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Constructing the EU's high-tech borders: FRONTEX and dual-use drones for border management

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ABSTRACT

FRONTEX has highlighted Remotely Piloted Aircraft Systems (RPAS) as affordable and efficient capabilities for securing the EU's vast frontiers in order to further upgrade them into smart technological borders. In this regard, this article examines the EU's strategy and rationalisations to develop dual-use technologies such as aerial surveillance drones for border management. By drawing on critical security and technology studies and by focusing on their functional technological efficiency, the article argues that drones are being normalised in a technological regime of exclusion at the border-zone. It further contends that high-end technologies such as drones introduce a military bias as security enablers in border surveillance and as a panacea for the consequences of failed policies to manage irregular migration. A closer examination of several EU-endorsed drone projects reveals a pragmatic and industry-driven approach to border security, underlining the evolving homogenisation between internal and external security and the imminent "dronisation" of European borders.

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Introduction

FRONTEX, revamped in 2016 as the European Border and Coast Guard Agency, has singled out dual-use Remotely Piloted Aircraft Systems (RPAS) as modular and cost-effective technologies for securing the EU's frontiers in order to further upgrade them into so-called smart or technological borders (Dijstelbloem and Meijer 2011). The goal for the new FRONTEX was set out to improve the internal security of the EU and safeguard the principle of free movement of persons in the Schengen area (European Commission 2016, FRONTEX 2016a). The transformation occurred on 10 June 2016, the new agency, along with the member states, having as a directive the quick identification of any potential security risks at the EU's external borders. The new mandate has significantly expanded the role of FRONTEX: doubled permanent staff; created a rapid reserve pool of at least 1,500 border guards and a technical equipment pool at the agency's disposal; significantly increased the budget from €91.1 million in 2014 to a remarkable €282.1 million in 2017 (Wolff 2016); created financial and decisional autonomy in equipment acquisition,

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including drones; introduced periodic risk analysis and obligatory vulnerability assessments at external maritime and territorial borders; and, more importantly, granted discretionary powers in deploying its equipment at short-notice border operations (FRONTEX 2016a). With such developments, it could be said that FRONTEX has reached a higher potential and autonomy in both operational and technical terms.

RPAS, along with other offshore sensors, radars, satellite systems, and high-resolution imagery, are set to become an integral part of the EU's sophisticated technical arsenal for border surveillance, namely the FRONTEX-run and satellite-based European Border Surveillance System (EUROSUR). They represent an increasingly technologised approach to securing the EU's vast territorial and maritime borders against irregular migration, and they fall under what Bigo (2006) has identified as technologies of ban and the policing at a distance type of logic. The strategy with such technologies is to capitalise on their remote control capabilities (Bigo in Huysmans *et al*. 2006, p. 98) and data-gathering potential. Drones play a significant role in the virtualisation and automation of surveillance of irregular migrants and in preventing and managing smuggling, trafficking, and terrorism or other related crimes. What better technology to embody this remote-control logic than the efficient and automated surveillance drones, equipped with night-vision cameras, high-fidelity communications, considerable flight autonomy, and impressive data-processing capacity.

This article examines the European Union's (EU) strategy to prioritise the research and investment in state-of-the-art technologies such as aerial surveillance drones for border management. It addresses the transformation of the EU into a technological fortress (Armstrong and Anderson 2007, Marin 2011). The article also problematises the tendency to capitalise on cutting-edge surveillance technologies seen as the best responses to managing migratory flows at the periphery. In doing so, it also lays emphasis on automation and on the inherent isolation of the human factor from the governance of border management, exacerbated by the use of drone technologies as security enablers.

The article calls into question the EU's undeniable interest in dual-use Research & Development (R&D) and Research & Technology (R&T) drone projects financed under its structural funds for border management. It argues that drone technologies, as socio-technical assemblages, create a regime of "violent dehumanisation and non-differentiation" of people and have the potential to "further militarise […] government agencies" (Wall and Monahan 2011, pp. 243–245) such as FRONTEX. The key argument is that high-end technological solutions like drones are an outcome of the failure to address migration challenges with other means, being used as a technical panacea for the consequences of failed policies and politics to manage and secure the periphery.

Extant academic scholarship regarding drones' conceptualisation as dual-use technologies is scarce, especially concerning their application for both peaceful and military objectives and for different policy areas of interest like border management. While there is recent work concentrated on an emerging civilian market for drone technologies in Europe (Hoijtink 2014), on the EU's latest defence research and development policies (Karampekios *et al*. 2017), on drones used in warfare and with a predominantly American focus and a military-oriented dimension (Holmqvist 2013, Chamayou 2015, Noys 2015, Akhter 2017, Shaw 2017), there is little in-depth treatment as regards their impact on the EU's security continuum and specifically in the case of border security. With few exceptions of research dedicated to border surveillance technologies (Marin 2011, Lemberg-

Pedersen 2013, Jumbert 2016, Marin and Krajčíková 2016), there seem to be no disagreements or substantive debates surrounding the creation of dual-use RPAS and an EU drone fleet for border security (Stares 2016).

Drones are the type of technology that best exemplify the abandonment of the dichotomy between war and police in favour of a new conceptualisation of the "war-police nexus" (Neocleous 2013, p. 589). The focus is on "intermediary agencies" such as FRONTEX that "are situated 'between' police and armies, as if they were the solution to new threats" (Bigo 2006, p. 391). Such hybrid agencies represent a "normalising *dispositif* of complex technological governmental practices" and a strategic and technological intermixing of policing and warring regimes to enhance the EU's "sovereign capacity" (Neal 2009, p. 353) and order production in the periphery (Jensen 2016, p. 587). One aftereffect is the militarisation of border management by adapting military surveillance systems and techniques to controlling the EU's vast maritime and land borders in order to increase situational awareness in intelligence, surveillance, and reconnaissance (ISR) or in search and rescue (SAR) missions.

FRONTEX has shown substandard results in preventing the staggering rise in non-sanctioned border crossings from 159,100 people detected in 2008 to 1,822,337 in 2016 (Wolff 2016). In order to address the problem of unauthorised border crossings, in recent years a security-oriented approach to the migration crisis has gained increasing traction at the EU-level (Huysmans 2000, Huysmans *et al*. 2006, Léonard 2010, Lazaridis and Wadia 2015). This finds striking resonance in contemporary global security tendencies to create high-tech capabilities in order to provide surveillance, deterrence, and oversight over migratory influxes at external frontiers. In this regard, the militarisation, high technologisation, and increasing privatisation of border controls are but a few of the many symptoms that the new global insecurity narrative and approach to security after the war on terror have triggered in the past two decades (Bigo 2006, p. 387). It is not so much about responding to a fluid and uncertain international security environment, but it is more about prevention, the outsourcing of controls, the external governance of internal security (Lavenex and Wichmann 2009), and the production of technological "silver bullets" to new threats (Sauer and Schörnig 2012, p. 370).

It is important to note that the real impact of such technologies on border and homeland security remains under question, especially in terms of their actual effectiveness and the supposedly increased security they are intended to provide (Ceyhan 2008). The "rapid technological progress and the comparatively slow legislative process and regulatory rule-making" (Howard 2014) in the case of new technologies are other aspects to keep in mind when addressing the adoption of such technologies. Uncritically inserting drones into existing security frameworks for internal security purposes could have unforeseen or negative consequences in both policing strategies and border control activities, more so in the broader political and cultural fabric of European society in general. The "technological colonisation" of FRONTEX with dual-use drones requires more than ever the maintenance of checks and balances to attain a critical and "reflexive relation" (Heidegger in Thomson 2000, p. 210) to biased military technologies such as drones that first originated in the battlefield.

The article proceeds as follows. First, it lays out the EU's pragmatic strategy in engaging its periphery and the tendency to construct high-tech "virtual walls" via augmented and highly technologised bordering and surveillance strategies to protect against risks

associated with irregular migration. The article argues that the EU's border security strategy is to opt for high-tech solutions for controlling and monitoring irregular migration. Second, by examining the framing of specific EU-led drone projects under Horizon 2020 and the previous 7th EU Framework Programme (FP7), the article problematises the implications and challenges associated with the EU's impetus to introduce dual-use capabilities such as border surveillance drone technologies in the management of external borders. Finally, by drawing on critical technology theory scholarship, the article engages with the works of Marcuse (1998, 1999, 2006) and Andrew Feenberg (1999, 2002) and the concepts of technological rationality and technological bias. Due to their original design for military purposes, drone technologies were born in the battlefield and their initial creation was intended to attain certain hegemonic objectives in military terms. This final section contends that biased technological artefacts such as drones, despite their purported technological rationality, instrumental usefulness, and cost-efficiency as border security enablers, contribute to the creation of a militarised technological regime of exclusion at the EU's periphery.

The EU's pragmatic strategy to manage its periphery

The EU is the most developed example of a post-sovereign society and normative power (Bretherton and Vogler 1999, pp. 19–20) that constructs its identity transversely between multilateral, multi-level, and overlapping centres of governance. Accordingly, the current EU borders reflect the values, attitudes, and beliefs of the society they encompass. The effectiveness of such a society is measured against that of its borders, which act as either barriers or bridges to the outside world. The freedom of movement and the ideal of borderless-ness within the EU are clearly privileges exclusively reserved for EU citizens. The existence of high-tech and virtual fortress-type barriers at the EU's periphery is indicative of the EU's propensity to uphold the community's fundamental values and its normative rhetoric of inclusiveness within its borders alone. Moreover, the increasing use of drones in border security could entail a refashioning of borders into technological deterrents and barriers redolent of virtual combat zones, being constructed as ontological boundaries between a more radicalised "us *versus* them" (Wall and Monahan 2011, p. 151). The "dronisation" of borders is understood as an ongoing process that prioritises high-end technological solutions such as drones in the broader European securitised approach to migration.

With the new weight given to security and defence integration in the EU's latest 2016 strategic document, *A Global Strategy for the European Union's Foreign And Security Policy: "Shared Vision, Common Action: A Stronger Europe"* (EUGS 2016), the EU has taken an ostensibly realist approach to international relations with a pragmatic-oriented rebranding of its foreign and security policy, based on and promoting its values and interests. The EUGS has clearly enshrined the EU's own brand of a reimagined *Realpolitik* (Biscop 2016), which highlights the maximisation of European vital interests *and* values in foreign and security policy areas in a pragmatic and "principled" manner. In this regard, the EUGS still refers in several instances to the EU's ideal of normative or transformative power in global politics (Juncos 2017, p. 14). The pragmatic reorientation includes but is not limited to an integrated approach to the conflict resolution cycle (EUGS 2016, p. 28), the development of permanent planning logistics and collective security capabilities (EUGS 2016, p. 21, 27, 44), and the clear

division of objectives between NATO and the Common Security and Defence Policy (CSDP) – priority being given to the strategic autonomy of the CSDP (EUGS 2016, p. 20, 45). With the "principled pragmatism" concept, it could be argued that the EU has performed an epistemic shift from its previous civilian power normativity, which was heavily present in the 2003 European Security Strategy (ESS) – *A Secure Europe in a Better World* – to a more nuanced pragmatism and principled realism as outlined in the 2016 EUGS.

The EU has also recently started to put forward a pragmatic strategic vision based on the prioritisation of common interests, resilience-building programmes (Juncos 2017, p. 15), and investment projects in home-grown security and defence capabilities (EUGS 2016, p. 10). In the case of border management, the EUGS has clearly stressed the increased coordination between the CSDP missions and operations and the European Border and Coast Guard Agency and other specialised agencies to provide enhanced border and maritime security "in order to save more lives, fight cross-border crime and disrupt smuggling networks" (EUGS 2016, p. 20). Against this background, it is quite understandable that various security-oriented issues have slowly gained increased traction on the EU's policy agenda, among which are augmented and highly technologised bordering strategies for a "more efficient" migration policy and "effective" crises prevention (EUGS 2016, p. 27, 29).

The 2016 EUGS has recognised that in order for the EU to preserve its global normative influence and long-term approach to global public goods and shared values, it also needs to be backed by credible military power and innovative security and defence capabilities. The EU has acknowledged that the "soft power" type of reactive and ad-hoc responses to global crises are not enough anymore, as the EU needs to redefine its identity in security and defence terms. This is to be accomplished through a new level of ambition in civil–military relations and substantial investments in the R&D and R&T of high-end and dual-use technologies (EUGS 2016, pp. 36–38, 43–46).

The promotion of the internal ideals of liberal democracy and neoliberalism remains in place, but they are to be achieved with both civilian means and with credible power projection instruments such as military technologies on the higher-end of the capabilities spectrum. In addition, the scaling down of internal border controls with the creation of the Schengen area and the framework of the Area of Freedom, Security and Justice is to be matched by the scaling up and strengthening of the EU's external border controls (Jumbert 2016, pp. 92–93). This is particularly important in the case of the EU's shift in perception as regards the periphery and the more recent pragmatic approach to secure and upgrade its external borders by laying emphasis on the employment of highly advanced security technologies such as drones. It could be asserted that the EU has been involved in a technologically mediated order building via heavily investing in high-tech surveillance of the European peripheral airspace (Akhter 2017, p. 6).

In this case, cutting-edge surveillance technologies such as drones become "symbol-manipulating machines" that engender new regimes of aerial sovereignty and governmentality (Adey *et al*. 2013, Neocleous 2013), allowing for new ways of controlling and monitoring the European periphery. In a Deleuzean understanding, drones do not necessarily determine the production of such exclusionary regimes in the borderzone, but rather "express the social forms capable of producing them and making use of them" (Deleuze 1995, p. 80). From this perspective, the core critical argument about the concept of a high-tech fortress Europe revolves around the notion of the border, seen metaphorically

as a *point d'entrée* for the several interpretations of the EU's body politic and identity. Also, the process of highly technologised bordering of the homeland gives precedence to technological "silver bullets" such as surveillance drones in non-combat settings. However, the digital "virtual walls" created by surveillance drones could be construed as palliative solutions treating the effects and not the sources of complex challenges such as migration, which tend to become the norm rather than the exception. It seems that more migration flows caused by conflicts and climate change will test the EU's frontiers.

The importance given to high-tech security solutions is one of the consequences of the globalised post "war on terror" type of narratives of threat and insecurity (Bigo in Huysmans *et al*. 2006). These narratives "have given rise to a political and media fix on the notion of borders as security barriers" (Armstrong and Anderson 2007, p. 62). A cursory scrutiny of this policy field points towards the fact that irregular migration has been constructed as a security threat by the EU and correlatively criminalised by its linkage to terrorism, organised crime, drugs trade, and human or arms trafficking. Consequently, there has been a security logic being normalised (Neal 2009) by the EU's approach to irregular migration, which also reflects a tendency to further securitise migration (Léonard 2010) by proposing out-of-the-box technological solutions for policing the periphery.

The EU's recent dual-use R&D and R&T programmes under the structural funds have already put forward civil–military technological solutions for homeland security purposes such as border management. The European Commission, with dual-use technologies, aimed to create a common civilian and military contribution and a shared technological base from which both realms can share advanced technologies. There is an increased reliance on high technologies and their unhindered hybridisation, which could be interpreted as a back door for pushing forward an agenda to militarise policing and border management. Complex challenges such as irregular migration are being managed through technocratic policy initiatives and defence industry-driven lobbying to invest more in the research and development of cutting-edge technologies for border security. This move is also part of the EU's ingenious plan to overhaul a lagging behind European Defence Technological and Industrial Base (EDTIB) through investing in emerging technologies such as dual-use drones and by capitalising on a rising European market for civil security (Hoijtink 2014).

The choices were to be made between RPAS and Optionally Piloted Aircraft (OPA) for European border surveillance and SAR operations (FRONTEX 2012). The latter are aircraft that could be operated by remote control but with a technician on board, hence avoiding flight restrictions placed on unmanned drones in commercial airspace through the presence of a person during flight. The agency's former executive director, Ilkka Laitinen, emphasised that FRONTEX has been looking to expand its preventive surveillance operations beyond the EU to develop a "common pre-frontier intelligence picture (CPIP)" or virtual and prescient surveillance circles around the EU (Nielsen 2013, Jumbert 2016, p. 94). The arguments supporting such technologies go along the lines that Unmanned Aerial Vehicles (UAVs) are highly accurate technologies and they are much more cost-effective to deploy at sea for maritime surveillance to locate, for example, migrants or refugees in distress.

The European Commission has also underlined the efficiency narrative of drones, in terms of both their costs and dependability for border controls and CPIP objectives. It stressed the fact that CPIPs are to provide "the national coordination centres with

surveillance information on their external borders and on the pre-frontier area on a more frequent, reliable and cost-efficient basis" (European Commission 2016, pp. 7–8). FRONTEX has been designated to act as a facilitator in this case, "via the procurement of satellite imagery […] and co-ordinating the sharing of surveillance equipment such as unmanned aerial vehicles (UAV)" (European Commission 2016, p. 8). Conversely, this demonstrates a manifest interest to deter irregular migration before it reaches the EU's territorial waters or even stopping migrant vessels from departing (Jumbert 2016, 94). The EU is being shaped into a fortified and compact territorial entity that is technologically far-reaching in its power projection beyond its borders. This underlines a strong tendency to rationalise border surveillance efforts and reflects a pragmatic evolutionary pattern in the EU's actorness as a technological powerhouse.

Moreover, the "dronisation" of European borders introduces another technical level of complexity in border management practices, which will be further encoded and automated in response to more substantive security problems or humanitarian concerns (Johnston 1999, p. 27). Extensive literature on drone technologies deployed for surveillance purposes has problematised this very transformative influence in security making (Virilio 1994, Gregory 2011, Wall and Monahan 2011, Graham and Hewitt 2012, Sauer and Schörnig 2012, Adey *et al*. 2013, Asaro 2013, Coeckelbergh 2013, Holmqvist 2013, Neocleous 2013, Boucher 2015, Chamayou 2015, Jensen 2016, Akhter 2017, Wilcox 2017). According to authors such as Wall and Monahan (2011, p. 239), the surveillance capabilities of drones and the so-called ubiquitous "drone stare" radicalises a technological system of remote surveillance and violence. Drones provide an algorithmic visual mediation between the observers and the observed, being primarily data-driven technologies for the identification and monitoring of mobile targets in warfare scenarios (Wilcox 2017, p. 13). In other words, drones can produce what Virilio has termed as the "sightless vision" (Virilio 1994, p. 73) or a highly automated and computer-mediated perception, in which human cognizance is controlled and appropriated by the machine.

The sight and perceptions of drone technicians involved in border surveillance will become increasingly techno-culturally meditated, provided by "instruments and their scientific interpretation or military appropriation" (Johnston 1999, p. 30). This "god-trick" cloak of "scientific objectivity" (Haraway 1991, p. 3) and omniscience inscribed in the technologically mediated perception of drones could be interpreted as no more than "the institutionalisation of certain forms of blindness" (Johnston 1999, p. 31) determined by the assumptions that drones are technologically rational. The use of advanced surveillance drones may indeed present accurate, cost-efficient, and effective technological solutions to policing the EU's expansive borders, but similar to other types of remote surveillance technologies, they offer a reduced vision or a "scopic regime" of perception at the border-zone (Gregory 2011, Wall and Monahan 2011). The following section illustrates the pragmatic moves made at the EU-level to enhance FRONTEX's border surveillance capacities, including the use of drones in border controls.

FRONTEX and border surveillance drones

Smart borders or technological borders (Dijstelbloem and Meijer 2011) have become essential components in the EU's plan for controlling irregular migration, with the new

FRONTEX to increasingly employ drones as key tools in its border management activities. Integrated border management has been actually prioritised, by strengthening the functional aspects of the agency in terms of improved usage of information, border surveillance, and innovative technologies through the EUROSUR platform that became operational in 2013. The European Borders Surveillance system (EUROSUR 2018) is a multipurpose system designed to enhance the cooperation between FRONTEX and EU member states in order "to improve situational awareness and increase reaction capability at external borders", by enabling the rapid exchange of information and joint response to challenges through the use of advanced satellite imagery or ship reporting systems. The framework programmes have been heavily utilised to fund the development and demonstration of new technologies such as UAV projects for border security. RPAS have been prioritised as highly efficient solutions complementing the EUROSUR system and providing enhanced surveillance coverage of the EU's expansive maritime and sea frontiers. In this respect, the agency has organised practical demonstrations and equipment tests for the deployment of RPAS for border surveillance, going as far as paying for demonstrations of Israeli drones described as the ultimate solution for Over The Hill reconnaissance missions, Low Intensity Conflicts and Urban warfare operations (EUROSUR 2013).

Furthermore, by signing the "Tripartite Working Arrangement" (EFCA 2017), both the mandates of the European Fisheries Control Agency (EFCA) and the European Maritime Agency (EMSA) have been aligned to the European Border and Coast Guard Agency – FRONTEX. The new cooperation agreement has aimed to enhance synergy between the European agencies, to carry out joint border control tasks, to improve border surveillance, to intercept vessels suspected of "engaging in criminal activities", and to combat illegal fishing activities (EFCA 2017). The three agencies have been tasked to work together on launching joint coast guard surveillance operations, "for instance by jointly operating Remotely Piloted Aircraft Systems (drones) in the Mediterranean Sea" (European Commission 2015). RPAS are best suited for prolonged and accurate air surveillance over vast land and sea territories and ostensible irregular movements across borders (Ceyhan 2008), as "their real and imagined functionalities fit into an already existing narrative of the need to control borders through better 'situational awareness'" (Jumbert 2016, pp. 89–90).

Consequently, drones have been singled out as particularly useful for border surveillance and the monitoring of irregular migration flows at the EU's periphery. In fact, the EU has been upgrading its coastal and maritime surveillance to new levels, with most of the €81 million in funding up to 2020 being reserved for RPAS alone and a quarter to automated satellite reconnaissance capabilities developed for environmental and security concerns in the framework of the Copernicus programme (Monroy 2016). Copernicus has been the first user of the arms company Airbus' "SpaceDataHighway" (2018), a satellite relay system aimed at improving data transmission speeds that is also used by FRONTEX to operate drones (Monroy 2016). In early 2017, EMSA has acquired maritime drone surveillance services and signed multi-million contracts to rent the availability of drone technologies from Portuguese and Italian companies (Jones 2017, p. 42, 52). The goal has been to provide FRONTEX with better information gathering and surveillance capabilities to monitor Europe's borders and beyond, but without acquiring such technologies.

According to the 2017 watchdog report on "Market Forces: The development of the EU Security-Industrial Complex", published by the Transnational Institute (TNI) and

Statewatch, such service acquisition practices are constructing "a new public-private apparatus of surveillance and control" that is largely away from public scrutiny or knowledge (Jones 2017, p. 42). With such services, any EU member state can request that FRONTEX fly a fleet of drones to carry out coastal surveillance functions. In practice, FRONTEX receives the order from EU member states, then contacts the EMSA and activates any of the following three suppliers' services for up to two months: the Portuguese company Tekever's unmanned 150 kg heavy aircrafts that could fly up to 10 hours autonomously; the Portuguese Air Force to provide military expertise and services in UAV missions when the Tekever cannot cope alone; and the Rotary-winged drones of the Italian Leonardo S.p.A. (Pena 2017). Each unmanned drone is equipped to gather data and detect the smallest movements along the sea borders, transmit this information to the EMSA command centre in Lisbon, which then relays it to FRONTEX in Warsaw. The report put forward the argument that security is increasingly understood as "best delivered through the importation, knowingly or not, of militaristic models of command-and-control and the widespread deployment of new surveillance technologies" such as drones (Jones 2017, p. 9).

The EU has also been funding since 2013 the RPAS-ATM Integration Demonstration – RAID (2013) – project led by the Italian Aerospace Research Centre as part of the Single European Sky ATM Research (SESAR) programme in order to trial and test the operation of RPAS in civilian airspace (Monroy 2016). DeSIRE II (2018), "Demonstration of Satellites enabling the Insertion of RPAS in Europe", is a similar project run by the EU as a joint European Defence Agency (EDA) and European Space Agency (ESA) initiative. The project has examined the performance and use of satellite navigation for the control of large drones, by testing the Israel Aerospace Industries-made Heron 1 drone for target applications such as maritime surveillance and crisis management, a type of unmanned aerial vehicle used for example by Germany for reconnaissance purposes in Afghanistan up until February 2018 (Stevenson 2015, Dombe 2017).

In its Annual Activity Report 2016, FRONTEX (2016b) underlined the strategic cooperation in relation to Israel and Israeli drone producing companies for border security concerns. In January 2018, a contract award notice was published (2018) for the trials of RPAS for long endurance maritime aerial and border surveillance in the Mediterranean Sea, testing two military drones, the combat-proven Israeli Aerospace Industries' (IAI) Heron military drone and the Italian arms company Leonardo's S.p.A. Falco drone. FRONTEX already considered the viability of the Heron drone back in 2012, when several arms manufactures including the IAI displayed their drones for border security in Greece, but at the time, it was difficult to operate them in the European airspace due to regulation hurdles. Between 2013 and 2014, small-end drones have already been deployed as part of the Italian Navy's operation Mare Nostrum for search and rescue missions (Jumbert 2016, pp. 89–90). The SARA project (2018), Search and Rescue Aid using High Accuracy European Global Navigation Satellite Systems (EGNSS 2018), funded under the EU Research and Innovation programme Horizon 2020, has been conceived to create a semi-automatic system using Earth Observation data to enhance surveillance and to support SAR operations based upon deployable RPAS. However, their testing and implementation have raised an array of significant political and legal issues related to data protection standards and the externalisation of border protections to third parties

(Marin and Krajčíková 2016), in this case military agencies, private actors, and weapons manufacturers.

A 2016 watchdog report, "Border Wars: the arms dealers profiting from Europe's refugee tragedy", examined the booming border security market in Europe, which has been predicted to rise to over €29 billion annually in 2022 (Akkerman 2016). Concerning drone technologies for border management, the report emphasised the role of major European weapons manufactures such as Airbus, Finmeccanica (now Leonardo S.p.A.), Thales, Indra, Safran, and Saab (Akkerman 2016, pp. 36–40). Of note has been the joint development and marketing of the "Harfang" UAV by Airbus and the Israel Aerospace Industries, promoting a drone for tracking refugees and for border surveillance that was "tested" by Israel in Gaza (Akkerman 2016, p. 36). FRONTEX also paid weapons manufacturers for field demonstrations of advanced technological solutions for maritime surveillance, including companies such as Israel Aerospace Industries, Lockheed Martin, FAST Protect AG, L-3 Communications, FLIR Systems, SCOTTY Group Austria, Diamond Airborne Sensing, Inmarsat, Thales, AeroVision, AeroVironment, Altus, and BlueBird (Akkerman 2016, p. 33).

The defence industry has helped shape the EU's border security policy through lobbying pressures, regular interactions with the EU's border agencies, industry days, roundtables, specialist arms and security fairs, and by influencing the overall research and development policy agenda in the case of border management technologies. The European Organisation for Security (EOS), including Airbus, Thales, and Finmeccanica (now Leonardo S.p.A.), has been one of the most active and influential lobbying entities for increased border security (Akkerman 2016, p. 2). According to Lemberg-Pedersen (2013, pp. 152–153), such private security companies (PSCs) have played a central role in the design, framing, and the transformation of the EU's border security governance, important questions being raised about "the opaqueness of borderscape budgets, lock-in effects making it difficult for public actors to reverse PSC militarisation of borders and the humanitarian consequences of this for migrants".

According to a Single European Sky ATM Research (SESAR) outlook study, drones with longer endurance and flying above 150 metres are expected to be deployed for border security and maritime surveillance by the EU or member states and that could reach a fleet size of a few hundred units over time (SESAR 2016). The outlook study reflects the dual-use nature of drone technologies, by pointing out that such capabilities will likely be "in the form of technology transferred from the military" (SESAR 2016, p. 21). The study goes on to predict that dual-use drones and "more complex technologies originating from defence and military are also expected to be used in […] border security, maritime surveillance" (SESAR 2016, p. 25). It assesses that almost "a hundred drones are estimated to cover over 100 000 kilometers of European borders allowing for two flights a day flights over non-Schengen borders (15 000 kilometers) and daily on the coastlines (70 000 kilometers)" (SESAR 2016, p. 25).

Most importantly and reflecting a bias towards transfers of military technologies for border security, the SESAR study evaluates that the dual-use nature of "defence systems for national state and regional security is a leading discussion for drones", stressing the ease, cost-efficiency, and effectiveness of drones as compared to helicopters to conduct both border security and maritime surveillance operations (SESAR 2016, p. 58). For that matter, the European Commission announced in June 2017 a new multibillion-euro

fund under the European Defence Fund aiming to foster cooperation among EU member states, including projects with the objective to jointly invest in, develop, and acquire drone technologies and related satellite communications (European Commission 2017). The question still remains as to how exactly dual-use border surveillance drones will play out in the field and shape border management, or whether they would be used as a force for "good" to save more lives or to further technologise and reinforce exclusionary control practices at the EU's borderlines according to a logic of prevention (Jumbert 2016, pp. 91–92).

Overall, the EU-level strategies to test and invest in drone projects could be construed as an instance of preventive and fortress-type protectionist tactics of bordering, deterrence, and exclusion. There is an overt tendency to prioritise high technologies such as drones in border management and the adoption of so-called "robot armies at the EU's borders" (Hayes 2014). The EU's FP7 structural funds for security research have been allocated to defence consortia, including Israel Aerospace Industries (IAI), Sagem, Dassault Aviation, Thales, Airbus Group, Bae System, and Finmeccanica (now Leonardo S.p.A.). Rules have generally prohibited defence companies from tapping research grants under the structural funds schemes for the specific funding of military-oriented research projects. The concept of dual-use technologies has managed to circumvent such rules, covering equipment development such as dual-use drone technologies for both civilian and military objectives. To illustrate this point, the following section tackles several EU-endorsed drone projects under the EU's framework programmes.

European drone projects for border management

Starting from the early 2000s, the EU began funding for border surveillance drones under the European Commission's Preparatory Action for Security Research programme (PASR) (2004–2006). Most notable, the Border Surveillance by Unmanned Aerial Vehicles (BSUAV 2006) project amounted to €5 million. Led by Dassault Aviation, whose accomplishments include introducing Europe's first stealth drone and developing the nEUROn combat drone, the BSUAV project (2006) was tasked to carry out an exhaustive "socio-economic-technological trade off analysis of the potential of unmanned aerial vehicle (UAV) contribution; in terms of surveillance; to peacetime security of European borders." The study was conducted in several steps, from a "complete analysis of the potential contribution of RPAS to peacetime security on European borders, both green and blue," understanding the various security problems posed by different types of European borders, to the requirements on drone systems able to handle such challenging situations. The EU's input under the FP7 funds amounted to €433,000 and reunited under its umbrella several leading companies from the defence production sector, such as Dessault Aviation, Alenia Aeronautica, Rolls-Royce, SAAB, Thales, and Flying Robots (Hayes *et al*. 2014, p. 38).

Major stakeholders in the European aerospace defence industry have had vested interests in contributing to the EU-led policy agenda as regards the development of cutting-edge drone technologies. There are also overlapping interests in the partial and majority state ownership of such EU-based defence companies. For instance, Finmeccanica (now Leonardo S.p.A.) is partly owned by the Italian state, Thales is partly owned by the French state, and Airbus Group (former EADS) is partly owned by France, Germany, and Spain (Heinrich 2015). Several EU-funded drone development projects for border

control include SOBCAH, Talos, Sectronic, and Seabilla (Hayes 2014). They are focused on producing innovative surveillance and detection technologies aimed at creating a virtual fence around Europe (Wall and Monahan 2011, pp. 244). Furthermore, the Israel Aerospace Industries, a leading global producer of lethal drones, has benefited from significant EU-funded drone projects as part of consortia under the "security research" component of the FP7 structural funds programme, tallying a staggering number of 69 EU research grants to develop drones that can "autonomously" stop "illegal migrants" and "non-cooperative vehicles" (Hayes 2013).

Strong lobbying pressures from the technologically competitive European aerospace industry could also account for the EU's investment programme in the research and development of dual-use technologies, advocating for a more streamlined approach to the production of border surveillance drones. For example, the AeroSpace and Defence Industries Association of Europe (ASD) played a significant role as the most encompassing lobby association in Europe in aggregating an EU-wide corporate agenda to invest in the R&D and R&T of drones. The ASD (2018) stands for the Civil Aviation, Space, Security, Defence industries in Europe, and generates a turnover of approximately €197 billion, invests over €20 billion in R&D, employs approximately 780,000 people, and encompasses over 3,000 companies and 80,000 suppliers. This association of industries aims to preserve Europe's technological excellence and to secure Europe's force-projection beyond its borders. FRONTEX has been regularly taking part in forums dedicated to the securitisation of border controls alongside such major industry lobbying groups like the ASD, which represent leading voices in the European aeronautics industry (Fotiadis 2010).

FRONTEX has been granted the power to directly acquire border management equipment, making the agency an important new player in the drone sector and a potential customer for the drone-producing aeronautics industry. It is not surprising that hybrid aerial surveillance drones for maritime surveillance and for combating irregular migration have been considered by FRONTEX as security multipliers in border management (Nielsen 2013). FRONTEX has highlighted the humanitarian factor in the use of drones for border surveillance as effective tools for SAR operations, due to their operational potential for quick responses in saving lives. Drones are much more cost-effective to deploy at sea for maritime surveillance and to locate, for example, migrants or refugees in distress. With structural funds, the EU has made notable efforts to fund civilian drone projects that concomitantly benefit the military advancement of drones. In addition, bridging the structural-innovation gap in new technologies such as drones is one way forward to assure the EU's security autonomy and resilience, with the added benefit of also protecting the European defence industry's competitive niche in the case of high-end technologies.

Under Horizon 2020 and focusing on capability areas that are essential to strengthening Europe's technological and industrial base, several border management projects involving autonomous drone technologies have been noteworthy. In particular, emphasis has been given to improving maritime surveillance and situational awareness systems. For instance, the H2020 "Autonomous Dronistics for Security (ADS): optimised services with fleets of flying robots" project (2015), has focused for the first time on autonomously coordinating and managing fleets of drones for automatic video-surveillance and alarm response purposes. The H2020 "Elistar – Bringing unlimited autonomy to Civilian Drones: PULSE, an Intelligent Tethered Power Supply" project (2015) – aimed to develop the first intelligent

tethered power supply system to improve the autonomy of drones, targeting aerial surveillance among others.

Another H2020 drone project, the SECOPS – An Integrated Security Concept for Drone Operations (2017) in response to the SESAR2020 Remotely Piloted Aircraft Systems (RPAS) Exploratory Research Call – has aimed to push drone technology forward by ensuring that security risks in the Unmanned Traffic Management (UTM) concept, also known as U-Space, are mitigated at acceptable levels. The goal has been to enhance drone security and geo-fencing in several drone-related R&T projects and initiatives, engendering joint national, European, and industrial partnerships to provide innovative security solutions for drones. The H2020 Aerial Insights project – facilitating access to aerial drone imagery services through novel and cost-effective data analytics solutions (2017) – has proposed to put forward "faster, cheaper and more reliable" innovative solutions to extract drone imagery information from aerial data. The project has responded to the need of fast drone data processing for monitoring purposes and has recognised that today's existing solutions are both cost-prohibitive and expertise-poor. Also stressing cost-efficient and flexible solutions for a high variety of drones and missions, the H2020 IMPETUS project – Information Management Portal to Enable the integration of Unmanned Systems (2017) – boasted one project participant C-ASTRAL that provided "a wide view and extensive market experience for diverse drones-related business models, with applications in surveying, border protection or surveillance operations".

A more recent project, the H2020 ROBORDER to strengthen security through border management and through autonomous swarms of heterogeneous RObots for BORDER surveillance (2017), has been designed to develop and demonstrate "a fully-functional autonomous border surveillance system with unmanned mobile robots including aerial, water surface, underwater, and ground vehicles, capable of functioning both as standalone and in swarms". Interoperability and flexibility have been stressed with "adaptable sensing and robotic technologies that can operate in a wide range of operational and environmental settings", including the delivery of a complete and detailed situational awareness picture through border surveillance radars and mobile sensors "customised and installed on board unmanned vehicles." The Portuguese company Tekever that promises its customers field-tested and battle proven drone systems is leading the project and it will receive over €16 million from the EU budget (Jones 2018). Conversely, the H2020 REVOsdr – taking drones beyond and bringing them safely back (2018) – has targeted the development of more performant communications systems between inspection drones and operators, thus improving long-range real-time connectivity that allows an inspection drone to safely cover vaster territories. As interoperability is the key word used with regard to the advancement of hybrid drones within the EU, priority has been given to the development of low-cost and multi-purpose technologies such as drones for both civilian and for military objectives.

Several other examples of the EU-funded drone development projects for border management under the FP7 and their framing are also worth highlighting. They are part of a wider EU-driven and industry-supported agenda to find lucrative civilian–military synergies for border management technologies. STABORSEC (2007), the Standards for Border Security Enhancement project, was intended to develop cutting-edge technological equipment to be used for border security, by facilitating the "transfer of NATO standards for unmanned military platforms to the civil domain". Led by Sagem, a French defence and

security conglomerate, the project clearly validated the emphasis given to interoperability in the case of drone technologies, as well as the civil–military hybridisation tendency to transfer military standards of operations of drone technologies in the "civil domain" (Hayes *et al*. 2014, p. 30). This blurring of lines and the unproblematic conflation of civilian and military drones are indicative of the "militarisation of the civilian domain" (Mutter 2015) in the case of technologies such as drones. Moreover, when issues such as reinstating order in the periphery by the introduction of drones take a high-tech dimension, "political issues are transformed into a technical matter, as drone capabilities reduce larger and complex political issues into matters of functionalities" (Jumbert 2016, p. 91).

SOBCAH (2006), the Surveillance of Borders, Coastlines and Harbours, renamed "Safer European Borders" by the European Commission, was another EU-endorsed research project for the surveillance of land and maritime borders. The project received the amount of €2,000,000 of EU funding and was intended to identify the main threats relevant to "green" and "blue" borders and to tackle European border surveillance problems in order to deter the possible access for "illegal migrants, drug smuggler, and terrorists" (Athwal 2006). The way in which "illegal" migrants were featured in the project's description is particularly noteworthy, being singled out as possible "threats" and linked to "drug smugglers" and "terrorists." This is reflective of the broader criminalising practices in border management, the use of drones exacerbating such tendencies of objectification with the technologically mediated surveillance of the so-called "threat environment" at the borderzone.

The specific framing of the European border airspace as a threat environment and the borderzones as sites of criminality to be secured via drone technologies leads to the transformation of the subjects of surveillance into objects and targets to be tracked, policed, and deterred. Moreover, due to the superior aerial surveillance capabilities of such technologies, borders are no longer defined between an outside and an inside (Walker 2011), but also vertically between lower and upper layers of air surveillance (Mbembe 2003, p. 29). It becomes of vital importance to control the skies above and imbue them with a power significance or the "symbolic of the *top*" (Mbembe 2003, p. 29), the occupation of the skies becoming part of an expansive strategy to police the EU borderscapes from the air. It could be contended that in the centre-periphery separation, drones become the visual and virtual extension of the fortress observation tower or the watchtower, providing an elevated and safe place from which border sentinels may efficiently survey the threatening surrounding areas.

In addition, the emphasis on the effectiveness and cost-efficiency of drone-mediated surveillance could also run the risk of institutionalising dehumanising and non-differentiating tendencies in the perception of irregular migrants (Wall and Monahan 2011, p. 246). For instance, the motivation and the phrasing behind TALOS (2008), the transportable autonomous patrol for land border surveillance, is illuminating in this regards, principally because they advance "autonomous" technological solutions — the aerial surveillance drones, to deeper socio-economic problems. TALOS was funded with €13 million of EU money under the seventh Framework Programme funds in security priority and in collaboration with Israel Aerospace Industries, a chief producer of lethal drones.

On the one hand, the project listed the dangerous character of the Eastern borderline with the former Soviet Union and the dramatic changes it has incurred due to the EU accessions of Central and Eastern European countries: "the probability of occurrence

and intensity of illegal activities, […] illicit trafficking, […] illegal migration, […] human trafficking and smuggling." The justification of the project is colonised by instances of "good *versus* bad" type of reasoning that are meant to dichotomise and criminalise irregular migration prompted by poverty, suggesting an exclusionary rationale: "This part of the eastern EU frontier is a buffer between the relative prosperity of the West and the poverty of the former Soviet Republics." On the other hand, it is argued in the project that autonomous drone technologies are "more versatile, efficient and cost effective" to protect the EU's vast land borders, thus normalising the strategic and functional potential of such technologies in providing timely and efficient solutions for combating "illegal" migration.

Similar justifications were used in describing another maritime surveillance drone-related project, the WIMA^{2}S (2008) or the Wide Maritime Area Airborne Surveillance. Three elements were underlined, namely the reduced cost of operations, more autonomy, and improved efficiency through the introduction of unmanned aerial vehicles with reduced or zero on-board personnel. The "unmanned" and "autonomous" signifiers are redolent of recent efforts to automate drone operations and to create intelligent unmanned machines for surveillance purposes. However, automation and robotics point towards deeper complexities in the relation between the human and the machine components in border controls. Another issue to take into account is the fact that the use of drones in border management affects the technological constitution of subjectivities in the case of both border agents and irregular migrants. In the "us *versus* them" nexus embedded in the remote control automation of border controls, the technical constitution of subjects can be both beneficial and detrimental; beneficial in instilling a sense of detachment and omniscience to border agents through the high-definition oculus of the drone, and detrimental by de-humanising and reducing migrants to technical objects and targets of surveillance.

Cost-effectiveness was also highlighted in the SEABILLA (2010) project, on Sea Border Surveillance, which intended to define the architecture for cost-efficient European Sea Border Surveillance systems, by integrating space, land, sea and air assets, including legacy systems, in "the struggle against border infringements and maritime security." Conversely, the OPARUS (2010) project, the Open Architecture for a UAV-based Surveillance System, aimed to improve the automation of UAV-based aerial surveillance and to elaborate an open architecture for the operation of unmanned air-to-ground wide area land and sea-border surveillance platforms in Europe, centred on analysis of concepts and scenarios for UAV-based aerial surveillance of European borders. PERSEUS (2010), the protection of European seas and borders through the "intelligent" use of surveillance, a demonstration project supported by the FP7 Security Research theme, was designed to accentuate both the intelligent use of maritime surveillance and its enhancement with innovative technologies. The project's goal was to efficiently "monitor illegal migration and combat related crime and goods smuggling", and received over €27 million in EU funds, while the PERSEUS' consortium of major defence contractors and national authorities contributed another €15 million (Nielsen 2013).

Alternatively, the ICARUS (2012) project, the Integrated Components for Assisted Rescue and Unmanned Search operations, emphasised the undeniable advantages of high technologies during a major crisis and its uncontested aid to human crisis managers in saving lives, by providing increased situational awareness and by assisting search and rescue operations. The CLOSEYE-end (2013) project, the "collaborative evaluation of

border surveillance technologies in maritime environment by pre-operational validation of innovative solutions", also aimed to increase situational awareness and improve the reaction capability of authorities surveying the external borders of the EU. This initiative came in response to an "urgent sudden major challenge for the control of the migratory pressure from the North African coast" and to a limited market providing "innovative solutions" for the accomplishment of such objectives. However, the AEROCEPTOR (2013) project, the UAV - Based Innovative Means for Land and Sea Non-Cooperative Vehicles Stop, underscored the remote-control proficiency of drones in contrast to their life-saving potential. The project aimed "to increase the capability of law enforcement authorities to remotely, safely and externally, control and stop non-cooperative vehicles in both land and sea scenarios, by means of Unmanned Aerial Vehicles."

Also, the SUNNY (2014a) project, gathering 18 European companies and research labs from different member states, intended to improve the effectiveness of EU border monitoring and was meant to test networks and sensors for drones to be used by drones for maritime surveillance, the detection of "illegal" vessels carrying "illegal" immigrants and drug traffickers, and monitoring the coasts. SUNNY has been developing smart unmanned aerial vehicles with a two-tier sensor network, the first one aiming to detect suspicious targets over large areas and to provide global situational awareness, and the second one to track the targets and gather data to better assess potential threats and anomalies "by using novel algorithms." (SUNNY 2014b).

In the above project descriptions, the words illegal, effectiveness, cost-efficiency, intelligent, automation, surveillance, situational awareness, innovation, and unmanned are recurrently used to accentuate and justify the projects' objectives. They provide the strategic framing of high-end technologies and express the instrumental character of their technological efficiency (Marcuse 1998, p. 6). In light of the above, an *illusio* (Bourdieu 1998, pp. 76–79) is performed or the belief in the "fiction" of drones is normalised, as the effective and cost-efficient solutions for Europe's challenges at the borders. This *illusio* signifies the tendency to engage in the game of justifying and rationalising security capability production, by putting trust in drones, by stressing the intrinsic importance and efficiency of drones as strategic multipliers for the EU, and for fighting both old and new forms of threats. The EU has also put forward economic justifications in terms of accentuating the commercial payoffs of dual-use drones in order to preserve the EU's much needed competitiveness in the field of disruptive innovation (European Commission 2014).

In other words, arguments of functional and cost efficiencies are being used as framing strategies with a view to making "security solutions and technologies more publicly acceptable, and as central strategies to open up for legal authorisation and further commercial development" (Jumbert 2016, p. 92). Nevertheless, efficiency does not mean excellence or absolute objectivity in solving border security problems, due to the fact that technological solutions can malfunction as well as carry socio-political biases. This is a problematic position because there is a real lack of a European-wide public debate on the topic, coupled with the lack of a serious assessment of the limitations and the unintended consequences of such technologies where border management is concerned. The following section puts forward the theoretical argument concerning the technological efficiency of drones and its limitations, by taking issue with the technical rationalisations to justify the use of dual-use RPAS technologies in border management.

The drone efficiency narrative

Drone technologies, as seemingly very efficient solutions for border management, endorse a neoliberal rationality of governmental power (Foucault 2008, p. 3) that is relative to a specific (in)security context in which the EU currently finds itself. They also reflect the EU's quest to increase its sovereign violence both within and outside its borders (Foucault 1990, p. 136), while at the same time performing an unproblematic instrumentalisation and rationalisation of drones as security enablers in border surveillance. The conceptual lenses of technological rationality and technological bias help to unpack how the efficiency narrative of drones allows for both the normalisation of such technologies and the increasing militarisation of border management. The normalisation of drones is accomplished either by "domesticating this technology by downplaying the connection between the military and the non-military" (Boucher 2015, p. 1393) or by what this article has identified as the efficiency narrative of drones.

Drones embody very complex regimes of violence, profoundly transforming the dynamic between material objects and people, as well as between the civil and military realms. Their hybrid nature resides in the interlocking of humans and objects, technical and social relations, complex systems, values, and interests or what Haraway (1991) meant by the hybridisation between machine and organism and the "illegitimate offspring of militarism and patriarchal capitalism" (Haraway 1991, p. 151). With such technologies, the "human in the loop" tends to be dislocated or rendered secondary from the decisional cycle, in part because of the "better-than-human efficiency ethic" (Shaw and Akhter 2012, p. 1500) embedded in such technologies.

In addition, drones radicalise the very notions of panoptic surveillance (Chamayou 2015, pp. 16–17, 24), being seen as the next step in revolutionising twenty-first century security making along with artificial intelligence (AI). They are suggestive of a verticalisation of power or above-the-ground omniscient authority, from where everything can be efficiently monitored, policed, or targeted from the air (Chamayou 2015, pp. 54–55). Drones have been labelled as "dedifferentiating machines", engaged in a problematic process of homogenisation between the "battlefield and home space; civilian and combatant" (Andrejevic 2016, p. 25). In view of that, the introduction of new technoscientific transformations to border security practices, as prompted by complex surveillance systems such as drone technologies, can affect and transform border management strategies, operational concepts, and doctrines.

In a Foucauldian interpretation, neoliberalism is generally characterised by rationality (Kiersery and Stokes 2010, pp. 22–23) and a constant need for mechanisms of power such as surveillance and pre-emptive action to safeguard its interests, which are epitomised by a state of "permanent vigilance, activity, and intervention" (Foucault 2008, pp. 131–134, 1986, p. 239). The integration of remotely controlled robotic systems such as drones into the internal-external security nexus is a perfect example of reaching the highest levels of permanent vigilance, with all the trimmings of divinity, "ubiquity, instantaneity, immediacy, omnivoyance and omnipotence" (Virilio 1989, p. 17). The utilisation of drone technologies in border surveillance is part of an efficiency quest to rationalise border control mechanisms targeting "the continuing localisation and management of people and objects on the move" (Klauser 2013, p. 290). Thus, when the justification of drone technologies in the European security context is being constructed around the co-constitutive

nature of technological rationality and their utility, the effect is an overemphasised focus on efficiency from the point of view of both cost–benefit economic factors and their instrumental function in security-making.

Technological rationality is a concept introduced by the Frankfurt School theorist Herbert Marcuse in his 1941 article, "Some Social Implications of Modern Technology" (Marcuse 1998, p. 39), which he further developed in his 1964 book, "One Dimensional Man" (Marcuse 2006). The origins of technological rationality are to be found in the advancement of capitalist society and its efficient modes of production, this technological process creating "a new rationality and new standards of individuality" (Marcuse 1998, p. 42). The idea behind technological rationality is that once new technologies become generally accepted and organise the rationality of the entire social apparatus (Marcuse 1998, p. 48), then they can manipulate what is considered efficient and normal within that society.

As the previous section has demonstrated, drone technologies have been framed as maximising the EU's resilience in both economic and strategic terms as intelligent solutions in border management. Their production has been directly incentivised though investments in defence research and innovation projects, the EU taking a proactive approach to stimulate the European industry and market to finance new hybrid technologies for both internal and external aspects of security. The empirical evidence presented speaks to certain trends in the evolution of the EU's policy shift for supporting the RPAS introduction in border management. The EU has made notable efforts to fund for civilian drone projects that concomitantly benefit the military advancement of drones, with "at least €315 million of EU research funding directed at drone-based projects; of this almost €120 million has gone towards major security research projects" (Hayes *et al.* 2014). Bridging the structural-innovation gap in defence technologies was one way forward to assure the EU's security autonomy and to secure the European defence industry's competitive niche. Equally, the EU has been constructing a legitimising narrative around the technological rationality and multi-purpose efficiency of drones.

This interpretation has clear-cut normative consequences contingent upon specific historical and socio-political contexts prioritising rationality that in turn shapes how people relate to new technologies such as drones. Consequently, what Marcuse argued is that specific technologies create false needs of rationality and efficiency as social needs, thus normalising the use of such technologies. In the case of drone technologies, they lead to making ideas surrounding their technological efficiency acceptable as high-tech "silver bullets" to security problems. Therefore, they can be perceived as both effective and cost-efficient security providers. As a result, social needs for enhanced border and homeland security are transformed into ideals to strive for in defending the homeland. They have the power to create favourable attitudes that make the European society more inclined to accept certain military technologies that originally emerged out of the battlefield (Ocay 2010, pp. 59–60).

Critical technology theorist Feenberg's (1999) nuanced conceptualisation of technological efficiency introduces another layer of complexity in the constitution of drone technologies. From this perspective, Feenberg recognises that technology has an ontological impact on society, by hard-wiring specific cultural values into technical codes and devices (Feenberg 1999, p. 127, Thomson 2000, p. 206, 2011). In this interpretation, drone technologies are not solely determined by their functional efficiency in use and their performative

technological prowess in security making, but also by their original creation as war machines. There are a host of interests and values associated with militarism and the contextual underpinnings (Feenberg 2002, p. 15) particular to the battlefield and embedded in the design of drone systems as war machines (Mbembe 2003, p. 30). By introducing such technologies in border management practices, certain design legacies are also being transferred, thus supporting the militarisation argument in the case of technologised border security practices.

Biased technological objects (Feenberg 1999, p. 3) such as drones contribute to the reproduction of specific systems of domination and hegemonic practices of coercion and control by privileged actors and their worldviews against less privileged "others". Making reference to urban theorist Steve Graham and his reminder of Foucault's position on warfare technologies, Jensen (2016, p. 20) points out the fact that military technologies such as drones that are "tested" out in remote warzones have a tendency to "return" in cities and societies. The high-definition and constant aerial surveillance potential of drones awards a "three-dimensionality" (Jensen 2016, p. 24) to this security technology. They are able to spatially control the "fortress" internally, but also to project its "verticalised omniscience and domination" outside its walls (Graham and Hewitt 2012, p. 86). This is directly linked to the conceptualisation of the EU as a high-tech fortress and a space to be secured, further illuminating particular ways in which technological air-dominance is exerted to protect the homeland (Jensen 2016, p. 22).

Consequently, drone technologies are not simply determined by their functional necessities as efficient and cost-effective instruments for border security, but also by contingent assumptions about the civil–military or dual-use technological design in particular and the framing of the migration phenomenon as a securitised issue in general. By acknowledging a level of path dependency in the ways in which the materiality of technological objects such as drones shape human security practices (McCarthy 2017, p. 69), Feenberg emphasises the importance of the technological design process that carries with it specific socio-political biases and worldviews, such as criminalised perceptions of irregular migrants. In the case of drones for border management, their technological design as dual-use technologies, both for civil and for military purposes, is inherently biased. Moreover, this perspective provides deeper insights into the tensioned relationship between technological rationality and domination in the history of modern society, as well as how "technical reason becomes an ideological mask" (Leiss 1972, p. 39) obscuring mechanisms of domination. Nevertheless, according to Feenberg, not all is lost, technological biases are never fully entrenched or secured, due to the ambivalence at the lower levels of technological objects, thus giving leeway to human agency and progressive social change (McCarthy 2017, p. 69).

The concept of dual-use applied to drone technologies brings about further complexities, namely the legal and psychological barriers between civilian and military research, dual-use technologies as a smokescreen to justify further military spending, duality seen in terms of reconverting existing civilian or military technologies, or referring to different stages in the life cycle of technological production. The term dual-use is an open-ended signifier that is loaded with different production and strategic objectives, triggered either by economic-driven imperatives or by security concerns. In the case of dual-use drones for border surveillance, the emphasis is given to their modular effectiveness as security tools and their cost-efficiency in economic terms, both characteristics reflecting

the instrumental power of technological rationality. Such characteristics make any critical opposition to these apparently rational technical solutions to both border security and economic problems seem irrational and unfounded. If drone technologies are indeed both cheap to produce and highly efficient in solving security problems, then why question their use in the first place. In an effort to seamlessly link security and the economic profit of high technologies (Hoijtink 2014, p. 463), the EU and the arms producing industry have been making high-end technologies as centrepieces of security systems and the security providers against a wide array of dangers and risks, including irregular migration (Ceyhan 2008, p. 102, 107).

Nevertheless, the utilitarian dimension of drones as precision technologies is overemphasised, "woven up in myths of technological superiority, objectivity, and control that help support their adaptation" (Wall and Monahan 2011, p. 246). Furthermore, the ostensible accuracy of the "all-seeing" drones is in fact a matter of strategic framing, as proven by the countless technical glitches, the hacking incidents, the coding errors or the excessive faith placed in the quantitative and now artificial intelligence (AI)-driven data analysis provided by drones (Chamayou 2015, pp. 50–51). In the words of Edward Tenner (1997), technology "bites back", all the more so when policy makers and political leaders fail to grasp the complexities associated with new technologies. Aerial surveillance drones or what Paul Virilio has described as "sight machines" (Virilio 1989, p. 4) embody a host of complications from the perspective of both the users and the objects of their surveillance. Authors such as Noys have pointed out that nothing escapes the inhumanity of this aerial view, because from "the view of the 'travelling eye of God' what lies below is rendered as "defenceless and ridiculous"" (Noys 2015, p. 1). Scholarship dedicated to the omniscient surveillance capacities of aerial drones have described it as a "scopic regime" (Gregory 2011), "mobile panopticon" (Noys 2015), "drone vision" (Stahl 2013), and "drone stare" (Wall and Monahan 2011).

Drone surveillance, like other long-range surveillance, needs to take into account several ethical implications. The practice is conducive to the easier objectification of the surveillance targets by creating both physical and moral distance. This double-distance is translated in the so-called bureaucratisation and gamification of surveillance (Asaro 2013, Coeckelbergh 2013), which implies the lack of human empathy and the removal of moral and psychological foundations. Authors such as Holmqvist (2013) have also considered the ontological effects of drone surveillance on the conception of the human both in the case of drone operators and on their subjects of surveillance. According to Herbert Marcuse, in this scenario, drone operators enjoy what he termed as a "happy conscience", where "guilt has no place", because technological rationality facilitates transgressions "free from all pangs of conscience [to] live happily ever after" (Marcuse 2006, pp. 79–80).

Conclusion

The article has contended that the development and use of drone-related technologies will have direct military and civilian consequences, which in turn will also affect larger cultural and economic phenomena. Smart, dual-use technologies such as drones are neither neutral nor normative-free technologies, as they embody a host of implications such as ethical and legal regimes of usability; not to mention the risks associated with their presumed technological rationality and superiority in security making from a distance and

the alienation of the human factor by the use of remote-controlled surveillance technologies.

It is difficult to assess the implications of disruptive security technologies such as drones in border management, especially because they can both solve security challenges but also pose further problems. The EU policy makers, the European public, and the defence industry alike need to carefully evaluate the dual-use potential of disruptive technologies and strike a healthy balance between their military and civilian use. On the one hand, the "dronisation" of border management is an instance where the EU is seeking to externalise its irregular migration problems by pushing border controls outside the EU and by enhancing its technological supremacy and aerial surveillance arsenal for preventive purposes. This is a strategy primarily aimed at consolidating a restrictive security apparatus in order to discourage migratory inflows. On the other hand, drone technologies could better help identify irregular migrants at risk and enhance the surveillance capabilities of border agents in order to save lives as well as revitalise an industry and a market that are lagging behind in the case of new technologies.

The article revealed that the EU has taken concerted efforts to invest in drones as strategic technologies for border security. It argued that the "dronisation" of border management falls within the broader European securitised approach to migration. The EU's technology-driven response towards irregular migration is to prioritise automated aerial surveillance drone technologies and to externalise controls to private drone manufactures and operators. Such strategic moves support policy outputs that give precedence to the EU's technological power in controlling irregular migration. They also create further opportunities for discrimination and exploitation in the case of vulnerable migrants, as they introduce a technical, spatial, aerial, and a mental distance in border management practices.

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