad new services' - from infrastructure monitoring and photography to the transport of goods and, in the long term, even people - along with a real opportunity to foster job creation and a source for innovation and economic growth. Emergency response is a highly significant domain in this, where innovations could be developed rapidly and emphasise benign potential.

Yet along with opportunities come also challenges. The lack of a unified regulatory framework means that special authorisations are issued through burdensome procedures on a case by case basis by each member state in order to allow providers and manufacturers to operate. This stifles market development and innovation. As the EU report stresses, ensuring a safe and harmonised regulatory framework is in the interests of both the service and manufacturing industry who may delay investment until clear and comprehensive legal frameworks are in place, but also the public who are identified as having serious concerns over issues such as safety, security and privacy. To address these issues, the EU Commission calls for

- Strict EU wide rules on safety authorisations.
- Tough controls on privacy and data protection.
- Controls to ensure security.
- A clear framework for liability and insurance.
- Streamlining R&D & supporting new industry. (EU Commission, 2014b)

Through such actions, the European Commission aims not only to establish a single, European RPAS market to 'reap the societal benefits of this innovative technology' but also to ensure that societal concerns on issues, such as safety, privacy and security, will be addressed through 'adequate public debate' (EU Commission, 2014a: 4).

Demilitarising and Humanising a Risky Technology

> *And let me be clear on one point. We are talking here about machines which will be under human control, not completely automatic. Somebody, somewhere will always have his or her hand on the joystick* (Siim Kallas in EU Commission, 2014c)

This is a point EU Vice-President Siim Kallas stressed in his press statement in April 2014. The attention to automation is driven by a perceived need to manage public acceptance, where - alongside fears about privacy intrusion - fears over safety in general and automation in particular have been identified as one of the key obstacles faced by the civil-RPAS market. The EU Vice-President is keen to address these fears head on. Arguing that the public view RPAS as 'killing machines' informed by military uses and 'catastrophe movies', the Roadmap produced by the European RPAS Steering Group (ERSG, 2013b: 30) recommends that such perceptions must be replaced by alternative visions. The Roadmap proposes the solution: 'Give to the citizens a different vision' (ibid: 36). Although the document does not outline specific strategies on how to achieve this, it hints at ways of directing the debate to particular avenues - such as towards visions of machines taking care of, what could be called, the "dangerous, dull, and dirty" [iii] jobs of oil rig maintenance or the hard grind of search and rescue. As the report recommends, the civil RPAS community should 'stress the roles RPAS have in conducting humanitarian operations or in testing for airborne toxins, rather than focusing only on the military and security applications' (ERSG 2013b: 39–40).

This battle of perceptions seems to be one of the key headaches that both industry and policymakers face at the moment and, as Boucher (2014) writes, it is part of a

general attempt to 'demilitarise' the drone starting from the name itself. In his article titled 'Don't say 'Drones', beg Drone Makers', Whittle (2013) writes that 'AUVSI [Aerial Unmanned Vehicle Systems International], the Air Force, the Navy, the Army and many defense industry leaders just hate the word "drones"'. There are reports of keynote speakers being advised not to use the '"D" word' in a drone and aerial robotics conference (Gosztola, 2013), and of industry experts pleading (unsuccessfully) to journalists 'Whatever you write, please don't call it a drone. It just strikes fear into a lot of people' (CEO of Scion UAS, Steen Mogensen in Terris, 2013).

In a UK article in *The Guardian* newspaper, the British Secretary of State for Defence, Philip Hammond (2013) wrote:

> *The most basic falsehood, invariably, is the use of the term "drone" – a name that conjures up images of computer-controlled machines, free from human oversight. It is a legitimate term in the right context but mostly it is used erroneously.*

Whether it is unreasonable fear and concern or a disingenuous PR strategy perpetuated by erroneous '"drone" activists', as the Secretary of State would have it (Hammond, 2013), it is particularly interesting that public acceptance is played out on images of *autonomous machines getting out of human control*. As Langdon Winner (1977) has demonstrated, the fear of autonomy and of uncontrollable, intelligent machines has long pervaded our technological and political imaginaries manifesting itself as the anxiety of losing control over our smart helpers who might learn and adapt to such a degree that they end up outsmarting us. Such fears of ultimately losing sight of who is the master and who is the slave have their basis on the humanistic belief of the exceptionality and mastery of the human against its Others, be they slaves, servants, or, in this case, machines designed to do our bidding.[iv]

Once again in the case of the drone, we see this fear being highlighted, repeated and in a way (per)formed in its very denial; namely, in the very efforts of good-willed policymakers and experts who seek to reassure us that, *really*, there is nothing to worry about, either because *we* kind of got it all wrong - as AUVSI's president, Michael Toscano is reported saying 'the average person on the street, and *even intelligent and informed people*, when they think of the word 'drone,' they think of the military, they think hostile, they think weaponised, they think large and they think autonomous. That connotation is not only inaccurate but damaging' (in Whittle, 2013; italics added) - or, because *they* will make sure that things don't get out of control - promises by the EU Commission of 'tough controls' and 'strict rules' function as reassurances that there will always be 'human oversight' or, as the EU Vice-President asserted in his earlier statement, there will always be somebody, somewhere with his or her hand on the joystick (in EU Commission, 2014c). Yet, as we will see, reality refuses to fit into such neat, paternalistic storylines. Human oversight is neither complete nor totally absent in RPAS in use.

Complexity – Beyond Human Control (Autonomy and Automation)

Underneath efforts to reassure what is perceived as an alarmed public with images of 'somebody, somewhere' always keeping a tight hold of the reigns, things are rather more complicated. While we do not have the space to explore the interlinked and often contradictory ways in which the concepts of autonomy and automation have developed through time,[v] we would like to make some preliminary but important observations which paint a more complicated picture; a picture which does not fit into humanistic stories of heroic humans, evil machines, and publics in distress.

Autonomy, Automation and Control

As the ERSG Roadmap report makes clear, automation and human control do not work against each other in the case of RPAS, but in synch, with a remote pilot in command under normal conditions, while automation is expected to take control in specific non-normal failure conditions, hence forming a complex, interlinked assemblage (ESRG, 2013a).

This has always been the case in modern aviation according to Holloway, Knight and McDermid (2014: 1) who write that, '[t]he notion of "autonomy" is neither absolute nor new in aviation' and point us to the direction of the Full Authority Digital Engine Controllers (FADECs) which control modern aircraft engines. As

the authors demonstrate, there are different degrees of automation for different systems and in different situations with different results which do not easily lend themselves to a 'simplistic view' of automation as good or bad (2).

Furthermore, as military experts stress, 'there is nothing unmanned about an unmanned system' (Michael Toscano, CEO of AUVSI, in Gosztola, 2013). In her testimony before a Senate subcommittee the former chief of AFRICOM (the US Combatant Command which covers Africa and Egypt) Martha McSally stated that

> *the military does use the term "remotely piloted aircraft" to explain … that it actually takes 200 individuals to keep one of these aircrafts airborne for a 24 hour orbit and that 200 individuals include the operators, the intelligence personnel, the maintenance personnel, the equipment people, the lawyers, and, also, part of the process you have literally hundreds of other personnel that are involved in the process on the military side when you are actually conducting one of these operations* (in Gosztola, 2013).

While this does indeed confirm that there is always "a human in the loop", we would argue that it does not in any way resolve the issue - as the military experts would have it - but actually opens the debate to further questions. Especially questions such as, when there is such a distribution of responsibility, who/what could, or should, take the blame when things go wrong?

Drones as Dual-Use Technologies

While drone advocates would like to break the link between drones and the military in the public's minds, this link is actually strong. By tracing the 'enthusiasm', as Boucher (2014) calls it, for the dual-use aspect of civil-RPAS development through the policy documents of the EU Commission's consultation process, the author demonstrates that there is a strong interdependence between the military and civil RPAS industries as the latter is expected to drive innovation and 'effectively amortise the high costs of development' in the military sector (EU Commission, 2009 in Boucher, 2014).

Under this light, the EU Commission's strategies for promoting public acceptance which are based on diverting attention from such links can appear 'disingenuous', as Boucher (2014) puts it, and can undermine efforts for a responsible and transparent innovation process. This becomes particularly pertinent if we consider that the EU Commission is operating under the framework of Responsible Research and Innovation (RRI) for the technology development and management in Europe. This is a framework which permeates the Commission's €80b 2014–2020 research funding framework, Horizon 2020, and emerged from the Commission's determination to bridge the gap between the scientific community and European citizens (EU Commission 2012).

Multiple Public(s)

The public is not the univocal (fearful, misinformed) entity that policymakers and drone experts imagine. There are cases of drone enthusiasts, of communities using drones in humanitarian emergency settings (e.g. Meier, 2014a, b) but also a limited number of studies that reveal a much more complicated and nuanced picture of the public which is not captured in media-hyped discourses (e.g. Eyerman, Letterman, Pitts, Holloway, Hinkle, Schanzer, Ladd, Mitchell, Kaydos-Daniels, 2013).

DISCUSSION: CHANGING THE STORIES

Haraway warns that there is no way out of stories. 'We exist in a sea of powerful stories' (1997: 45) that weave the material, technical, social, political and textual together. Yet she asserts that changing the technoscientific stories that surround us, both materially and semiotically, is a modest intervention worth making (ibid). In this paper we have attempted to give a taste of some of the powerful stories that surround the figure of the drone in order to create and open the possibility of re-telling them, of telling them *differently* as a way of intervention (Suchman, 2007).

Specifically, we argue that humanist dualisms that pitch human vs. machine, expert vs. layman, military vs. civilian, heroic vs. evil veil important complexities of modern technoscience and posthuman phenomenology. Instead, we need to move away from traditional conceptions of agency as an inherent property of individual, discreet, self-standing entities (humans and machines) and reconceptualise it as the effect of particular human-machine configurations (see

Barad, 2007). In Suchman and Weber's words, we need to 'refigure autonomous agency' (2014: 19) and, consequently, ethics and accountability in ways that can help us understand, account for and design around the complexities of our world.

By challenging paternalistic stories of heroic humans, evil machines and publics in distress, we seek to open up the possibility of imagining, designing and doing socio-technical innovation in "responsible and accountable" ways; that is, ways which recognise that, as Scuppli puts it, neither humans nor machines operate in autonomous realms. Indeed, 'complex systems are rarely, if ever, the product of single authorship' (2014: 5). Instead, as we have learned from our own experience in addressing ethical, legal and social issues (ELSI) through collaborative design in the Bridge and SecInCoRe projects, complex socio-technical innovation is the outcome of an ongoing and deeply political process of negotiation, exploration and tinkering, which needs to be done in situ and hand in hand with humans and machines, publics and experts, stories and materials as they are all entangled in dynamic, yet asymmetric, assemblages.

ACKNOWLEDGMENTS

The research presented here is part of the BRIDGE and SecInCoRe projects, funded by the European Union 7th Framework Programme under (BRIDGE) FP7-SEC-2010-1 Theme: SEC-2010.4.2-1: Interoperability of data, systems, tools and equipment, Grant agreement no.: 261817 and (SecInCoRe) Theme SEC-2012.5.1-1: Analysis and identification of security systems and data sets used by first responders and police authorities, Grant agreement no.: 607832. We are grateful to our colleagues in these projects for our many inspiring conversations and their insightful comments.

REFERENCES

1. Adams, S., Levitan, M. and Friedland, C. (2012) High Resolution Imagery Collection Utilizing Unmanned Aerial Vehicles (UAVs) for Post-Disaster Studies, *Proceedings of ATC & SEI Conference on Advances in Hurricane Engineering*, Miami, Florida, US, 777-793.
2. Boucher, P. (2014) Domesticating the Drone: The Demilitarisation of Unmanned Aircraft for Civil Markets, *Science and Engineering Ethics* (e-pub.). http://link.springer.com/article/10.1007/s11948-014-9603-3/fulltext.html [accessed 28.01.2015]
3. Chasin A. (1995) Class and Its Close Relations: Identities Among Women, Servants, Machines. In Halberstam J. and Livingston I. (eds.) *Posthuman Bodies* (pp.73-96). Bloomington and Indianapolis: Indiana University Press.
4. de Cubber, G., Balta, H., Doroftei, D. and Baudoin, Y. (2014) UAS deployment and data processing during the Balkans flooding, *Proceedings of 2014 IEEE International Symposium on Safety, Security, and Rescue Robotics (SSRR)*, Hokaido, 1-4.
5. ERSG (2013a) Roadmap for the integration of civil remotely-piloted aircraft systems into the European aviation system, *Final report from the European RPAS Steering Group*. http://ec.europa.eu/enterprise/sectors/aerospace/files/rpas-roadmap_en.pdf [accessed 28.01.2015]
6. ERSG (2013b) Roadmap for the integration of civil remotely-piloted aircraft systems into the European aviation system - Annex 3: A study on the societal impact of the integration of civil RPAS into the European aviation system. http://ec.europa.eu/enterprise/sectors/aerospace/files/rpas-roadmap-annex-3_en.pdf [accessed 28.01.2015]
7. EU Commission (2012) Europe's ability to respond to societal challenges Responsible Research and Innovation. http://ec.europa.eu/research/science-society/document_library/pdf_06/responsible-research-and-innovation-leaflet_en.pdf [accessed 28.01.2015]
8. EU Commission (2014a) Communication from the commission to the European parliament and the council: A new era for aviation—opening the aviation market to the civil use of remotely piloted aircraft systems in a safe and sustainable manner. http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52014DC0207&from=EN [accessed 28.01.2015]

9. EU Commission (2014b) European Commission calls for tough standards to regulate civil drones. http://europa.eu/rapid/press-release_IP-14-384_en.pdf [accessed 28.01.2015]
10. EU Commission (2014c) Statement to the media—Vice President Siim Kallas. http://europa.eu/rapid/press-release_STATEMENT-14-110_en.pdf [accessed 28.01.2015]
11. Eyerman, J., Letterman, C., Pitts, W., Holloway, J., Hinkle, K., Schanzer, D., Ladd, K., Mitchell, S. and Kaydos-Daniels, S. (2013) Unmanned aircraft and the human element: Public perceptions and first responder concerns, *Research brief*, Research Triangle Park, NC: Institute for Homeland Security Solutions. http://sites.duke.edu/ihss/files/2013/06/UAS-Research-Brief.pdf [accessed 28.01.2015]
12. Gosztola, K. (2013) Don't use the "D" word: They're "UAVs" or "RPAs" but definitely not "Drones", *The Dissenter*. http://dissenter.firedoglake.com/2013/10/11/dont-use-the-word-drones-theyre-uavs/ [accessed 28.01.2015]
13. Hammond, P. (2013) In defence of drones, *The Guardian*. http://www.theguardian.com/commentisfree/2013/dec/18/in-defence-of-drones-keep-civilians-troops-safe [accessed 28.01.2015]
14. Holloway, M., Knight, J. and McDermid, J. (2014) Neither Pollyanna nor Chicken Little: Thoughts on the Ethics of Automation, *IEEE International Symposium on Ethics in Engineering, Science, and Technology*, Chicago, IL, United States. http://ntrs.nasa.gov/archive/nasa/casi.ntrs.nasa.gov/20140010015.pdf [accessed 28.01.2015]
15. Meier, P. (2014a) Using UAVs for Community Mapping and Disaster Risk Reduction in Haiti, *iRevolutions: From Innovations to Revolutions*. http://irevolution.net/2014/07/09/uavs-for-disaster-risk-reduction-haiti/ [accessed 28.01.2015]
16. Meier, P. (2014b) Grassroots UAVs for Disaster Response, *iRevolutions: From Innovations to Revolutions*. http://irevolution.net/2014/03/18/grassroots-uavs-for-disaster-response/[accessed 28.01.2015]
17. Schuppli, S. (2014) Deadly algorithms: Can legal codes hold software accountable for code that kills?, *Radical Philosophy*, 187 (Sept/Oct). https://www.radicalphilosophy.com/commentary/deadly-algorithms [accessed 28.01.2015]
18. Suchman, L. and Weber, J. (2014) Human-Machine Autonomies. https://www.academia.edu/9659770/Human-Machine_Autonomies [accessed 28.01.2015]
19. Suchman, L. (2014) Humanizing Humanity, *Robot Futures*. https://robotfutures.wordpress.com/2014/07/19/humanizing-humanity/ [accessed 28.01.2015]
20. Suchman, L. (2015) Situational Awareness: Deadly Bioconvergence at the Boundaries of Bodies and Machines, *MediaTropes*, 5, 1, 1-24.
21. Terris, B. (2013) Can drones be known for more than causing death?, *Yahoo News*. http://news.yahoo.com/drones-known-more-causing-death-195047986.html. [accessed 28.01.2015]
22. Whittle, R. (2013) Don't say "drones", beg drone makers, Breaking Defense. http://breakingdefense.com/2013/08/dont-say-drones-beg-drone-makers/2/. [accessed 28.01.2015]
23. Winner, L. (1977) Autonomous technology: Technics-out-of-control as a theme in political thought, MIT Press.
24. Wise, M. (1998) Intelligent Agency, *Cultural Studies,* 12, 3, 410-428.

ENDNOTES

[i] Bridge project: http://www.bridgeproject.eu/en, SecInCoRe project: http://www.secincore.eu.

[ii] See, for example, Adams, Levitan and Friedland (2012), de Cubber, Balta, Doroftei and Baudoin (2014), or projects like ConservationDrones.org, a non-profit organization which seeks to build and use drones for conservation-related uses, and online communities such as DIYDrones.com, which focuses on DIY, recreational drone projects.

[iii] As Suchman writes in her blog *Robot Futures*, this is an oft-repeated triple used to describe those forms of labour which are considered a priority for automation, and argues: 'Assumed to be jobs that no human would want, this valuation makes absent the fact that these are the only jobs that, worldwide, increasing numbers of people rely upon to survive' (2014). Also, see Suchman (2015: 15-17) where the author uses the case of the iRobot company to demonstrate how mottos like these are used to construct robotic imaginaries which bring together narratives of military war fighting alongside narratives of civilian domestic life.

[iv] See Chasin (1995), Suchman (2007), Wise (1998).

[v] Suchman and Weber (2014) trace the genealogy of the concept of autonomy within the philosophical traditions that inform AI, robotics and contemporary autonomous weapon systems. In their account, the authors explore the intermingled and often contradictory imaginaries that accompany autonomous machines. As they write 'In the debate on autonomous weapon systems, it becomes even more obvious how autonomy is configured as self-sufficient, adaptive and self-determined performance on the one hand, and pre-programmed, fully automated execution under perfect human control on the other. These two imaginaries are profoundly intermingled, with questionable rhetorical and practical effects' (14).