REVISIONS; Ms. No. RCMS-2020-0048R1 204808270

Title: Visualizations of the small military drone: Normalization through 'naturalization'

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Funding details: N/A

Disclosure/ declaration of interests: The author declares no conflicts of interest.

Word count: 10,000 words (inclusive of article, abstract, references, figure list, captions)

Figures: Figure list on page 39

Ethics approvals: The fieldwork cited in the piece took place while a PhD Student in Human Geography at the University of Exeter. As such, the research went through the University's postgraduate student ethics board, and passed this (no application number was given). Where under an event ethnography interested in observation, visualizations, and passing / fleeting encounters, rather than sustained and in-depth interviews, the research (at the defence tradeshows) did not require informed consent to be given by each and every delegate observed/ conversed with at the tradeshow. No identifying details are included about any of such encounters/ individuals.

Acknowledgements: I would like to sincerely thank both the paper's editor, Victoria Basham, and two anonymous reviewers, each of whom offered valuable, constructive and kind feedback on the paper. All mistakes are of course my own.

Visualizations of the small military drone: Normalization through 'naturalization'

Abstract

We are in the midst of a global turn to the drone. Responding to the 'unmanning' of contemporary warfare, interdisciplinary scholarship has interrogated the human operators and non-human actors underpinning the drone, and their wide-ranging ethical, geopolitical, and legal implications. A key facet of extant drone debates surrounds drone vision – both as it operationally visualizes and is fetishized. While comparatively nascent, scholars have begun to explore how drones are instead visualized across particular media. In this article I identify two lacuna within extant drone scholarship: first a lack of attentiveness to small military drones, which while comprising the majority of global military arsenals remain comparatively absent from scholarly analysis; and second, a need to attend to a greater diversity of visual representations of the drone. In response, this article explores promotional visualizations of small military drones as they are ethnographically-encountered at a key site through which their usage is compelled and their functioning enabled - the defence tradeshow. In so doing, I identify three central frames through which the drone is repeatedly represented therein. I argue that these frames both engage and employ visual conventions associated with 'nature' and the 'natural' in order to 'naturalise' and normalize the drone in as-yet unaccounted ways. Approaching the drone through the current, yet under-examined, visual milieu of the defence environments in which it is promoted, the article contributes to both interdisciplinary drone scholarship, and literatures exploring the visual cultures of militarism more widely.

Key words: Drones, unmanned, visual analysis, visual culture, militarism

Introduction

Wearing an event pass, I step through to the exhibition floor. A maze of stalls, bright and striking displays, lies ahead. The hall busies as people filter in, stopping to browse, muse and discuss defence products and 'capability demonstrations'. My eyes flit, landing upon the 'drone pavilion'. I wander towards it, passing posters and leaflets featuring drones with familiar names – 'hornet' and 'hummingbird' – and pictured in and against 'natural' scenes – mountains, forests, skies and seas. As I mull over these nods to, and representational forays into, the natural world. I slow to observe a group of men gathered, looking at the ground. One gestures at a shadow on the floor before moving his hand upwards, pointing to a drone hanging above their heads. The drone looks like a bird, and, the stall's representative continues, 'so does its shadow'. The men exuberantly nod, accepting a flyer passed around and handing back a growing stack of business cards (field diary excerpt, DSEI 2013)

The vignette that opens this article describes my experience at a defence tradeshow, an event space in which the defence industry and military personnel gather – at once to showcase and browse product displays, to network, and to give and attend presentations grappling with the 'defence challenges of the day' (speaker, DSEI 2013). In this article I approach the study of the small military drone via a series of encounters with it at the under-examined site of the defence tradeshow. As the opening vignette intimates, the defence tradeshow was littered with drone paraphernalia – much of it visual in character. Drones were centred and hung, featured on posters and video screens, littered across pamphlets and magazines, flown and demonstrated in these halls. Drawing upon ethnographic work attentive to such visual displays, this article identifies and interrogates a striking observation shared across them, namely the recurrent portrayal of the drone in relation to 'nature' and the 'natural'.

In developing its argumentation the paper engages the increasingly rich interdisciplinary literature accompanying the drone's meteoric rise. Drones have emerged as a central tool of military arsenals in the conduct of 'remote control warfare' (Shaw 2016), with around 95 countries now hosting them in 'active inventory' (Gettinger 2019, viii). As such, scholars have interrogated the military drone as a 'contemporary icon' of air power (Wall 2013, 33) along a range of now well-documented lines. These span the drone's histories and emergence (Gregory 2011, Kindervater 2016, Shaw 2016a), networked infrastructure and expansion of conflict spatialities (Gregory 2011a, Shaw 2013, 2016; Kindervater 2017), as well as implications for both practices and understandings of 'warfighting' (Asaro 2013, Gregory 2011a, Williams 2011, Hijazi et al. 2019, Holmqvist 2013, Wilcox 2017), and those of territory, sovereignty and the use of force more widely (Boyle 2015, Kindervater 2017a; Shaw and Akhter 2012).

Given the military drone's long-standing association with the possession of a 'commanding stare' over those below it, scholars have further examined the drone's 'scopic regime' and 'ways of seeing' (Grayson 2012, 123; Gregory 2011a, 190; Grayson and Mawdsley 2019, Bousquet 2018). In so doing, they have focused attention to both the visual and sensing capacities of the drone (Parks 2014), and its fetishization as an 'all seeing' and 'unblinking eye' (Williams 2011). While such work predominantly foregrounds the military drone *as it visualizes*, scholars have begun to examine how drones are instead *visualized*, across select media (Van Veeren 2013). Following Mitchell's 'dictum that not only power shapes the visual field, but the visual field executes power' (in Maurer 2017, 142), scholars have, for example, reflected upon the drone's representation within (Western) popular culture such as video-games, noting a stark 'militarising of domestic space' (Stahl 2013, 672). Approaching the drone instead in artwork, Maurer (2017) examines visual artist Omer Fast's piece '5000 feet is best'. Maurer (2017, 148) argues that the short film 'presents the drone's

full visual power', while laying bare the complex 'effects of the drone's invisibility' (see also Asaro 2013). This observation reverberates with work examining the visual representation of the drone within news media reportage and commentary. Here, Bridle (2013, n.p) foregrounds a single yet 'endlessly reproduced' image of the drone, noting that it is in fact a 'fiction' – a Photoshop job. As Bridle (2013, n.p) remarks, this 'seemingly unreal' image reflects the technofetishism of the drone, namely that it 'appears otherworldly' while 'self-obfuscating'. Thinking across a number of 'competing ways in which drone warfare is made sensible', Van Veeren (2013) contends that such representations foster different imaginations of the drone, those which can and should be further examined.

While such work collectively demonstrates the value of attending to the drone as it is represented across multiple media, it also remains partial in those which it foregrounds, as yet to examine defence-industry marketing. Further, the majority of drone scholarship has focussed upon large military drones such as the iconic Reaper and (now retired) Predator drone. While, in recognition of the growing diversity of platforms that comprise the drone 'ecosystem' (Jackman 2019), scholars are increasingly foregrounding the small drone, analysis thus far remains largely confined to commercial drones (speculated) in domestic airspace (Crampton 2016, Jensen 2016, Jackman 2016), police and protest drones (Wall 2013, 2016; Shaw 2016b, Kaplan 2020), and the weaponization and subversion of consumer drones (Jackman 2019, Bradley et al. 2019). It is at this juncture – between attending to small military drones, and exploring drones as they are visualized across more diverse terrain - that this article offers intervention. Working at the intersection of drone scholarship and that which has interrogated the visual cultures of militarism more widely (Wegner 2020, Rech 2014, 2015; Rech et al. 2015, Pomarède 2018), I interrogate the drone through visualizations that promote and market it, as ethnographically encountered at the fieldsite of the defence tradeshow. Approaching such visualizations as important facets of the 'consumption of

militarism' (Basham et al. 2015, 2), I conduct a critical visual analysis of promotional representations of the small military drone. Therein I identify a trend to engage and employ visual conventions associated with 'nature' and 'the natural' in order to seek, foster, and contribute to the normalization of the drone through its 'naturalisation'. Following work attentive to representation as both a 'means by which' military power is 'explained and normalized', and as that which is 'sited' – with 'meaning made somewhere' (Rech et al. 2015, 52, 53; Rech 2015), in this paper I pursue a 'curiosity' (Basham et al. 2015, 2) about the representational politics of the small military drone at the defence tradeshow.

Approaching the drone through three frames each mobilising and evoking particular representational practices and 'knowledges of nature' (Castree 2005, xvii), I first explore the bio-inspired drone – a platform seeking, in both morphological design and visual representation, to 'look natural' and 'blend into' aerial environments. I then turn to the biomimetic drone, one designed and visually represented to mimic nature – that is to look, move and act 'animal' in order to appear unremarkable. I lastly turn attention to the representation of the (non bio-) small military drone more widely, interrogating the mobilisation of a series of visual conventions common in the depiction of 'nature' and the 'natural'. I argue that such frames collectively characterise a current, yet under-examined, visual milieu of the small military drone in defence environments (see Rech 2015, Jackman 2016). In their examination, the article offers a sited contribution to discussions of the 'making of' the drone (Klauser and Pedrozo 2015, 290) and the 'forceful' representations (Anderson 2019) and imaginations that compel, propel, and fetishize it. In both re-approaching and re-siting analysis of the small military drone to the tradeshow and the visualizations that promote it therein, it offers an alternative reading of the diverse means through which drones are both 'represented, repeated and circulated' (Van Veeren 2013, n.p),

reflecting upon the implications of 'naturalisation' for the normalisation of drones more widely.

Methodology: Approaching and encountering visualizations of the military drone

As is the case with other military apparatus (see Forsyth 2019), the drone remains a challenging object to research – one understood as 'redacted, hidden in plain sight, present but opaque' (Coley and Lockwood 2015, 3). While associated with illumination, drones can be difficult to 'empirically ground' and access (Klauser and Pedrozo 2015, 289; Asaro 2013). Drone researchers have nonetheless forged avenues of access and accompanying methodologies. In interrogating the 'in-theatre' contemporary drone, these have spanned: interviews with drone operators (Clark 2018, Williams 2011) and ground combat personnel (MacDonald and Schneider 2019); and analysis of particular drone strikes and/or operator testimonies (Allinson 2015, Bentley 2018, Wilcox 2017, Gregory 2011a, 2018). Such analyses have been accompanied by desk-based research examining military and government documentation (Fuller 2014, Shaw 2017a, Asaro 2013, Pugliese 2016; Hijazi et al. 2019), legal frameworks (Boyle 2015, Kindervater 2017a, McNeal 2014), and the drone's emergence (Gregory 2011, 2011b). Exploring the drone's deeper histories, scholars have also undertaken archival work (Kindervater 2016, Fuller 2014). Throughout, scholars have unpacked the drone's entrenched association with discourses of 'precision' and the 'all-seeing eye', through which it is repeatedly legitimated.

While examining the drone in diverse ways, existing analyses nonetheless invite further approaches. For example, they first demonstrate a predominant focus on the drone 'in-theatre' - as it 'functions', interrogating its practices, capabilities, and 'implications' (Klauser and Pedrozo 2015). As such, further attention is needed to the sites and means through which the drone is formed and enabled – that is 'made' (ibid). Second, such analyses predominantly

approach the drone through textual forms, interrogating it discursively. Where exceptions are found, analyses of visualizations of the drone remain limited to artistic, popular culture and news media forms (Stahl 2013, Maurer 2017, Asaro 2013, Bridle 2013, Van Veeren 2013). Working at the intersection of this lacuna, this article re-approaches the drone as it is visually encountered and promoted at a key site through which its networks and knowledges 'emerge and crystallise' (Klauser and Pedrozo 2015, 290) – that of the defence tradeshow (see Rech 2015, Jackman 2016, Gibbon and Sylvester 2017).

The article draws upon fieldwork at three events: Defence and Security Equipment International (DSEI) 2013, The Counter Terror Expo 2014, and Autonomous, Unmanned Systems and Robotics Expo 2014[i]. The first two events were held in London, UK, and the latter in Rishon Lezion, Israel. Held over several days, each was billed as a 'leading event' for members of international military, defence communities, and defence industries to gather, with the aim of facilitating displays, 'networking' and 'a platform for business' (DSEI n.d.). Held in exhibition halls, the events were divided into 'pavilion' areas, each featuring industry and military 'stalls' showcasing products and manned by individuals poised for networking. This was accompanied by a dedicated seminar space, in which speakers (from armed forces, industry, and academia) provided presentations on (emergent) capabilities and shifting defence landscapes. Whilst the exhibition floor area was often free to enter, entry was subject to advance registration approval, and to event admittance policy.

At each site, I employed event ethnography – a variant of ethnography facilitating immersive fieldwork at 'short term' institutional events (Billo and Mountz 2016, 212). Here, I understood the defence tradeshow as a 'stage of performance' pivotal in the 'framing, translation and sense-making' of issues key to drone communities (Suarez and Corson 2013, 64, 69). At the tradeshow, I employed the ethnographic mainstay of participant observation, understanding myself as a researcher 'participating' in the environment – partaking in

informal discussions and asking questions - rather than solely ‘observing’ (Cohn 1987). I approached the defence tradeshow as a ‘learning field’ in which I could ‘hear anecdotes’ (Wood 2016, 392), watch presentations and engage in conversations with ‘defence intellectuals’ (Cohn 1987, 2006) advocating and sustaining the drone. As per the opening vignette, I scribbled down anecdotes, observations and reflections at each site. I took inspiration from work in critical geopolitics thinking through the ‘extra-ocular’ aspects of seeing (MacDonald et al. 2010, 18). Writing of the British military air show, for example, Matt Rech (2015, 536) takes ‘seriously the spatial and sensory experience’ through employing ‘observant practice’. As Rech (2015, 537, 545) continues, this involves a sited and interactive reflection of ‘seeing-as-it-happens’.

Writing of a wider multi-sited exploration of British military recruitment via an ‘auto/ethnography’ of the airshow, home and body, Rech (2019, 1) continues to widen a concern for the (visual) cultures of militarism by foregrounding the material. As Rech (2019, 2) notes, while military recruitment has long held a visual character, so too has there been a “proliferation of ‘thing-ness’”, with “free pens, lanyards, keyrings and stickers” increasingly accompanying ‘glossy careers pamphlets and posters’. Such ‘ephemera’ (Rech 2019) importantly participate in the atmosphere of the space, one in which 'military equipment' on display 'steps forth as a commodity', becoming 'an object of exchange, a focus for fantasies and profit' (Gibbon and Sylvester 2017, 249). In what follows I think with such work, while foregrounding visualizations of the drone at the defence tradeshow. In interrogating the visual cultures of the small military drone as ethnographically-encountered therein, I photographed, collected, spoke, noted, watched demos of and interacted with it – and the communities concerned with its promotion and propelling. I quickly observed the striking trend to engage and employ visual techniques and practices associated with ‘nature’ and ‘the natural’. In what follows I undertake a critical visual analysis of the small military drone, reflecting on how

such visualizations relate and intersect with wider visual cultures, in order to unpack the desire to normalise the drone via 'naturalising' it.

Imaging and imagining in situ: Nature-inspired drones

Across the defence tradeshows attended, drones were recurrently discussed and visualized in relation and comparison to 'nature' and 'natural' environments. This section foregrounds both visualizations of the drone, and promotional statements around the 'strategic advantage…of nature-inspired platforms [as those] that are inconspicuous' (Sales representative, Counter Terror Expo 2014). It interrogates the recurrent promotion of the small military drone as a platform able to 'blend in' to our environments, highlighting alternative visual and design techniques through which drones are legitimated and their normalisation sought – through attempts at their 'naturalisation'.

Exploring small military drones which are both designed to morphologically look like animals (frame 1), as well as those bio-engineered to appear and act like animals (frame 2), I argue that such bio-inspiration, and the (visual) 'imaginations' that surround it, raise both important questions about evoking and seeking robo-'liveliness', and implications around conspicuity and covertness. In exploring such themes, I turn to geographical work highlighting both the mobilisation of 'nature' in, and desire 'to naturalise', military violence (Forsyth 2017, 498; Johnson 2010, 2011, 2015; Squire 2020), extending such analysis to the space of the drone. Here, I follow Ian Shaw's (2017a, 454) call for a 'more-than-human geopolitics' attentive to the 'dynamic agency' of both humans and nonhumans. I pursue this call in relation not just to the drone itself – but to the visualizations that accompany its promotion, understanding these as under-examined 'techniques' through which techno-futures are forged and imagined (Kinsley 2012, 1558).

Frame 1: Bio-inspired drones

'Have you seen those drones that are shaped like birds? They are really neat because you can send them off to fly and their outline looks realistic' (Delegate, DSEI 2013)

The remark that opens this section is just one of many centring around likenesses between drones and animals. This sentiment was again echoed by a sales representative at an Israeli tradeshow, with the individual stating "there's this trend around manufacturing natural-looking drones. It's straightforward when you think about it – you need something that goes unnoticed – something you could mistake as a bird" (AUS&R 2014). Spurred by the repeated ways in which drones were described, and as will become apparent - depicted, in relation to the animal, this section examines the bio-inspired drone, one that appears and looks like particular animals.

Shaw (2017, 883) writes that 'new morphologies and ontologies of urban (in)security' are emerging. While not discussed within Shaw's account, one way of re-approaching this claim is through a literal focus on drone morphology – structure and form. Such attributes of the drone are, after all, recurrently foregrounded in drone imagery, as well as performatively mobilised in visual drone displays at the tradeshow. For example, when asked about drone innovation, describing the 'evolving face and shape' of the drone, one sales representative noted that 'the key drone space to watch' was 'small drones – where some unusual and exciting things are happening' (DSEI 2013). When pressed for further detail, the representative added - 'drones are increasingly appearing in different shapes and sizes', adding that 'those ones which can fool you at a distance' excited him most (DSEI 2013). Here, our conversation caught the attention of a bystander. I smiled and shuffled over and the individual asked gently whether we were discussing 'Aerovironment's range' (DSEI 2013). Here, the sales representative took the opportunity to steer back to their own company's provision, while quickly thereafter being called away. In continuing the conversation, I asked the delegate if he had a particular platform in mind, to which he pulled up a picture of the

‘Raven’ (figure 1), stating that it was designed after its namesake. He continued, ‘at a distance’ it morphologically ‘resembles a bird in flight’ (delegate DSEI 2013).

Figure 1. Aerovironment Raven (Aerovironment n.d) (permission granted)

I later learned it was advertised by its manufacturers as the ‘most widely deployed unmanned aircraft system in the world’ (Aeronvironment n.d.). Touted as ‘ideal for low-altitude intelligence, surveillance, and reconnaissance missions (ISR)’ (ibid), the platform’s advertising evoked its avian namesake in a number of ways. Visually, the drone has a large torso, featuring a payload sensor ball shaped like a bird’s head, as well as a bird-like outstretched wingspan, and a robotic fin appearing like a tail feather. Beyond morphological resemblance, the textual accompaniment on the manufacturer’s website cites the platform’s ‘aerodynamic design’ in discussion of its ‘wingspan’, as well as its ability to provide ‘aerial observation, day or night’ (ibid). However, while morphologically-evoking the Raven bird, when encountered up-close this drone does not resemble the bird per se. Rather, the drone’s strength lies in its ability to ‘blend’ into the airspace as it is aerial, as it flies. At altitude, the platform’s more angular features become less noticeable (figure 2).

Figure 2. Aerovironment Raven (Aerovironment n.d) (permission granted)

A discussion of shifting drone morphology and its implications for covertness later again resurfaced. In talking with a sales representative regarding how small drones afford situational awareness to ground-troops, the individual opened a copy of the event's daily magazine (issued onsite), gesturing to the 'Maveric' drone (DSEI 2013). This drone, they stated, 'had a convincing form, meaning it could get up close and personal with enemies below – get a real good scout' (sales representative, DSEI 2013). A small drone designed by US-based Prioria Robotics, the Maveric could 'fly as high as 25,000 feet and at between 20 and 65mph' (McDuffee 2013, n.p). What made this drone distinctive, the company argued, was its morphology. As a company executive stated, 'there was a Special Operations requirement for a plane that had a natural, biological look – it wasn't supposed to look [Department of Defense]-ish' (in McDuffee 2013, n.p). It was the platform's design evocation of the bird in-flight that earned the Maveric (figure 3) a $4.5million contract from the US Army's Rapid Equipping Force (ibid).

Figure 3. Prioria Robotics ‘Maveric’ (Permission granted)

Such bio-morphologically-inspired drones highlight, I argue, a need to diversify existing and entrenched debates around proximity and distance within drone scholarship. In discussion of large military drones and their operators, debates have followed specific discourses (Williams 2011). Here, drone operators are presented as either ‘distant-and-detached’ from those below them, or conversely as ‘intimately proximate’ (Gregory 2011a, Asaro 2013, Jackman 2020). In foregrounding small and bio-inspired drones, an analytical opportunity to revisit such discourses emerges. Here, physical proximity, as enabled by morphology, becomes a key capability touted by manufacturers and desired by drone users.

This alternative reading of proximity is further emphasised in drones that not only morphologically, but also aesthetically, resemble birds. For example, as sales representatives and military personnel at DSEI 2013 debated the “changing face” of ISR, they argued that it was one marked by ‘drones that literally had faces’. Here, a uniformed individual asked whether I’d come across US-manufacturer Expal’s ‘Shepherd-Mil’ (figure 4). He proceeded to explain that, like the ‘Maveric’, the ‘Shepherd-Mil’ was a small drone that ‘looked like a bird, complete with shadow…convincing enough you’d not look up’ (delegate DSEI 2013). This sentiment of bird-like appearance features on the company’s website. Described as ‘forward observer units’, the drone’s ‘shape’ and appearance are attributed with the ability to

‘discretely analyze the scenario’, flying ‘silently’ to enable getting ‘closer…without being recognized’ (Expal n.d.). This is echoed in the drone’s visual representation, whereby the company seek to convey that it leaves a ‘bird-like’ shadow as it passes over (see figure 4). Their website adds that ‘the device can reproduce the birds’ circular flight motions’ to add a ‘natural touch’ (ibid).

Figure 4. Shepherd-Mil (EXPACE ON BOARD SYSTEMS, S.L.) (Permission granted)

Beyond its morphological resemblance, the drone is also adorned with decorative detail. Feathers are individually painted, the drone replete with watchful eyes, lively-looking wing-tips and a small beak (figure 5). Advertised as resembling a ‘native bird’ (Expace 2014), such platforms are thus designed and visually represented to appear as ‘natural’ in an aerial scene– undertaking flight circles above, creating shadows below, and passing as flecks of colour (figure 5).

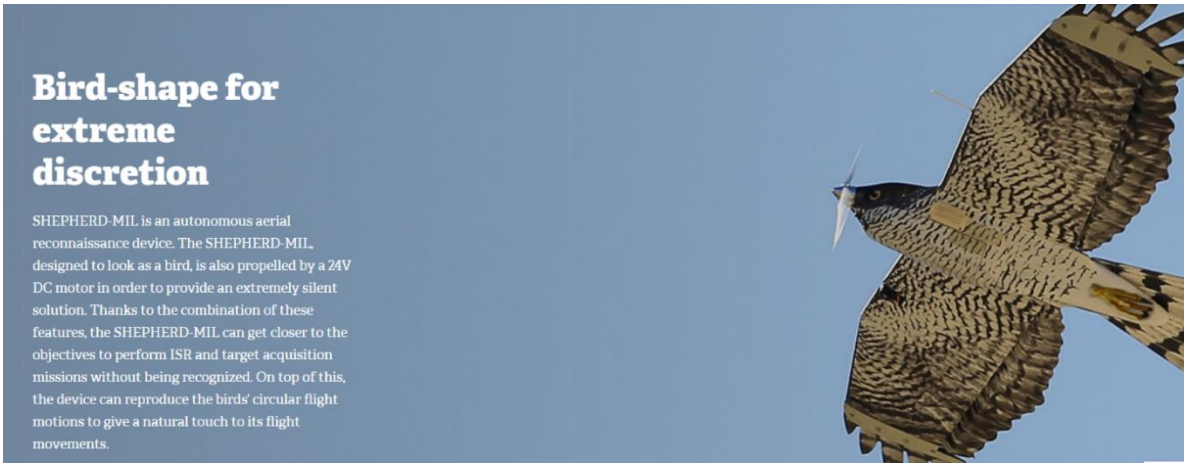

Figure 5. Shepherd-Mil (EXPACE ON BOARD SYSTEMS, S.L.) (Permission granted)

Here, both the morphology and aesthetic appearance of the drone represent desires to blend the drone into a scene, and for it to function, proximately yet covertly. As a delegate at DSEI 2013 explained in discussion of 'exciting drone innovation' in the area of 'natural-looking drones'- 'who looks up to see if a bird has a camera in it!'. Of course the strategy of mobilising and mimicking 'nature' and 'the natural' with the aim of facilitating covertness is not a new one. Camouflage's desire for 'concealment' (Bousquet 2018, 160) marks the long-standing (bio)technological intertwinement of militarism, nature, science and design (Forsyth 2013, 2014). Reflecting on camouflage in the context of World War II, Forsyth (2013) identifies the re-imagining of the battlespace in volumetric terms – requiring the designing of military techniques and technologies to defend against aerial bombardment. Here, camouflage, a ground-based technique using paintings and coverings to 'blend' into or render indistinguishable a potential 'target' from its surroundings, was designed to 'outwit reconnaissance observation' (Forsyth 2013, 1038; Bousquet 2018, 160). This situation, it is argued, raises 'questions about the visual and the hidden, the observer and the observed' (Forsyth 2013, 1038; Bousquet, 2018).

In a historical exploration of military perception, Bousquet (2018, 154) writes that camouflage marks a "shift from conspicuous military displays to systematic practices of

concealment and obscuration". Reflecting on advancements in the contemporary armoury, Bousquet (2018, 170, 173, 155) identifies a 'reinvention' of 'the arsenal of visual warfare'. Though not the focus of his work, here we can think too with the bio-inspired drone. While sharing the imperative to both 'conceal and counterfeit the military's presence in landscape habitats' (Forsyth 2014, 247) and to 'reduce visibility' (Bousquet 2018, 162), the bio-inspired drone's markings also differ from those adorning soldiers and tanks, amongst other wartime (non-)humans. For example, as a World War I camoufleur notes (in Bousquet 2018, 159), their goal was to 'reverse the principle used by the artist', that is to 'make a three-dimensional object appear flat' as a means to 'make it disappear'. While the bio-inspired drone is also designed to blend into the background, it is not designed, nor visually represented or promoted, as that which is 'flat' - rather its three-dimensionality, mirroring that of the bird, is embraced and celebrated. Here movement and voluminosity come together. As Morris (2018, 305) writes of starlings gathering, they 'undulate, expand and contract, swoop and turn' in composing volumetric formations. The bio-inspired drone thus seeks to evoke the mobile bird, one with a lively body and depth-full movements.

In bringing this frame to a close, I draw attention to one final recurrent trope within visual representations of bio-inspired drones, namely the presence of a human operator. As demonstrated in figure 6, when a bio-inspired drone was displayed, at least one image featured the drone with, in proximity to, and under control of its operator. Here, uniformed personnel are pictured holding or releasing hand-launched platforms.

Figure 6. Aerovironment Wasp (Aerovironment n.da) (permission granted)

While such platforms are attributed with a range of autonomous functionalities enabling their pre-programmed independent navigation and 'auto-landing' (Aerovironment n.d.b), the bio-inspired drone's capabilities are nonetheless visually affirmed in relation to their operator, who skilfully sends them off to scope a scene, or as one sales representative stated, 'to extend to the soldier's own gaze' (AUS&R 2014). Such representations visually enforce an operational order in which human primacy prevails, in spite of ongoing advances in machinic agencies of the drone itself (Schuppli 2014). Thus while drones are not subservient or "passive instruments", but rather powerful 'actors capable of reprogramming worlds' (Shaw 2017a, 455) – advancements in their agency are not foregrounded nor recognised in such visualizations. In thinking with a further frame through which the small military drone is recurrently represented in relation to and engagement with 'nature', I now turn from morphological and aesthetic resemblances to instead drones which mimic nature's very capacities for action (Johnson 2010, 2011); from bio-inspiration to biomimicry.

Frame 2: The biomimetic drone

When visiting the US Department of Homeland Security (DHS) stand at DSEI 2013, I overheard a discussion about investments in unmanned technologies. Noticing my presence, a trio of men asked if I was interested in joining. We went on to discuss several platforms DHS

have invested in, with one delegate remarking: *'It'll be B.E's BIOSwimmer, that's where the tech goes…it's the way to get one of these things [drones] into an environment without people noticing – it moves like a fish so you wouldn't think it's not one!' (DSEI 2013).* The conversation wound to a close and I looked up the platform discussed. 'BIOSwimmer' was a 'biologically- inspired' underwater drone employed as a 'shallow water mine countermeasure' and 'explosive ordnance disposal' platform (Boston Engineering 2014, n.p). While bearing morphological similarity to the tuna fish, the 'BIOSwimmer' is distinct because it is also *engineered to mimic* – that is to move and act like - the tuna fish. The drone includes 'a flexible aft section and sets of pectoral and other fins', enabling fish-like 'propulsion and manoeuvrability' (Homeland Security 2012, n.p). Following recurrent discussions of such drones as 'the future' of 'all unmanned' (delegate, DSEI 2013), this section foregrounds 'biomimetic drones', exploring their promotional visualization as a further means through which 'nature' and 'the natural' are engaged to normalize the small military drone via its 'naturalisation'.

Biomimicry, 'from bios, meaning life, and mimesis, meaning to imitate' (Biomimicry Institute 2014, n.p), is a discipline approaching biological organisms as sources of 'inspiration' for the development of 'new design techniques' (Johnson 2011, 11). A vast field, biomimicry has included experiments with 'stigmergy navigation in ants and geese, gecko adhesion, bat sonar, spider and fly vision, lizard limb regeneration, creating spider web materials, and flexibility and strength in octopus and squid arms' (Johnson 2010, 179). Through the practice, biological life has, it is argued, become enrolled into the US security apparatus (see Johnson 2010, 2011, 2015). While noting that war has long-involved 'combining and reconfiguring human and nonhuman in the execution of violence' (Forsyth 2017, 497; Squire 2020), Johnson (2011) foregrounds the specific biomimetic innovations of the 'Robolobster' (a lobster-inspired robot designed to identify underwater IEDs), and the

'Robobee' (a robotic honeybee designed to undertake civilian and military applications), in demonstrating a ‘biological’ turn in US defence. Here, Johnson (2011, 21) interrogates biomimicry as a field both seeking to imitate an organism’s ‘capacities to act’, and to value and valuate this.

In recognition that intelligence ‘exceeds the human’ (Lynch and Del Casino 2020, 382), scholars writing of biomimicry have turned to Spinoza’s discussion of ‘capacities for action’ (Johnson 2010). Spinoza asserts that ‘a human being’ can be characterized ‘not by its form, its organs’ but instead by that ‘which it is capable’ (in Buchanan 2008, 156). Here, the body is defined by both ‘relations of motion and rest, of slowness and speed’ and by that which can affect it and ‘the affects of which it is capable’ (Deleuze 1988, 123). Deleuze (1988) continues that such ideas apply to the bodies of non-humans too, focusing attention to the field of ethology – the science of animal behaviour – and to the discipline’s founding father Jacob Von Uexküll, who famously wrote that the blood-sucking tick was defined by ‘three affects - light, scent, heat’ (in Buchanan 2008, 156). Stressing that the tick ‘created its own worlds through its senses’ (Partin 2019, n.p), Von Uexküll’s work foregrounded not the animal, but ‘what the animal can do’ (Buchanan 2008, 156) – it’s capacities to act. In this vein, Johnson (2010, 180) explores biomimicry as both a commercialization and securitization of ethological field science, and the ‘appropriation of embodied capacities’ therein.

In what follows, this analysis is extended to the biomimetic drone, as it is encountered at the defence tradeshow. After all, drone manufacturers have developed drones ‘inspired by flying insects, birds, and bats’, those that seek to mimic the capabilities and efficiencies of flapping flight (Ward et al. 2017, 155). Such biomimetic innovations have too been militarized. For example, working under a contract awarded by the Defense Advanced

Research Projects Agency (DARPA), US-based drone company Aerovironment (2011) developed the ‘nano-hummingbird’ - a hummingbird-inspired drone (figure 7).

Figure 7. Aerovironment Nano Hummingbird (permission granted)

Encountered at the defence tradeshow, biomimetic drones were both depicted and recurrently referred to as enabling the ability to ‘operate unnoticed’ or ‘unobserved’ (DSEI 2013, AUS&R 2014, Counter Terror Expo 2014). As one sales representative stated while pointing to an image of the ‘nano-Hummingbird’, ‘these drones can co-exist - just fade into the background. They look so realistic, they can hover, sit on a power line, you don’t notice them’ (DSEI 2013). This is echoed in the company’s web-description. Aerovironment (2011, n.p) are quick to highlight the drone’s ‘flying weight’ of 19g, making the drone ‘larger than an average hummingbird, but smaller than the largest hummingbird found in nature’. The drone’s form is firmly situated within the context of the non-human, that which is further echoed and amplified in its promotional visualization.

Figure 8. Aerovironment Nano Hummingbird (permission granted)

In figure 8, Aerovironment's 'hummingbird' is depicted flying in front of a leafy green background, blending into the scene, while occupying a hovering stance commonly featured in wildlife photography (a convention explored in *Frame 3*). The choice to design and depict the drone as such intersects with wider military discussions around drones and 'stealth'. Here 'stealth' refers to measures adopted to decrease platform detectability (Schuppli 2014a, Bousquet 2018). While extant debates of stealth drones centre on large platforms, small biomimetic drones arguably represent a distinct manifestation. Here, stealth is 'innovated' through attempts to 'blend' the drone in not by making it technically 'undetectable', but rather by making it appear congruous in a scene. In other words, stealth, here, is not simply around hiding or reducing the drone to that which is not visible, but rather about designing it so that if and when an individual glances at it, it appears otherwise – it does not resemble a drone, but looks, acts, and moves like a bird. The biomimetic drone thus thinks with and extends camouflage, trying to 'adapt to the milieu it seeks to render itself indistinguishable from' (Bousquet 2018, 154), while raising questions of its own limitations. While comprised of over three hundred species, most hummingbirds are 'found in the tropics, with only a handful of species reaching the United States' (Arizona-Sonora Desert Museum n.d.). The idea that camouflage should be attentive and "attuned to the perception of the

potential observer" (Bousquet 2018, 154) then demands further reflection of where these drones are to be employed; in other words, into whose ‘nature’ are such platforms seeking to blend? Collectively, then, what such innovations and their wider visual cultures act to reveal is that while crucial, extant investigations of how drones are legitimated can be extended to consider both small military drones, and the non-textual, visual, forms and frames through which the drone’s normalization is sought and forged.

Frame 3: Engaging and employing visual conventions

In the final frame, I re-approach the promotional visualization of the (non bio-) small military drone more widely. This choice followed the observation that many tradeshow visualizations featured striking internal consistencies, engaging visual practices deployed across representations of animals, bodies, and ‘natural’ scenes alike. This frame thus conducts a critical visual analysis of the drone through the lens of the ‘representational regime’ (Rancière 2004). In exploring the intersection between politics and art, Rancière (2004) identifies three ‘regimes’ (ethical, representational, aesthetic), those which each distinctly present, practice, and are ‘understood as art’ (Davis 2010, 127). In so doing, Rancière (2004) explores the ‘distribution of the sensible’ – namely what is both visible and invisible (Sayers 2005). In interrogation of the ‘representational regime’, Rancière (2004) identifies and explores the conventions and ‘norms’ (around scope, style and size) underpinning paintings in the ‘Classical Age’. While I am interested in visualizations produced by advertisers, as opposed to the artistic community of which Rancière writes, these nonetheless feature a discernible series of conventions underpinning their form, comprising their own ‘representational regime’. Focusing upon three commonly deployed conventions - the cross-section, taxonomy, and naturalism aesthetic - this section demonstrates both that promotional visualizations draw upon lengthier visual practices deployed in anatomical and

biological sciences, and that these elicitations of ‘nature’ and ‘the natural’ raise questions around evocations of authority and the fetishization of the drone more widely.

The cross-section drone

Across the tradeshows attended, visual materials adorning stalls were recurrently drawn upon like props by stall representatives; they clutched papers, pointed at prototypes, gestured to video displays. In conversation, one individual remarked: ‘The best way to explain that to you, Miss, is with this diagram. It's like a guide to our most successful model…It's got all the measurements and stats’ (Sales representative, DSEI 2013). In proceeding to describe how the drone in question ‘surpassed its competitors’, the sales representative (DSEI 2013) pointed to an image of a drone, similar to figure 9, tracing its contours as he spoke.

Figure 9. Heron UAS (Israel Aerospace Industries n.d.) (permissions granted)

This kind of image of the drone, featured frequently at the tradeshow, employs the visual convention of the cross section –the depiction of an object’s exterior while simultaneously revealing its interior. Looking at such visualizations, I became interested in the rationale for, and histories of, this convention. Employed as part of the ‘dissection gaze’ within the fields of biology and anatomy, it was used to communicate visually the interior of

previously unknown bodies. Foucault (1970, 251, 268) understands such visual practice as representing a shift from ‘taxinomia [taxonomy]’ in the Classical age, to a new episteme marked by ‘verticality’, seeking to reveal and render visible that ‘concealed in the depths of the body’. In the case of both anatomy and biology, the cross-section positioned the subject’s body to enable ‘maximum and evenly distributed visibility’ (Waldby 2000, 59), and to communicate the body’s 3-dimensional attributes (figure 10).

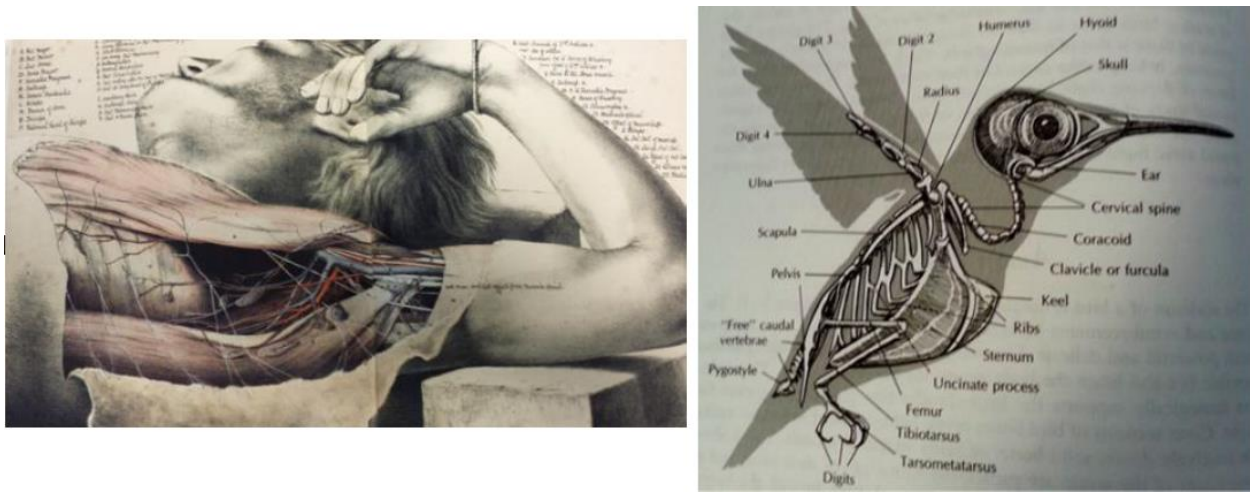

Figure 10. (L) Veins and arteries of the body (Rifkin et al. 2011, 87), (R) Major features of a bird skeleton (Gill 1994, 94) (permission confirmation in process)

Such visualizations were collated in scientific atlases, both presenting ‘a discipline’s most significant objects of inquiry’, and enrolled in the ‘training of the eye’ to identify and regard particular ‘objects as exemplary’ (Daston and Galison 2007, 17, 22). In so doing, cross-sections have historically been associated and imbued with a sense of ‘objective’ authority (Datson and Galison 2007, Kemp 2000, Livingstone and Withers 2011). Treated as mimetic representations that ‘reveal the aesthetic of nature’s hidden order’ (Kemp 2000, 75), such visualizations both reflected and constituted a wider ‘scientific privileging of vision as the appropriate sense for the apprehension of rational knowledge’ (Waldby 2000, 66).

In musing what the employment of the cross-section meant for the visualization of the drone, it struck me how such visualizations were referred to by sales representatives engaging

them. One stated: ‘This machine is well put together. I can't exactly show you under the hood, but this explains some of its best features, gives you a little glimpse inside’ (Counter Terror Expo 2014). Performatively engaged as such, these visualizations can be understood as constituting a form of ‘expert visuality’ (Rech 2015, 544) through which understandings of the drone are forged. The significance of such visualization is two-fold. First, this mode of seeing directs the attention of its onlooker inwards – to the platform and it’s interior. As such, it can be understood as another mechanism through the drone is fetishized – that is rendered visible (sensible) via the qualities and characteristics that comprise it, rather than in relation to its effects (which are silenced). Second, scholars have long-critiqued the perceived ‘objectivity’ mobilised through such visual practice, noting that their ‘ordering’ and ‘neatness’ is both the result of ‘judgement, negotiation and regulation’ (Livingstone 2003, 16), and demonstrative of the eschewal of any ‘anomalies’ (Daston and Galison 2007). In this vein, drone cross-sections can be read as selective and partial - neat depictions of idealized drones – those which elide platform failures and limitations (Crandall 2011).

The taxonomic drone

The second visual convention through which the small military drone was recurrently visualized was that of the taxonomy. Across many displays, photographs of in-flight drones were accompanied by both a sketch and metrics in a pane alongside it (figure 11).

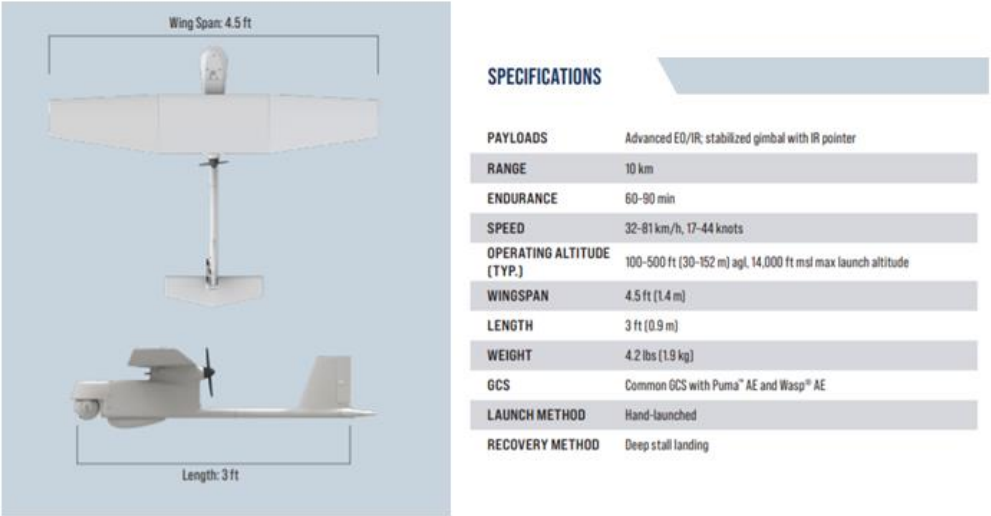

Figure 11. Aerovironment Raven (Aerovironment n.d.) (permission granted)

Given the repeated employment of this convention, this section reflects upon the implications of engaging the taxonomic tradition - one employed by scientific disciplines such as ornithology for the purposes of biological classification. Derived from the Greek 'taxis' (arrangement) and 'nomos' (distribution) (Asma 2001, 85), taxonomy is a classification system dividing groups of organisms into ‘units’ or ‘taxa’ (Sadava et al. 2014). The most famous taxonomic system was Linnaeus', which building upon existing distinctions of species and genus, added further ranks below, grouping ‘the families into orders, orders into classes, classes into phyla, and phyla into kingdoms’ (ibid, 463).

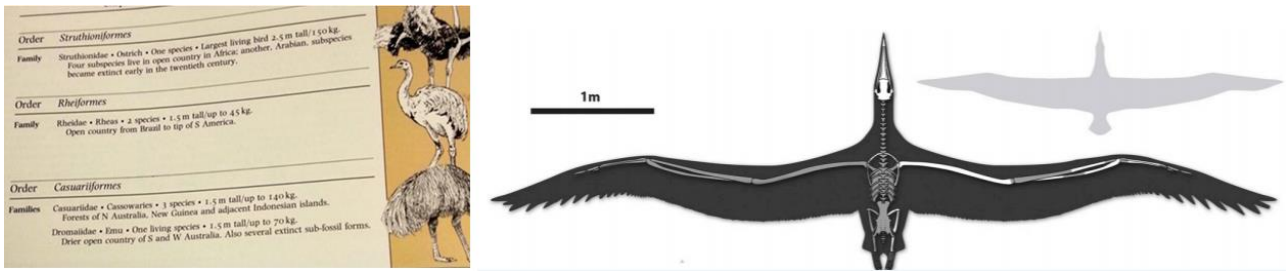

Figure 12. (L) Bird taxonomy (Brooke and Birkhead 1991, 86), (R) wingspan (Ksepka 2014, 2) (permission confirmation in process)

Classifying in this fashion, taxonomies are commonly accompanied by images of the organism, and metrics detailing its size, height, and/or weight. Echoing the emergence of the

‘SWaP’ (size, weight and power) classification system in the wider unmanned environment (Unmanned Experts CC1), promotional visualizations of the drone featured these same metrics. Further, such visualizations (figure 11), recurrently draw upon wider visual conventions mobilised within organism classification, such as silhouette sketches and wingspan designations (per figure 12). The association between ornithological conventions and the visual cultures of the drone has thus been observed. For example, in 2013 artist Ruben Pater presented the ‘Drone Survival Guide’ (figure 13).

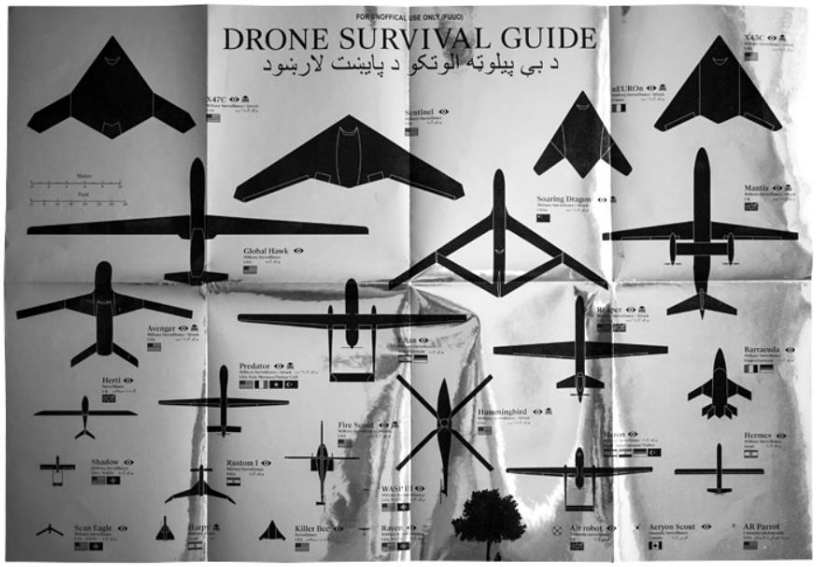

Figure 13. Drone Survival Guide (Ruben Pater) (creative commons)

Described as ‘twenty-first century birdwatching’, the image features silhouettes of 27 drones, identified as ‘the most common drone species used today’ (Drone Survival Guide n.d.). Alongside each silhouette – ‘drawn in scale for size indication’, is an annotation of the drone’s ‘nationality’ and utility (ibid). As Mattern (2016, n.p) writes of field guides, visual conventions are key in ‘mapping and classifying’ phenomena, and as such, further questions are needed of the ‘patterns of mind’ and ‘propositions’ entangled in the ‘representational techniques’ engaged therein. In mobilising such modes of classification, promotional drone visualizations seek to convey a sense of scientific authority – one orienting the material’s

audiences towards particular attributes of the platforms – and importantly – away from others. In visualizing the drone through its components and capabilities, any presentation of their fallibility or implications (social, political, ethical) are obscured, in favour of a system-focused or 'abstracted' depiction. Such visual conventions thus contribute to the wider techno-fetishism of the military drone. As Shaw and Akhter (2012, 1501) write, the military drone is presented as ‘an autonomous agent, isolated from the imperial and military apparatus behind it’. While existing scholarship focuses upon large military drones and the discourses through which they are legitimated – this section has demonstrated the importance of attending to the visual dimensions of techno-fetishism, those which engage ‘nature’ and ‘the natural’ in distinct ways.

The ‘naturalism’ aesthetic

> *‘They’re nature’s drones!’ (sales representative, DSEI 2013)*

In encountering the drone at the defence tradeshow, one further commonality in their visualization was observed – the drone was photographed or digitally placed within ‘natural’ environments or scenes (figure 14). This section explores the engagement of a ‘naturalism’ aesthetic, one seeking to emplace, blend, and normalise the drone into particular landscapes through an engagement of wildlife photography conventions.

Figure 14. (L) Aerovironment Nano Hummingbird, (R) Prioria Robotics ‘Maveric’ (Permissions granted)

Promotional visualisations of the drone at the defence tradeshow commonly pictured drones as always already integrated into ‘nature’ and air, land or seascape scenes. Figure 14, for example, evokes the avian as it is captured in wildlife photography - visualizing the drone hovering and soaring in aerial frames, just off centre. As wildlife photographer Peterson (2003, 57) advises, the first ‘thought’ in a wildlife shoot ‘should be of composition and the communication of movement’. Movement is, after all, key in evoking ‘liveliness’ and the ‘joys of living’ (Thrift 2008, 5). This evocation is further evident in figure 15, in which Atlas Elektronik's mine-detecting underwater drones (the SeaFox, SeaCat, SeaOtter) are advertised.

Figure 15. ATLAS ELEKTRONIK GmbH (copyright) (permissions granted)

In addition to the vehicles’ overtly animal-themed naming (commonplace across the dronescape more widely), the advertisement aesthetically evokes lively aquatic environments through its depiction of a movement-filled scene. Rather than causing a disturbance to the water above, these underwater drones are enveloped in localized oxygen bubbles, appearing like the emission of breath - suggesting a form of ‘mechanical viscerality’ (Campbell et al. 2005, 348). This is significant as it represents an attempt through which to ‘naturalise’ the drone in a scene, with the aim of normalizing it.

Figure 16. Prioria Robotics 'Maveric' flying in proximity with birds (circles added) (permission granted)

This goal is echoed in figure 16, in which Prioria Robotics' 'Maveric' drone is filmed flying in proximity with birds. This seeks to suggest that the drone integrates into this aerial environment: it is part of an aerial community, rather than disruptive to the sky's inhabitants. This runs contrary to reports of birds grabbing drones, and the employment of trained birds to down them as a form of counter-measure. Nonetheless, in considering what such depictions and 'constructions of the natural disclose' (Kirsch 2014, 699), such visualizations first present the functioning drone in, and always already integrated into, particular environments, in order to visually situate and normalize the drone. Second, it should be noted that the 'natural' scenes within which the drones are presented remain contingent. For example, when featured in aerial scenes, the drone soars above mountainous or woodland landscapes, free of people. Where peopled activities are present, such as the captaining of boats (figure 15) drones remain portrayed in the foreground, operating out of sight and reach of those onboard. In either instance, drones are visualized as seamlessly integrated within, rather than observable to, unwelcome or limited in such environments. This again marks a form of fetishization. After all, as Crandall (2011, n.p) asserts, while 'drone desire' grows, they

remain susceptible to ‘system failures’, bad weather, and pilot error – facets that are precluded and countered in its ‘naturalisation’ in promotional visualizations.

Conclusions

Drones have emerged as the ‘quintessential technology of the War on Terror’ (Partin 2019, n.p). Given extant interdisciplinary scholarship predominantly focuses on the ‘in-theatre’ large military drone, and the discursive cultures legitimating it, an opportunity arises to re-approach the drone - at alternative fieldsites, different sizes, and as it is promotionally visualized. Following the established mantra that (visual) representations are not ‘neutral accounts’, but rather ‘strategic attempts’ to ‘glorify’ and legitimate military activities (Wegner 2020, 80), this article brings promotional visualizations of the small military drone at the defence tradeshow to the fore. It identifies and interrogates an engagement and employment of visual conventions associated with ‘nature’ and the ‘natural’, those seeking to ‘naturalise’ and thus normalize the drone. Through the lens of three frames – of the bio-inspired and biomimetic drone, and the ‘naturalism’ aesthetic – it unpacks how the ‘natural’ is engaged and deployed in legitimation of military action (Forsyth 2017). Therein, it foregrounds diverse visual ‘techniques’ through which technological legitimation is ‘produced and promoted’ (Woodward 2005, 729).

The article reveals alternate means through which the drone is both legitimated and fetishized, and its normalization sought. It focuses attention to the intersection with and role of ‘nature’ and the ‘natural’ in the drone’s presentation. Such visualizations, I argue, both comprise and contribute to existing notions of the drone as a “dreamlike, ‘silver bullet’ scopic commodity” (Wall 2013, 36), albeit through an engagement and reliance upon a distinct visual register. Such visualizations orient their viewer inwards, to the drone itself, acting to elide and eschew wider consequences or implications of the drone. Precisely because of such

silences these visualizations remain an important, constitutive, and hitherto unexamined facet of the wider proponent cultural imagination of the drone.

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Figures

Figure 16. Prioria Robotics ‘Maveric’

[i] The defence tradeshow events attended included: Defence and Security Equipment International (DSEI) 2013, 10-13th September 2013, the Excel Centre, London, UK; The Counter Terror Expo 2014, 29-30th April 2014, the Olympia, London, UK; and Autonomous, Unmanned Systems and Robotics Expo (AUS&R) 2014, 26th November 2014, Rishon Lezion, Israel.