Public, private, hybrid: EU public research funds and the development of European drones

Bruno Oliveira Martins and Christian Küsters

Abstract

This article relates the ongoing exponential growth of the drone industry in Europe with the vast amounts of EU public research funding canalised to drone research. It argues that discussions on EU security and defence policies often neglect relevant empirical developments that take place outside conventional arenas of political decision-making. In the case under analysis, dozens of drone development projects in Europe have attracted hundreds of millions of EUR from EU public funds with little accountability and scarce political oversight. These projects often configure partnerships that are neither strictly public, nor strictly private, and it is precisely a combination of their hybrid nature with the centrality of technology expertise that makes them less visible. This partial invisibility is particularly relevant in the context of a dual-use technology that enables new forms of surveillance, that can be used as a lethal weapon, and has thus the potential to pose societal challenges that demand public accountability and require enhanced democratic legitimacy.

1 – Introduction

In recent years, the number of projects carried out in Europe aiming at developing Remotely-Piloted Aircraft Systems (RPAS, or drones) has expanded dramatically. While some of the projects are strictly national, many of them constitute multi-national initiatives that involve funding from different entities. A relevant percentage of these projects are treated as Research & Development (R&D) endeavours and have attracted public research funding provided by the European Union (EU), in numbers that have grown exponentially under Horizon 2020, the EU's framework programme for Research and Innovation currently in place for the period 2014-2020. As will be shown here, over the last years, more than EUR 500 millions of EU research funds have been spent on drone projects, some of which develop dual-use technology, i.e. technology that can be used both for civilian and military purposes.

Additionally, as has been widely highlighted by both EU authorities and academic literature, the drone technology enable practices that pose challenges for societally held norms and values. Recent technological developments currently employed by drones allow new practices of surveillance, massive data collection, and, if enhanced with weapons, opens up for a new use of missiles both in and outside battlefields. The latter is a practice in which the United Kingdom and some non-EU countries, most notably the US and Israel, have engaged. [1] While virtually all EU member states are either involved in the use of drones or in projects to develop or acquire the devices (UVS International 2016)[2], the role of EU research funds as a means to trigger the above dynamics has received surprisingly little attention and has not been examined in a systematic way.

This article has two main objectives. The first one is to map the field of drone development in Europe and to critically analyse the exponential growth of EU public research funds in triggering and sustaining these projects. As will be shown below, this growth happened when the EU shifted the focus of drone research from 'Growth', 'Transport', or 'Aerospace' to 'Security'. The second objective is to understand why the usage of vast sums of EU public research funding into projects aiming to developing drones has not been more thoroughly scrutinised and debated. This is particularly relevant considering the amount of funds provided, the sensitivity of the technology itself and its dual-use character. Our proposal is that the EU has aimed at participating in developing drones in Europe by fomenting partnerships that involve both the governments of the

---

[1] Melzer, Dr. N. (2013): Human Rights Implications of the Usage of Drones and Unmanned Robots in Warfare. European Parliament, May 2013, EXPO/B/DROI/2012/12, p. 7f.
[2] Blyenburgh, 2016: RPAS Yearbook 2016 – 14th Edition, June 2016. www.uvs-info.com

member states and the private sector, and this hybrid nature of the partnerships makes them less visible and thus less accountable. We engage with and expand the literature on hybridization and hybrid rule through the work of Weiss (2014), Hurst and Lipschutz (2015), Hönke (2013) Schroeder et al (2014) and Leander (2015), among others, highlighting that these hybrid forms offer political actors a 'way of circumventing ideological-political blockages (…) that might otherwise have retarded or stymied innovation activism' (Weiss 2014: 151). Importantly, this way of governing security is a political choice that has political consequences, of which the lack of scrutiny and accountability are the most relevant ones. As Denis et al (2015) highlight, politics has a crucial role in designing and implementing change and creating hybridity in public services organizations.

The rise of hybrid governance observed throughout the Western and in particular in the United States in the 1980, leading to the expansion of what Weiss (2014) and others (Nelson-Pallmeyer 1992) call the 'National Security State', and is understood in the context of external pressures calling for increased innovation. The developments explored in this article in the EU context are the product of a similar narrative that crosses economic constraints and global security pressures with the wish for strategic autonomy. We argue that the theoretical proposition of this body of literature sheds new light on the role of public authorities in the fields of security and, in concrete, expands the knowledge on the role of the EU in the governance of security in Europe. Moreover, we claim that the theoretical propositions of hybridization contribute to making sense of a striking puzzle in the EU's handling of drones: despite the potential implications of the drone research for our societies at large and despite the efforts of a few Members of European Parliament (MEP) and some sectors of the civil society, the use of EU research funds in these processes has remained largely unseen and has been subject to little political accountability.

We build our analysis on data generated for this research covering three dimensions of the process under scrutiny: data on drone projects taking place in Europe; data on EU research funds used in drone-related projects; and data on initiatives of the European Parliament (EP) that relate to the use of EU research funds on drone projects.

The data on European drone projects was generated from several sources, in particular from the UVS Yearbook 2016, one of the largest RPAS lobby groups and whose comprehensive overview of current drone projects across the world is an international reference. Additional information was collected from reports from the European Commission and the European Defence Agency, as well as from media sources. The data on EU research funds used in drone-related projects was generated

out of information derived from the EU's CORDIS database[3], which lists all projects supported with EU research funding under the framework programmes. The terms 'UAV' (unmanned aerial vehicle), 'UAS' (unmanned aerial system), 'drone', 'RPAS' and 'unmanned' were used to identify projects involving drone technology. In a second step, we filtered this sample in order to identify the ones that explicitly address and advance drone technology. We disregarded projects only using drones as a tool or a means for research that does not revolve around RPAS technology itself, e.g. drones as a medium, e.g. for forest observation or for agricultural usage.

The data on initiatives of the European Parliament that relate to the use of EU research funds on drone projects was generated out of a search for EP resolutions and opinions on drone issues, as well as interventions of MEPs questioning EU authorities on the use of public funds for drone-related research. The timeframe under scrutiny entails the last five years since early 2012 to March 2017. The documents revised and quoted are to a large part written questions by MEPs to the Commission. These allow for a glimpse of the public oversight exercised by the EP regardless of the power distribution in the Parliament and its committees. All documents are publicly available via the EP's Public Register of Documents. The figures emerged of the research, detailed below, confirmed the expected growth of EU research funding for drone-related projects, but the magnitude of the numbers, the variation across EU Framework Programmes, the prominence of the "security" dimension, and the inconsequentiality of the modest European Parliament scrutiny bring new elements for understanding political and security dynamics within the EU.

2 – Europe's 'invisible' drones[4]

In recent years, drones have become a widely-discussed topic by media, security experts, military personnel, and NGOs. The discussions have mostly developed around two main dimensions. The first, and the most contested, concerns the usage of drones to conduct missile attacks. These weaponised drones have been used to carry attacks and targeted killings inside and outside battlefields, and have triggered legal, ethical and strategic debates on one key characteristic: the fact that drones are remotely piloted and are thus unmanned vehicles. The second dimension focuses on the use drones for surveillance, data-gathering, and patrol of areas such as conflict zones or non-

---

[3] (http://cordis.europa.eu/home_en.html)
[4] Unless otherwise states the following numbers and figures are derived from a careful analysis of the UVS Yearbook 2016 (2016 RPAS Yearbook, RPAS: The Global Perspective, 14th Edition, June 2016 – Blyenburgh & CO).

militarised locations such as borders. These debates are often organised around dichotomies that box the arguments into logics of "drones are good" or "drones are dangerous".

Importantly, these debates have largely neglected the European dimension of the new drone world (for exceptions see Dworkin 2013; Dorsey and Paulussen 2015; Martins 2015; Martins and Backhaus 2015; Hayes et al. 2014; Jumbert 2016). Yet, today there are more than 200 RPAS projects in Europe with double or purely military purpose(s) either already in operation or being under development (UVS International 2016). While basically all European governments (International Security lists 23[5]) pursue technological progress in this area, the bulk of the projects (ca. 60%) is concentrated at the defence heavyweights UK, France, Spain, Germany, Italy, Sweden and Poland (UVS International 2016).

More than half of these 200+ projects identified here are dual-use, whereas 80 are deliberately designed as military R&D (UVS International 2016). More than 60% of all research efforts fall under the category of mini, small, short range RPAS (and cannot therefore bear arms) and only 15 qualify as MALE (Medium Altitude, Long Endurance), HALE (Long Altitude, Long Endurance) or LALE (Low Altitude Long Endurance) drones. Five out of a total of more than 200 projects are explicitly designed as Unmanned Combat Aerial Vehicles (UCAV). The tight link between the size of a project and its R&D costs becomes evident when considering that more than 50% of the large (MALE, HALE, LALE) projects are joint developments of two or even more national governments. In total, we account for more than 25 cross-border projects in this R&D field in 2015 which make up more than 10% of all projects (all figures in this paragraph found in UVS International 2016).

So far, the UK is the only European country to have put their armed RPAS to use (Cole 2016[6]) and there is no European model of a UCAV yet. Others countries, though, are catching up soon, with Italy recently having acquired US approval to arm their US-procured Reaper drones[7], France being involved in the development of two UCAV projects (nEUROn as well as the Future Combat Air System) [8] and Poland working together with France to develop an armed version of the Watchkeeper-based GRYF[9], to name but a few examples. Armed drones are therefore also an European issue.

---

[5] http://securitydata.newamerica.net/world-drones.html
[6] https://dronewars.net/2016/07/19/european-use-of-military-drones-expanding/
[7] http://dsca.mil/major-arms-sales/italy-weaponization-mq-9s
[8] https://dronewars.net/2016/07/19/european-use-of-military-drones-expanding/
[9] http://www.unmannedsystemstechnology.com/2015/09/wb-electronics-and-thales-unveil-polish-gryf-uas/

Whereas most of RPAS projects are carried out either by one national government or a small consortium of countries/companies from different countries, the EU has become a relevant actor in the field of drones. Having understood the potential geostrategic, military and economic impact of the technology, the European Commission and the European Defence Agency (EDA) have recently geared up their efforts to foster cooperation among its member states in drone R&D. The most widely cited manifestation of this effort is the European MALE RPAS project carried out by Airbus Defence and Space (Germany), Dassault Aviation (France) and Leonardo S.p.a. (Italy) in cooperation with Spain.[10] Recently, the contract for the project's EUR 60m definition study was awarded to those three companies by OCCAR under EDA' auspices.[11]/[12]

The ambition to develop a European MALE drone is one of the outcomes of the seven-member "club" of drone-using countries that was formed at an EDA meeting in November 2013.[13] This group consists of France, Germany, Greece, Italy, the Netherlands, Poland and Spain and shares the vision of giving birth to a European drone.[14] Additionally, EDA is also involved in developing military RPAS certification, defining future RPAS payloads, streamlining airframes and datalinks, organizing MALE RPAS operational support and promoting RPAS Air Traffic Insertion.[15] The latter recently emerged in the form of the Enhanced RPAs Automation (ERA) project carried out by a multinational industrial consortium and backed by France, Italy, Poland, Sweden and Germany.[16] The project will look into the use of military and civil RPAS in non-segregated airspace as well as airports in order to overcome hindrances to RPAS air traffic insertion.[17]

Finally, the EDA also launched the MIDair Collision Avoidance (MIDCAS) project comprising eleven companies from five Member States to improve RPAS collision avoidance systems.[18] The ERA and the MIDCAS activities run under a forum called RPAS Joint Investment Programme (JIP)

http://www.uasvision.com/2015/07/22/thales-strengthens-watchkeeper-offer-to-poland/

[10] http://www.eda.europa.eu/info-hub/press-centre/latest-news/2016/09/28/european-male-rpas-definition-study-contract-awarded?utm_source=EDA+e-newsletter&utm_medium=newsletter&utm_campaign=October+2016

[11] http://www.eda.europa.eu/info-hub/press-centre/latest-news/2016/09/28/european-male-rpas-definition-study-contract-awarded?utm_source=EDA+e-newsletter&utm_medium=newsletter&utm_campaign=October+2016

[12] http://www.uasvision.com/2015/12/16/germany-to-lead-development-of-european-uav/

[13] https://euobserver.com/foreign/122167

[14] https://euobserver.com/foreign/122167

[15] http://www.sesarju.eu/sites/default/files/documents/events/rpas-workshop/EDA_RPAS_in_2015.pdf

[16] http://www.defensenews.com/story/defense/air-space/2016/02/16/eda-airbus-launch-project-integrate-remotely-piloted-aircraft/80468222/

[17] http://www.defensenews.com/story/defense/air-space/2016/02/16/eda-airbus-launch-project-integrate-remotely-piloted-aircraft/80468222/

[18] https://www.eda.europa.eu/docs/default-source/eda-factsheets/2016-08-25-factsheet-rpas03b9983fa4d264cfa776ff000087ef0f

that was launched by EDA in 2013, comprises of nine Member States (Austria, Belgium, Czech Republic, Spain, France, Italy, Poland, Sweden, UK) and sets out the R&D priorities in the field of RPAS safe airspace integration.[19] The Programme's activity is complemented by DeSIRE – the Demonstration of Satellites enabling the Insertion of RPAS in Europe jointly overseen by the EDA and the European Space Agency.[20] By providing frameworks for cooperation and initiating projects, the EDA has emerged as a pivotal actor in these processes. An expert-based agency whose work focuses on technical knowledge, its actions remain largely exempted from political accountability and oversight.

These developments are politically and analytically relevant for several reasons. They demonstrate that, despite persistent debates about Europe's incapacity to deliver on security and defence matters, its defence industry is active and willing to catch up with other aspiring military powers such a China, India and Iran and with the technological state of the art existing in the US and Israel. Additionally, they show that debates around defence cooperation in Europe are often most fruitfully found beyond the realm of the EU's Common Security and Defence Policy (CSDP). Finally, as will be analysed in the following section, there are several ways through which EU actors can become heavily involved in security and defence matters. In the case under scrutiny in this article, R&D research funds provided by the European Commission through its framework programmes have been decisive for the development of drones in Europe.

3 – Stepping up: EU framework programmes and drone research funding

As pointed out previously, the vast majority of countries in Europe are currently pursuing RPAS research and development. Drones are widely perceived as a decisive future capability for the military and as offering significant added dual-use value in realms as diverse as agriculture, logistics and security, among others.[21] The previous section provided a few examples of how European agencies, most importantly the EDA, have been involved in the context of RPAS R&D.

---

[19] https://www.eda.europa.eu/docs/default-source/eda-factsheets/2016-08-25-factsheet-rpas03b9983fa4d264cfa776ff000087ef0f

[20] https://www.eda.europa.eu/docs/default-source/eda-factsheets/2016-08-25-factsheet-rpas03b9983fa4d264cfa776ff000087ef0f

[21] See, e.g. Schrijver, R. (2016): Precision agriculture and future of farming in Europe. European Parliamentary Research Service – Scientific Foresight Unit, December 2016.

Yet, the most relevant EU involvement refers to the European Commission and its multi-annual research funding programmes.

The drone-related research is funded by various Directorate-Generals (e.g. Research & Innovation - RTD) as well as some of its agencies (e.g. Research Executive Agency - REA). As explicitly stated in the eligibility rules for Horizon 2020 and its predecessors, projects supported by the research FPs must not be defence-related, but may have a dual-use (i.e. bring about benefits for the civilian as well as the military sector). The Commission has funded RPAS-related research since its fifth Framework Programme (FP 5) covering the period from 1998 to 2002. Under this programme, it funded thirteen projects (among them ARC, CAPECON, COMETS, FASTWING, HELINET, USICO). Since then, and in total, the Commission has spent around half a billion euro via its research FPs on RPAS-related research. As the authors of an influential Statewatch report pointed out in 2014, support may take various forms: "The EU is subsidising European drone manufacturers, buying expertise from their Israeli counterparts and creating a favourable regulatory climate" (Hayes et al. 2014: 8).

Data[22]

As Table 1 shows below, the Framework Programme 7 (FP 7) from 2007 to 2013 financed 58 projects of RPAS(-related) research worth around EUR 274m. These numbers are growing exponentially under the current research programme Horizon 2020 that covers the period from 2014-2020. The entire research budget expanded from EUR 55bn under FP7 to about EUR 77bn under Horizon 2020. Yet the number and the value of drone-related projects is increasing at a much higher proportion. At the time of writing around EUR 150m had already been earmarked for 73 RPAS-related research projects.

Over the course of almost 20 years, the number of RPAS-research projects varied but saw a noteworthy uptick as of FP 7 (2007-13) (see Table 1). The number of projects supported by EU research funding increased from nine to 58 under FP 7 and already stands at 73 under Horizon 2020 Despite being engaged with drone-related research since 1998, serious EU support for RPAS-research only took off with FP 7 between 2007-13. The most recent numbers demonstrate that the Commission is interested in expanding its role in European drone-related research.

---

[22] Unless otherwise stated, the data presented in this section is derived from an extensive analysis of the European Commission's CORDIS database.
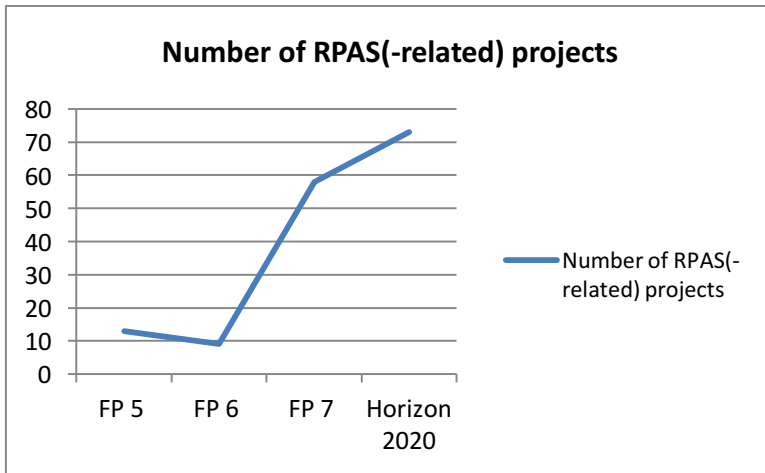
Table 1 – Number of RPAS-related projects funded by the EU framework programmes

A similar development can be seen when considering the value of RPAS-research projects and the value of the research funds' support for these projects. Table 2 reveals the overall value of RPAS(-related) research projects as well as the overall EU contribution to these projects [23]. Between FP 6 and FP 7 the value of the projects supported as well as of the EU's contribution increased eightfold. Under Horizon 2020 the value of RPAS-research projects is already almost five times higher than under FP 6 and is expected to increase further over the course of the next three years.
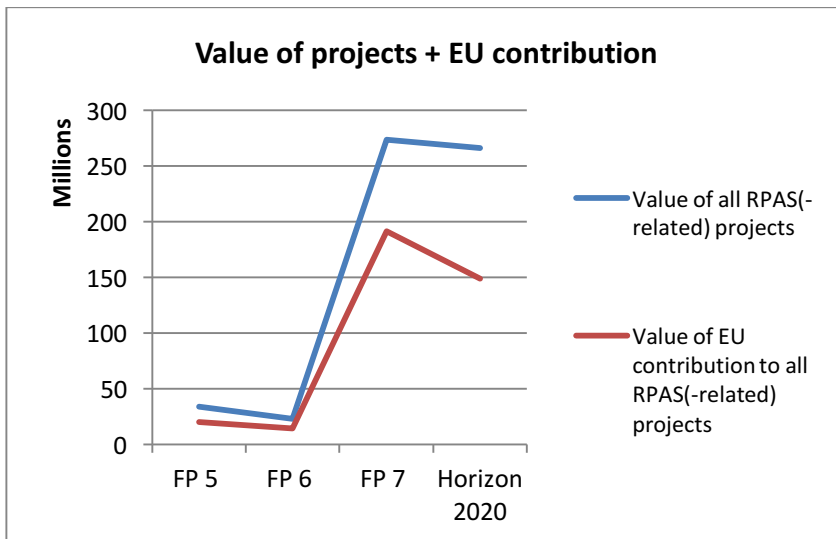

Table 2 – Value of all 73 RPAS-related research projects and their respective contribution from the Research Funds

---

[23] Based on the filtered information from the CORDIS database, the value of RPAS(-related) research projects has been added in order to quantify their overall value. The same calculation was undertaken for the overall value of the EU contribution through the research funds to those projects.

This growth is disproportionately higher than the overall increase in the research envelope, indicating a strong prioritization of drone-related research. The percentage of EU contributions to such research projects in the entire research envelope is also surging: from a negligible 0,013% under FP 5, it rose to 0,34% under FP 7 and currently stands at 0,19% under Horizon 2020 while the framework programme is half-way through.

Another indicator of the increasingly prominent role RPAS play in the Commission's research considerations is the sheer size of individual projects. Whereas the largest project under FP 5 was worth about €6m with an EU contribution of almost €3m[24], the largest project under FP 7 was PERSEUS – a surveillance system of systems to monitor migration and border crime worth €43.4m. The EU's contribution to this project amounted to €27.8m.[25] The project was coordinated by Spain's Indra Sistemas, but also featured other defence participants, such as Airbus D&S, DCNS, Boeing, NATO and the Greek Ministry of Defence. Out of the 10 largest RPAS-projects under FP 7, nine fall under the 'Security' headline, all 10 feature defence contractors as participants and six of the projects are coordinated by them (including DCNS, Seles, Airbus, BAE Systems).

Under Horizon 2020, the largest sums are currently channelled into SESAR projects.[26] SESAR is the technological pillar of the EU's Single European Sky initiative, set up in 2007, and currently accounting for four of the largest six RPAS-related projects under Horizon 2020 worth EUR 94,4m. PJ10 PROSA deserves to be singled-out, with a project value of EUR 43,25m it is worth more than twice as much as the largest non-SESAR project.[27] It is worth mentioning that the SESAR projects are clearly designed as public-private partnerships with a rather small contribution from the EU (e.g. EUR 5.3m for PJ10 PROSA) and a large sum invested by the projects participants – without exception all four current SESAR-projects supported by H2020 feature defence companies, including Airbus, Indra Sistemas, Thales, and others.

The single largest non-SESAR project so far is 'Reaching out', a response to an external crisis environment worth €21.1m also featuring drones.[28] The EU covers almost all of this cost with €18.8m disbursed to the coordinator Airbus and other companies such as BAE Systems. At the time of writing, two of the ten largest Horizon2020 drone-related projects fall under the 'Secure

[24] Airborne Minefield Area Reduction: http://cordis.europa.eu/project/rcn/54367_en.html
[25] PERSEUS: http://cordis.europa.eu/project/rcn/97515_en.html
[26] SESAR: http://www.sesarju.eu/
[27] PJ10 PROSA: http://cordis.europa.eu/project/rcn/206393_en.html
[28] Reaching out: http://cordis.europa.eu/project/rcn/204900_en.html

societies' headline with one being coordinated by defence contractors ('Reaching out' by Airbus D&S). Four of the largest 10 projects belong to SESAR (PJ10 PROSA, PJ03a SUMO, PJ11 CAPITO, PJ08 AAM) – and while none is coordinated by a defence contractor, all four feature defence enterprises as participants.

The move towards security

The steep surge of support for RPAS-research has been accompanied by a shift in focus of the programmes. Whereas RPAS-research projects were originally scattered over varying categories, from 'Growth' and '(Information Society Technologies)' (IST) under FP 5 and 'Transport', 'Aerospace', 'IST' and 'Mobility' under FP 6, the subsequent FP 7 introduced a dedicated 'Security' headline. Immediately, this became the largest category for RPAS-research (18 of 58 RPAS-related projects). Under Horizon 2020, this category has been renamed 'Secure societies' and already subsumes 13 out of the 73 RPAS-related research projects. Whereas the value of RPAS-research projects increased 12 times from FP 6 to FP 7, the EU support for such projects followed along and multiplied by 13 times. Under FP 7, one third of the projects fell under the 'Security' category accounting for two thirds of the value of all RPAS-related projects under this framework programme. The absorption rate of 67.3% of all EU contribution to RPAS-research only highlights the prominent position of the security context to drones research. In other words, 'security' became the main venue for, and the dominant logic behind, drone research funding.

In this process by which drone research came to be heavily linked to the security domain, defence companies have played a large role. While almost half of the RPAS- projects under FP 7's 'Security' headline were either coordinated by a defence company or had at least one participating, these projects accounted for 81.2% of the overall value of RPAS-projects under FP 7. They also absorbed 78.7% of all EU support granted for such projects. Therefore, the projects with a heavy involvement of defence companies are on average more expensive than others and receive a disproportionate amount of EU funding. As of march 2017, defence contractors play an important part in 18 of those 73 Horizon 2020 projects, leading 13 of them. These projects account for 65,4% of the value of all RPAS-related projects and absorb 47,6% of all EU contributions to RPAS-related research under H2020. Although the figures are still lower than under FP 7, the direction is similar

and therefore we can extrapolate that they are expected to rise over the remaining years of Horizon 2020.

4 – The (lack of) accountability around drone-related projects

Considering that a) the sums involved in drone-related research are very substantial, that b) they have been increasing in a sustained way for a few years, that c) these projects address dual-use technology of a sensitive nature, and that d) the data surrounding these projects is publicly available, one should expect extensive public and political scrutiny. This oversight would typically come from investigative media and other researchers, non-governmental / civil-society organizations, and, importantly, the EU institutions that provide judicial and parliamentary scrutiny, ie., the EU Court of Justice and the European Parliament (EP). Yet, this is not observed in practice and the EU's extensive involvement in the drone development enterprise has thus remained widely unexplored.

There are some notable exceptions to this general trend, and these can be grouped in two categories: the first one encompasses published reports from European NGOs, think tanks, and networks of investigative journalists. Here, we include research from Statewatch (Hayes et al 2014), Drone Wars (2016), a report from the Centre for Security and Defence Studies within the Belgian Royal Higher Institute for Defence (Csernatoni 2016), the activities of the civil-society group *European Forum on Armed Drones*, and the member-funded journalism platform *De Correspondent*' project 'Security for Sale'. The Statewatch report *EuroDrones, Inc.* (Hayes et al 2014) remains the most influential representative of these activities, with its conclusions triggering debates at the EP, as we will show below.

The second and most important category includes initiatives from the European Parliament aiming at exercising oversight of the activities of European Commission. These initiatives, analysed below, are either collegial, in the form of resolutions, or emerge out of actions from individual or small groups of MEPs.

Resolutions and Opinions

In 2013 and 2015 two EP Resolutions expressed support for a stronger role of the Commission in defence research, particularly via Horizon 2020 (2013/2125 (INI))[29] and 2014/2220 (INI))[30]. The first one explicitly 'welcomes the Commission's intention to launch a preparatory action for EU-funded research in support of CSDP missions' and invites the Commission to put forward a proposal for such an initiative for the next multiannual financial framework. The second one also welcomed further RPAS-research under Horizon 2020 and called on the Commission to expand the number of calls for this aim during the remaining years of the programme. It also flouts the idea of a preparatory action for defence funding under the forthcoming multiannual financial framework once more and clearly favours of a stronger grip of the Commission in the area of defence research, including RPAS.

Yet, in the same period, a joint motion tabled for a EP Resolution from 27 February 2014 (2014/2567 (RSP))[31] put forward two demands regarding RPAS:

1) The "development, production and use of fully autonomous weapons which enable strikes to be carried out without human intervention" should be banned;
2) The Commission shall keep the European Parliament "properly informed about the use of EU funds for all research and development projects associated with the construction of drones".

In its Resolution from 29 October 2015 (2014/2243(INI))[32] the Parliament also touches upon the use of the EU's research funds. The EP "strongly recommends" to enhance participation opportunities for the European public, industry, citizens and other stakeholders in order to "address their concerns regarding the protection of fundamental rights" and the risks and challenges that go along with RPAS. This underlines that the European Parliament is aware of the dangers that accompany RPAS research and of the lack of accountability of the Commission in their use of the research funds.

---

[29] http://www.europarl.europa.eu/sides/getDoc.do?pubRef=-//EP//TEXT+REPORT+A7-2013-0358+0+DOC+XML+V0//EN

[30] http://www.europarl.europa.eu/oeil-mobile/fiche-procedure/2014/2220%28INI%29?lang=en
[31] http://www.europarl.europa.eu/oeil-mobile/fiche-procedure/2014/2567%28RSP%29?lang=en
[32] http://www.europarl.europa.eu/oeil-mobile/fiche-procedure/2014/2243%28INI%29?lang=en

Such a viewpoint can be substantiated by a number of Opinions voiced by the EP's Committee on Civil Liberties, Justice and Home Affairs (LIBE). Commenting on the safe use of RPAS on 3 September 2015 (2014/2243 (INI)) [33], the committee highlighted data protection concerns and encouraged the Commission to support research on the safety, security and privacy issues in the operation of RPAS. For this purpose, it explicitly suggested using the research funds, including Horizon 2020. The Committee also proposes tapping into the same funding sources to facilitate safety measures like anti-jamming and anti-hacking to ensure 'the safe use of civilian RPAS'. Addressing the Civil Law Rules on Robotics on 8 September 2016 (2015/2103 (INL)) [34], the committee in its draft opinion expressed its concern about the 'protection of private life and the right to the protection of personal data' in regards to the use of RPAS by law enforcement authorities.

On the back of a European United Left/Nordic Green Left (GUE/NGL)-led effort, the European Parliament also tried to amend the 2017 budget (2016/2047 (BUD)) [35] to prevent the Commission from funding a €25m 'Preparatory Action (PA) on Defence research' which would also cover the research on a European MALE drone. However, following agreement between the Commission and the European Parliament on 17 November 2016[36] as well as the Council's formal approval one and a half weeks later, the EP still adopted the 2017 budget on 1 December 2016 – including the PA under Horizon 2020[37]. In its recent *Resolution on the European Defence Union*, the EP then included clause 23 calling "on the VP/HR to take an initiative to bring together major companies and stakeholders of the European defence industry with the aim of developing a European drone industry" (European Parliament resolution of 22 November 2016 on the European Defence Union (2016/2052(INI))[38].

---

[33] http://www.europarl.europa.eu/oeil-mobile/fiche-procedure/2014/2243%28INI%29?lang=en

[34] http://www.europarl.europa.eu/oeil-mobile/fiche-procedure/2015/2103%28INL%29?lang=en

[35] http://www.europarl.europa.eu/oeil-mobile/fiche-procedure/2016/2047%28BUD%29?lang=en

[36] (http://www.consilium.europa.eu/en/press/press-releases/2016/11/16-budget-2017/)

[37] "Preparatory action on Defence research" - Is in the last draft proposal: Title 02 04 77 03: Internal market, industry, entrepreneurship and SMEs – Horizon 2020 – Research relating to enterprises – Pilot Projects and preparatory actions (p. 21, http://data.consilium.europa.eu/doc/document/ST-14635-2016-ADD-3/en/pdf) 14635/16 – Brussels, 24 November 2016

[38] http://www.europarl.europa.eu/oeil-mobile/fiche-procedure/2016/2052%28INI%29?lang=en

Written Parliamentary questions

The most common and widely used method by the Parliament to inquire about the Commission's involvement in drone research is via written parliamentary questions. Out of the 30 interventions regarding the topic of RPAS between early 2012 and March 2017, 15 were questions raised by the MEPs concerning the use of public funds for drone research. Two of them explicitly request clarification of information given in the above-mentioned Statewatch report (Hayes et al 2014), i.e. on the overall amount provided for RPAS research (according to the report, it amounted to €315m as of 2014). In a response to these requests, the Commission mentioned that it "*cannot confirm*" these figures and it establishes them to be rather in the "*tens of millions*"[39].   With eleven written questions to the Commission revolving around the issue, the GUE/NGL has been most active EU group expressing scepticism as to the application of public funding. It was also the first one with Cornelis de Jong wondering in March 2012 about IAI's inclusion in a Frontex demonstration on RPAS usage for border surveillance.[40] GUE/NGL was also the driving force behind the above-mentioned intended amendment of the budget for 2017. Compared to the European People's Party (EPP), it is worth mentioning that the GUE/NGL is not only more active, but also more wary and precise when it comes to potentially negative ramifications of funding for drone research.

One of the more noteworthy exchanges is a question regarding RPAS technologies which the Commission answered on 30 May 2016 (E-004353/16)[41]. MEP Renau Muselier (EPP) pointed to the need to ensure RPAS safety by rendering them easily identifiable and interceptable in case of breach of law. The Commission replied that it does have the clear intention to continue and expand financing research on dual-use RPAS technology via Horizon 2020, especially in the fields of identification and interception. It also drew attention to a Call for Proposals currently being open under Horizon 2020 also covering the topic of 'detection and neutralization of rogue/suspicious light drone/UAV flying over restricted areas'[42]. All of them feature defence contractors either in the lead or as participants and the EU contribution per project ranges from €3.5m for AEROCEPTOR[43]

---

[39] Question for written answer P-002891/14 by Rina Ronja Kari (GUE/NGL), 12.03.2014)
[40] https://publications.europa.eu/en/publication-detail/-/publication/6b65541d-97f6-440e-b543-6381bc11cfe7/language-en
[41]   http://www.europarl.europa.eu/sides/getDoc.do?pubRef=-//EP//TEXT+WQ+E-2016-004353+0+DOC+XML+V0//EN&language=de
[42] Other projects put in the spotlight were the FP 7-supported SEABILLA (E-002516/2013), SUNNY (E-007959/2014), AEROCEPTOR (e.g. E-001904/14) and CLOSEYE (e.g. E-007499/2013)
[43] AEROCEPTOR: http://cordis.europa.eu/project/rcn/106475_en.html

to €9.8m for SEABILLA[44]. Regarding the latter, MEPs from GUE/NGL inquired about the close relationship between the project's supervisory team from Portsmouth Business School funded by FP7. This team was also supervising a doctoral programme on drones which have been used by the military in Central Asia, the Middle East and Africa. The Commission once more only highlighted the "exclusively civilian" nature[45] of the security research under FP 7. In August 2013, MEP Sabine Lösing (GUE/NGL) put forward a question regarding further details on the FP 7-supported projects AEROCEPTOR and CLOSEYE[46]. Further information was provided by the Commission highlighting that no direct research into drones was supported by FP 7. Following the same MEP's written question from October 2015, the Commission also had to clarify details regarding the foreseen payload of drones in the SUNNY[47], AEROCEPTOR[48] and CLOSEYE[49] projects – all of it purely civilian.

A close analysis of the behaviour exhibited by the European Commission in response to the MEP interventions reveals a pattern that is far from fulfilling the two demands expressed by the Parliament Resolution mentioned above. The Commission has generally not provided information beyond what is absolutely required and remains opaque about how and why it finances such projects, some of which, for example, explore technologies to be applied at the EU's external border for 'migration management'. Instead it undermines the demonstrated interest on the side of the MEPs as representatives of the European public and the EU citizens by withholding relevant details. The trend continues with the Commission further expanding its grip on defence and security research with limited to no public oversight or accountability following the approval of the budget 2017 by a vast majority of MEPs.

5 – The hybridity–unaccountability nexus

The article has so far documented the EU's engagement in drone development through the channelling of public research funding to private RPAS projects, many of them with an explicit double-use dimension. Contrasted with the startling lack of information, communication and

---

[44] SeaBILLA: http://cordis.europa.eu/project/rcn/94732_en.html
[45]   http://www.europarl.europa.eu/sides/getDoc.do?pubRef=-//EP//TEXT+WQ+P-2014-002891+0+DOC+XML+V0//EN
[46] http://www.europarl.europa.eu/sides/getAllAnswers.do?reference=E-2013-007499&language=EN
[47] SUNNY: http://cordis.europa.eu/project/rcn/111498_en.html
[48] AEROCEPTOR: http://cordis.europa.eu/project/rcn/106475_en.html
[49] CLOSEYE: http://cordis.europa.eu/project/rcn/108227_en.html

oversight by both public and private watchdogs, these developments require and understanding on why this is so. This section aims at theorizing the lack of scrutiny by drawing upon the literature of hybridity and hybrid rule which has been applied to understand contemporary security governance mostly in the US (Hurt 2015, Lipschutz 2015, Weiss 2014) and Africa (Bagayoko et al 2016, Höncke 2013, Kebede 2014, Moe 2016), while other individual case-studies can also be found (Neumann and Sending 2015 on Russia, or Russo 2016 on the post-soviet space, for example).

The concept of hybridity has a long tradition in public administration and public management[50]. For several years now, authors have highlighted the importance of an intermediate realm that greatly increased by the retreat of the welfare state (Kickert 2001: 136), as New Public Management reforms created public/private hybrid forms and have attempted to make the public sector more 'business like' (Denis et al 2015). New forms of governance have 'either replaced the archetypical, politically headed public bureaucracies as the primary arena for policy development and programme delivery, or sit alongside them connected through diverse formal and informal mechanisms' (Skelcher and Smith 2015: 433).

For Hurt and Lipschutz, hybrid rule in the security domain is 'a set of practices deployed by political elites that rely on the private sector to shield national security activities by expanding state power while constraining democratic accountability', aiming at safeguarding 'the state's legitimacy through valorization of the market as a primary mechanism in pursuit of myriad political objectives' (Hurt and Lipschutz 2015: 2). In line with Habermas, these authors argue that political elites re-imagined the private sector's relationship to public authority by drawing upon the material and ideational dimensions of the private sector to deflect state responsibility away from democratic mechanisms of accountability and to insulate state power from charges of illegitimacy. This aspect is very important to understand why the EU adopts hybrid forms of engagement with the European drone research.

When analysing the emergence of the what she calls the US National Security State, Linda Weiss observes that 'hybrids exist and multiply because of the functions they perform or because of the consequences that they allegedly produce, such as superior efficiency over traditional bureaucracies, improved operational flexibility, and insulation from democratic oversight' (Weiss, 2014: 149). In the US, the private sector is perceived as a silver bullet capable of relieving the two-pronged pressures of economic and strategic nature the military sector is facing in the international

---

[50] See Denis et al (2015: 282, table 1) for an overview of contending theories of hybridity in public services.

environment (Weiss, 2014: 150). Yet, this is not an exclusive of the US. The emergence of such a belief is a consequene of the neoliberal paradigm that has dominated political organization in the Western world in recent decades.

Following the demise of the Soviet Union in the early 1990s, the narrative of a "'gap' between the demand for security and supply" emerged (Leander, 2014: 146). Building on this narrative, only the private sector was in a position to bridge this gap, and today governments incentivize market actors to share a larger piece of the military technological research and developmental burden. The stimulus offered may take different forms. Among these are the creation of public-interest corporations, the partnering of federal labs with universities and industry to allow the transformation of the technology into commercializable commodities, government sponsored venture funds, and commercialization consortia made of universities, private companies, and governmental institutions (Weiss 2014: 155-165).

Together with the belief in the market, a second overarching paradigm of the hybridization trend is the idea of political risk aversion. Looking at the US, Hurt and Lipschutz demonstrate how the government, answering to a legitimacy crisis in the 1960s and 70s, started to move certain "potentially controversial public policies" to the private sector to prevent the public from gaining access to information (Hurt and Lipschutz, 2014: 18). Companies at the receiving end of this development gratefully take advantage of the new opportunity for large-scale, minimized risk investment and source of revenue. Especially in a high-technological, extremely innovative field such as RPAS-research, spin-ins from the private sector become relevant by enabling new, small companies to enter this market (Leander, 2014: 147). Leander furthermore emphasizes:

> "Companies consistently portray themselves as promoting technical solutions for mitigating risk and dealing with pressing security challenges and problems (Leander 2011: 1-16). This understanding of markets masks the politics folded into these supposedly technical and efficient solutions. It obscures the political choices embedded in the processes by which risks are identified and insecurity created." (Leander, 2014: 153)

Here, the enmeshment of the state and the private market becomes potentially problematic, in particular in an area as sensitive as security and defence research. Taking politically relevant issues outside the realm of normal, regular, elected political institutions and delegating them to the industry and the market raises questions of legitimacy. As argued by Hurt and Lipschutz, '(…) the potential consequences of hybrid rule not only increase state power but also render representative

institutions less important and the role of executive branch agencies more central' (Hurt and Lipschutz 2014: 33). Issues of legitimacy and accountability have also been highlighted by Bakayoko et al (2016) and Höncke (2013) in their analyses of hybrid security governance in different scenarios in Africa.

We argue that, due to its multi-level, multi-actor and de-centralised system of governance, and to the prominence of the internal market in the construction of the European integration project, the EU offers news possibilities for understanding dynamics of hybridization. As for the notion of governance, we follow Aarstad (2016) in approaching it as 'a meta-concept, encompassing subconcepts of modes of coordinating actions' that 'provide a useful starting point for discussing "how things are" (as opposed to "are things how they ought to be?"' (Aarstad 2016: 6). In this sense, hybridity is the vocabulary of the governance of governance, embedding the 'challenge of governing the range of nodes and nodal assemblages that now function to produce security goods across national, national and international levels' (Wood and Shearing 2007:115).

(In)visibility and (un)accountability

A fundamental consequence of hybridization is a decreasing visibility of the behaviour of the actors involved in hybrid forms of governance. By falling outside common political and legal categories, hybrid forms inhabit a space of uncertainty and non-definition that often escapes public scrutiny. In the words of Weiss, the state's activities are hard to see 'because they are often presented in – and thus obscured by – forms that merge public and private institutions in novel ways' (Weiss 2014: 146). It is important to underline that hybrid forms are not necessarily invisible. In fact, in the formulation of Leander, 'security can remain seen *and* unseen precisely because of its hybridity and that hybridity is core to the normalization, expansion and grip of hybrid security on the politics of security' (2015: 143). What is relevant to highlight is the fact that the hybrid nature of some forms of governance renders them *less* visible and therefore less accountable. For some authors, the attractiveness of hybridity to political elites lies precisely in this capacity to escape democratic scrutiny. Hurst and Lipschutz go as far as saying that 'hybrid rule is, first and foremost, a political project, one that serves the interest of both the state and its elites, who are concerned primarily about maintenance of an environment beyond democratic accountability and control' (2015: 17).

From this short overview of the literature on hybridity, we extract to our framework three dominant ideas: the belief in the market as a source of solutions to contemporary security problems, following a general endorsement of a business-like model of managing public affairs; the understanding that hybrid forms are efficient ways of managing political risks; and the fact that hybrid rule is generally less visible that strictly public or strictly private, therefore becoming less accountable.

6 – Discussion

The belief in the market for solving security problems while fostering technological development

In the drone technology, the European Commission, EDA and the European Parliament see a potential for a revolution on security and military practices. This has been mentioned often in strategic documents and non-binding papers emanated by these institutions, such as the above-mentioned resolutions of the EP and several reports from the Commission and the EDA. In a study commissioned the European Parliament's Directorate-General for External Policies, the authors argue for the need to increase the EU R&D defence investment, especially in dual-use technologies, in which Small and Medium Enterprises should play a vital role: "(…) while large corporations tend to be good at improving what they have been good at doing, newcomers are often more risk-oriented, quicker to react and better suited for exploiting radically new technologies or combining existing technologies" (Mauro and Thoma 2016). This belief in the market for finding the solutions for security problem explains the strategic choice of sharply increasing EU funding for these projects. At the same time, as mentioned by Hayes et al (2014), the EU institutions understand that, for the drone revolution to take place in Europe, 'various barriers – chiefly regulatory and technical – to the introduction and routine use of drones in EU airspace must be overcome' (2014:7). Considering the EU's non-sovereign character, and its correlated limited capacity to engage with the processes of security-related technological developments, fomenting the creation of hybrid partnerships between public entities (chiefly member states but also the EDA) and the private sector offers new possibilities and can be a way out for EU's difficulty in dealing with procurement, defence technology, and the high politics of security and defence.

The creation of "triadic partnerships among industry, universities, and government aimed at commercializing publicly funded R&D" (Weiss, 2014: 151) is one of the ways through which hybrid forms bridge technological development with the market. This form has been extensively

used by the EU under FP 7 and even more so under Horizon 2020, in line with similar developments occurred in the US. Many of the EU-funded drone-related projects involve universities and other research institutions, that develop their projects in partnership with government agencies and the industry. Considering the Commission's support for feasibility- as well as market-readiness studies, these partnerships seem like a materialization of the prevalent market-orientation of European defence politics.

Political risk aversion

Previous studies on hybrid security governance arrangements have shown that governments and other public bodies have gradually transferred competences on politically-sensitive areas from the public to the private sector, in a process that led to the creation on hybrid partnerships. In the case of the EU engagement with drone developments, this logic is also observed. In recent years, significant areas of the highly sensitive security domain have been transferred to expert knowledge-based agencies and to consortia that enmesh these agencies with the private sector. Expert knowledge-based policy-making has systematically increased in the EU, becoming mainstream in virtually all the domains of the security agenda, understood here in its widest sense. This includes agencies on defence (European Defence Agency and EU Satellite Centre, SatCen), borders (Frontex and Schengen Information System II, SIS II), EU freedoms (European Agency for the operational management of large-scale IT systems in the area of freedom, security and justice, eu-LISA), health (European Centre for Disease Prevention and Control, ECDC), and maritime security (European Maritime Safety Agency).

By allowing hybrid partnerships to assume the leadership of the processes, the EU shields away potential criticism of the outcomes of those same processes. In the case of drone research development, even though the EU framework programmes contribute with (co-)funding the research, the projects take a live of their own and, despite progress reports and mid-term evaluations, largely develop without tight scrutiny from the Commission. This is problematic to the extent that drones, in many regards, seem to be a solution in search of a problem. Many projects are developed aiming at advancing the technology itself, and not to do it in order to address one particular problem. And this becomes ethically problematic bearing in mind that drones allow and facilitate new forms of engagement with conflict and can be used as a weapon.

At the same time, and from the Brussels' perspective, these consortiums and hybrid arrangements are political risk aversion enterprises inasmuch as they largely remain unaccountable and exercise their tasks without political oversight. In the words of Weiss, hybrid partnerships are 'organizational innovations that – effectively if not intentionally – blunt the (national security) state's impact and blur its visible presence in economic governance, avoid political blockage, and promote the business of innovation' (Weiss 2014: 147).

The lack of accountability

The most problematic aspect of the way the EU engages with drone development in Europe is that its actions remain largely unseen and therefore widely unaccountable. Under the vests of technological research and development, the EU has been a silent yet decisive actor in the development of drones in Europe. The figures provided above in our article have shown how many dozens of drone-related research projects have received public research funding with little accountability, even though the technology is of a dual-use nature.

Perhaps more important than the lack of public outcry (some remarkable exceptions notwithstanding) is the nature of the processes involving the European Parliament. One of its main functions is to exercise supervision powers. According to the text of the Treaties, these allow it to exercise oversight over other institutions, to monitor the proper use of the EU budget and to ensure the correct implementation of EU law. Vested with direct democratic legitimacy, the EP functions as a representative of the people of the EU. Considering all the sums involved and the problematic issues involved with drone-related projects, it is surprising that the EP has not performed its supervision functions more thoroughly. When individual MEPs or Parliamentary groups raised direct questions on the Commission about the use of EU public funds for supporting drone-related research, the Commission did not provide enough information nor guarantees that all projects abide to EU law regarding, for example, privacy and protection of fundamental rights. Additionally, the resolutions approved by the Parliament that touch upon the issue of EU funding for drone-research have not been followed up.

These dynamics are not exclusive of the particular case of EU funding of drone research. Rather, they confirm a defining characteristic of hybrid rule. As Hurt and Lipschutz have put it, 'hybrid rule not only increases state power but also renders representative institutions less important and the role

of executive branch agencies more central' (Hurt and Lipschutz 2015: 33). This political logic has relevant implications in inasmuch as it contributes to underlying distrust of a political and technocratic elite towards "the public" and it affects the already challenged democratic standards in EU security policy-making.

The EU as hybrid itself per definition

A final aspect worth considering is that, in the plethora of classical forms of political organisation, the EU is a hybrid itself. For decades, its original political structure has been triggering debates on its sources of legitimacy, its constituent power, its constitutional character, or the possibilities it enables for developing efficient foreign and security policies. Indeed, some of the characteristics used in this article to define hybrid rule are often attributed to the EU by some its critics. These include issues such as the lack of accountability, its business-like, technocratic character, and the invisibility of many of its decisions that nevertheless have significant impact on people's lives.

Our argument here is that, precisely due to its hybrid nature, the EU is a venue in which the consequences of sub-levels of hybrid governance are amplified. Juxtaposing two levels of hybridity leads to more technocratic ruling, more expert knowledge-based decision-making, and less visibility and accountability.

7 – Conclusions

This article has shown how EU public research funds have been consistently used in the development of drones in Europe. In recent years, especially since FP7, the rise of EU funds invested in these projects has been exponential, and this movement occurred as drone research became gradually placed under an idea of security, instead of the previous categorization as growth, R&D, or transport. Importantly, the use of more than half billion EUR for projects dealing with this technology have received scarce attention and is largely unaccountable. The few attempts by the EP to gain more information and increase transparency and accountability met the Commission's resistance in providing information or in following non-binding recommendations.

These processes result from the growing importance of hybrid forms of governance observed in Western democracies in recent decades, with a particular emphasis on the security and defence domains, where technological development and expert-knowledge play a fundamental role. The EU, being itself a hybrid form of political organization, has thoroughly embraced hybrid ways of influencing drone developments in Europe and is therefore exposed to the consequences of this form of governance, some of which can have a relevant impact in terms of lack of transparency, political legitimacy, and democratic accountability.

References (incomplete)

Aarstad, ÅK (2016) 'Who governs Norwegian maritime security? Public facilitation of private security in a fragmented security environment', *Cooperation and Conflict*, Firstview, doi: 10.1177/0010836716652425.

Bagayoko, N., Hutchful, E. and Luckham, R. (2016) 'Hybrid Security Governance in Africa: Rethinking the Foundations of Security, Justice and Legitimate Public Authority', *Conflict, Security & Development* 16 (1):

Security and safety from the bottom up: hybrid security governance. 'Learning Lab on Security Sector Governance in Africa', Geneva: African Security Sector Network; Open Society Foundation; and Geneva Centre for the Democratic Control of Armed Forces.

Csernatoni, R. (2016) *Defending Europe: Dual-Use Technologies and Drone Development in the European Union*, Focus Paper 25, Brussels: Centre for Security and Defence Studies, Royal Higher Institute for Defence.

Denis, J-L et al (2015) 'Understanding hybridity in public organizations', *Public Administration* 93(2): 273-289.

Dorsey, J. and Paulussen, C. (2015) Towards a European Position on Armed Drones and Targeted Killing: Surveying EU Counter-Terrorism Perspectives, The Hague: International Centre for Counter-terrorism.

Dworkin, A. (2013). Drones and targeted killing: Defining a European position. London: European Council on Foreign Relations.

Hayes, B., Jones, C., & Töpfer, E. (2014). *Eurodrones Inc*. London: Statewatch and Transnational Institute.

Hurt, S and Lipschutz, R eds (2015) *Hybrid Rule and State Formation: Public-Private Power in the 21st Century*, Oxon: Routledge.

Junk, J. and Rauer, V. (2015) 'Combining Methods: Connections and Zooms in Analysing Hybrids', in Schlag, G., Junk, J, and Daase, C. eds., *Transformations of Security Studies: Dialogues, Diversity and Discipline*, Oxon and New York: Routledge.

Kebede, D.G. (2014) *The Hybridization of Security Sector Governance for Peace-Building and State-Building in Somalia*. The Southern Voices Network Research Paper No. 2, Washington: Wilson Center.

Kickert (2001): Public management of hybrid organizations: governance of quasi-autonomous executive agencies. *International Public Management Journal* 4 (2001) 135-150

Leander, A (2015) 'Seen and Unseen: Hybrid Rule in International Security', in Hurt and Lipschutz eds, *Hybrid Rule and State Formation: Public-Private Power in the 21st Century*, Oxon: Routledge.

BO Martins (2015) 'The European Union and Armed Drones: Framing the Debate', *Global Affairs* 1(3): 247-250.

BO Martins and B. Backhaus (2015) 'Why and How the EU should act on Armed Drones', *Global Affairs* 1 (3): 259-267

Mauro, F. and Thoma, K. (2016) *The Future of EU defence research*, Directorate-General for External Policies, Policy Department, ref. EP/EXPO/B/SEDE/2015-02, PE535.003, Brussels: European Parliament.

Moe, L.W. (2016) 'The strange wars of liberal peace: hybridity, complexity and the governing rationalities of counterinsurgency in Somalia', *Peacebuilding* 4(1): 99-117.

Sandvik, KB (2015) The Political and Moral Economies of Dual Technology Transfers: Arming Police Drones', in Završnik, Aleš ed., *Drones and Unmanned Aerial Systems Legal and Social Implications for Security and Surveillance*, Geneva: Springer, pp. 45-66.

Schroeder, U.C., Chappuis, F. and Kocak, D. (2014) 'Security Sector Reform and the Emergence of Hybrid Security Governance', *International Peacekeeping* 21(2): 214-230.

Skelcher, C. and Smith, SR (2015) 'Theorizing hybridity: institutional logics, complex organizations, and actor identities: The Case Of Nonprofits', *Public Administration* 93(2): 433–448

Weiss, L (2014) *America Inc.?: Innovation and Enterprise in the National Security State*, Cornell University Press.