REFUGEE STUDIES CENTRE

WORKING PAPER SERIES NO. 113

Militaries and humanitarian innovation
Opportunities and risks

Dr Josiah Kaplan
Research Associate, Humanitarian Innovation Project
Refugee Studies Centre, University of Oxford
Josiah.Kaplan@qeh.ox.ac.uk

Evan Easton-Calabria
Doctoral Candidate
Refugee Studies Centre, University of Oxford
Evan.Easton-Calabria@qeh.ox.ac.uk

February 2016

Refugee Studies Centre
Oxford Department of International Development
University of Oxford

Working Paper Series

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Glossary

AARs – After-Action Reviews
CALL – Center for Army Lessons Learned
CCOE – Civil-Military Cooperation Centre of Excellence
CMCoord – civil-military coordination
COTS – commercial off-the-shelf technologies
DARPA – Defense Advanced Research Projects Agency
DCDC – Development Concepts and Doctrine Centre
DFID – UK Department for International Development
DIA – Defense Intelligence Agency
DMCC – Diploma in the Medical Care of Catastrophes
DoD – Department of Defense
DSTL – Defence Science and Technology Laboratory
FLC – Federal Laboratories Consortium
GPS – Global Positioning System
HFP – Humanitarian Futures Programme
HIP – Humanitarian Innovation Project
ICRC – International Committee of the Red Cross
ICT – information communication technologies
INGO – international non-governmental organisation
ISR – intelligence, surveillance, and reconnaissance
MoD – Ministry of Defence
MSF – Médecins Sans Frontières
NATO – North Atlantic Treaty Organisation
NGO – non-governmental organisation
NMCG – NGO Civil-Military Contact Group
PMCs – private military contractors
R&D – research and development
REF – US Army Rapid Equipping Force
RTA – Rapid Threat Assessment
TRAC – US Army's Training and Doctrine Analysis Center
UAV – unmanned aerial vehicle
UN OCHA – United Nations Office for the Coordination of Humanitarian Affairs
UN-CMCoord – United Nations Civil-Military Coordination
USAMRIID – US Army Medical Research Institute of Infectious Disease
USIP – United States Institute of Peace
WHS – World Humanitarian Summit

1 Introduction

In this working paper, we call for greater recognition and new thinking about military actors as a serious subject of study within humanitarian innovation discourse. In so doing, we seek to contribute to the Humanitarian Innovation Project's (HIP) broader interdisciplinary agenda of rethinking the frontiers of the humanitarian system, while also encouraging the further conceptual development of a nascent debate around military actors and humanitarian innovation.[1]

The humanitarian community possesses serious gaps in its ability to innovate solutions to present and near-future challenges in the delivery of aid. In order to stay abreast of the changing complexities of 21st century humanitarian action, a new agenda has emerged around innovation. This humanitarian innovation 'turn' has also prompted a growing body of research which seeks new conceptualizations of the humanitarian innovation 'ecosystem', focusing on the humanitarian adaption of new technologies, funding and institutional frameworks for innovation management, and strategic innovation partnerships with non-traditional actors (Betts and Bloom 2014; Bessant et al. 2014; IFRC 2013; Ramalingam et al. 2009 and 2015).

Military actors have occupied a central and increasingly prominent presence in the international humanitarian landscape over the last two decades (ALNAP 2012; Hanley 2010; Wiharta et al. 2008). However, there has been little systematic attention to date on the interfaces between militaries and the humanitarian innovation ecosystem. This is surprising as the humanitarian innovation discourse has been otherwise eager to search 'outside' the traditional humanitarian community for new products, processes, and innovation good practices.[2]

We nonetheless identify in the existing literature the early stages of two complementary, but currently unlinked, research agendas. One is optimistic, focused on identifying opportunities for synergistic learning on innovation between military and humanitarian communities. The other is critical, concerned with the risks military technologies may pose to core humanitarian principles. We argue that both strands of thinking should be unified under a single research agenda, aimed at generating holistic understanding of the current opportunities, risks, and future implications of the humanitarian innovation ecosystem's intersections with military actors.

We structure this argument around three guiding questions. First: **do military products, processes, and models of innovation management have the potential to inform humanitarian innovation, and if so, in which arenas?** Second, **what real and perceived risks does the diffusion of military-derived innovation pose to humanitarian principles and practice?** Third, taking into account both lessons-learning opportunities and principle-based risks, **how might new or existing platforms for**

[1] This research was made possible by a grant from the University of Oxford John Fell Fund and the generous support of Stephanie and Hunter Hunt. The authors are also grateful for the research assistance of Louise Bloom and Jacalyn Marcatilli, as well as the many practitioners and academics from organisations listed in the Appendix, who shared their valuable insights through interviews.

[2] We adopt here ALNAP's definition of the 'humanitarian system' as *a network of interconnected institutional and operational entities through which humanitarian assistance is provided when local and national resources are insufficient to meet the needs of the affected population'* (ALNAP 2015: 18). We also refer to the adapted definition by Ramalingam et al of the 'humanitarian innovation ecosystem' as the collective *people, institutions, policies and resources that promote the translation of new ideas into products, processes and services* within the humanitarian sector (Ramalingam et al 2015: 10).

civil-military coordination facilitate collaborative lessons-learning around innovation in an effective and principled manner?

To ground the following discussion, we collected empirical data on a range of illustrative case studies of military innovations with proven or potential dual-use application to humanitarian practice over 2014-2015. This data draws from both an extensive desk-based literature review, and detailed consultations with expert practitioners, policymakers, and researchers from the aid sector, militaries, and academia. In total, 65 semi-structured interviews and three focus groups were conducted in the UK and US. To encourage frank discussion of sensitive issues, interviews were not for individual attribution; a full list of organisations consulted can be found in the Appendix.

This working paper presents preliminary findings to be developed further through subsequent research and consultative feedback. We draw from case studies to illustrate the opportunities, risks and challenges of innovation diffusion and exchange between militaries and humanitarians, but these are not meant to comprise a comprehensive 'inventory' of all available data. It is, rather, our aim to generate interest in further research on the topic.

Our focus is on two leading models of military innovation management, the US and UK military forces. While this is sufficient to illustrate the main points of this working paper, it is not representative of the wide diversity that exists amongst military forces worldwide. Important distinctions exist between international militaries, which intervene in the wake of humanitarian emergencies, and national militaries, and which are typically the first-responders during humanitarian emergencies. We lack space and time to address issues of innovation relevant to other security actors, including police and private military contractors (PMCs), but exploration of such actors is an important next step for further study.

The structure of the paper is as follows:

First, adopting a systems perspective of the humanitarian innovation ecosystem, we describe humanitarian action in the context of a rapidly shifting international security landscape, and the **humanitarian sector's resulting agenda to improve its capacity for innovation.** Through this perspective, we identify a gap in the understanding of militaries, which are increasingly prevalent actors in international humanitarian operations, but have yet to be seriously engaged with by academic and policy literature on humanitarian innovation.

Second, drawing from several parallel literatures, we argue that militaries are important reference points for thinking about humanitarian innovation. We posit that particular military products, processes, and innovation management strategies have **important lessons-learning value for humanitarian innovators.** We illustrate several areas where humanitarian practice can benefit from products and processes adapted from the military, including:

- Information communication technologies (ICT)
- Humanitarian medicine
- Strategic planning
- Innovation management
- Simulation and gaming
- Logistics

Third, the active and passive diffusion of 'dual-use' technologies – which have both military and civilian humanitarian applications – also pose **important critical questions regarding the risks military innovation diffusions pose to humanitarian principles.** We address several of these issues in a call for further critical research to problematise ongoing sites of innovation diffusion and exchange between militaries and humanitarians.

Fourth, in considering both the opportunities and risks of militaries in relation to the humanitarian innovation debate, we consider **how beneficial knowledge exchange and diffusion between military and humanitarian innovation ecosystems might be best facilitated**, while conforming to existing principle-based guidance on civil-military coordination. We suggest three potential approaches to civil-military coordination for innovation along a spectrum of engagement – 'minimalist' case study research, 'moderate' joint learning collaboration between military and humanitarian actors, and a 'maximalist' approach featuring direct innovation partnership.

Finally, we outline a broader research agenda, which unifies these three research opportunities, and suggest next steps for immediate research opportunities.

2 Context: Militaries and the humanitarian innovation debate

We begin with a brief introduction to the relationship between militaries, the wider humanitarian system, and the humanitarian innovation ecosystem. Militaries and humanitarians are intrinsically linked in the contemporary landscape of humanitarian emergency response – although 'military actors sit outside the formal humanitarian system', ALNAP (2012: 40) writes, they 'nevertheless maintain a longstanding, and often fraught, working relationship with it'.

2.1. Introducing the humanitarian innovation ecosystem

At the broadest level, the humanitarian system consists of INGOs and the ICRC, members of the UN system, national NGOs, host-government entities, regional intergovernmental agencies, and donor-government agencies and offices (ALNAP 2012). In theory, this diverse community is unified by their shared commitment to a common set of defining humanitarian principles, including humanity, impartiality, independence, and neutrality (OCHA 2010). In practice, however, humanitarian organisations vary widely in their approaches, norms, and adherence to these principles (Egeland et al. 2011; SCHR 2010; Slim 2015).

Since the end of the Cold War, however, the boundaries of international humanitarianism have been in a state of rapid change.

First, the humanitarian community has **greatly expanded in terms of the number of NGOs currently operating**, bringing serious coordination challenges to the entire sector (Walker and Russ 2010; Weiss 2013). This 'crowding' of humanitarian space is also driven by a concurrent rise of increasingly assertive non-traditional actors, who are often directly involved in humanitarian relief activities but do not hold humanitarian action as a core function nor necessarily adhere to humanitarian principles.

Militaries are included in this 'non-traditional' actor group, alongside others such as the private sector (including multinational corporations, large-scale national enterprises, commercial contractors and small-to-medium enterprises), religious institutions, diaspora groups, and members of affected communities themselves (ALNAP 2015: 19).

It should be noted that the historical imagining of a distinct and apolitical humanitarian space, reserved exclusively for traditional humanitarian actors, has been persuasively challenged in scholarship – indeed, aid workers have shared space with a range of actors during humanitarian emergencies throughout history (Collison and Elhawary 2012; Donini, ed. 2012; Slim 2011). Nonetheless, the unprecedented crowding of the contemporary humanitarian landscape poses new challenges – and new opportunities – to the traditional humanitarian sector which has long perceived itself as the primary custodians of humanitarian space (Weiss 2013: 23, 54; Sandvik 2015). We will return to this point in greater detail below in relation to militaries.

Second, a complex confluence of strategic challenges is shifting the nature of humanitarian emergencies in the early 21st century, placing additional demands on the design and implementation of humanitarian interventions. In response, an increasingly over-stretched and under-resourced humanitarian community is struggling to adapt to an evolving reality defined by emergencies of increased size, scope, frequency, duration, and complexity (Ramalingam et al. 2015: 7). Global climate change has been linked to the rising severity and frequency of natural disasters, while also impacting slower-onset emergencies such as droughts and agricultural disruptions (Ferris 2012: 1; Gelsdorf 2010; IPCC 2014; Wiharta et al.: 6-7). Major shifts in demographics and technology, including rising global urbanisation and networked societies, mean that humanitarian emergencies increasingly occur in interconnected, complex, and urbanised environments where simultaneous systems failures and interrelated, cascading 'spin-off emergencies' are becoming the new norm (Kent and Ratcliffe 2008; Ramalingam 2013). Adding to this complexity is a rise in aid worker insecurity during complex emergencies, exacerbated by the proliferation and rapid adaptations of globally-networked, non-state armed groups such as Islamic State (Pantuliano 2015). Due to these combined factors, emergencies are also increasing in duration, blurring emergency humanitarian response and longer-term development projects.[3]

Third, while the capacity of the humanitarian system to adapt and evolve to these developing strategic challenges will determine the future success or failure of humanitarian assistance, traditional humanitarian organisations also face recurrent impediments to their own endogenous capacity for adaptation. As a result, major gaps exist in the sector's approaches to knowledge management, sustainable financing models, strategic planning, accountability to affected populations, and transitioning from relief to development, amongst others. The result, as ALNAP (2015: 10) writes, is a humanitarian system that is, ultimately, 'failing to meet the global demand for humanitarian assistance'.

[3] As Betts and Bloom (2014: 6) note, for instance between 2006-2014, 'six countries have needed humanitarian assistance every year, while two thirds of all displaced people are in protracted displacement situations lasting at least five years'.

2.1.1. Humanitarian innovation

In recognition of the multiple serious challenges facing traditional aid actors in the fast-evolving humanitarian landscape, Ramalingam et al. (2015: 3) identify a 'growing awareness of the need for transformational change in what humanitarian actors do and how they do it, to maintain relevance, reputation and impact'. The result has been a surge in humanitarian initiatives to improve the sector's overall capacity for innovation.

Since the emergence of this so-called 'turn' towards innovation in humanitarian thinking between 2009-2011, 'an increasing number of organisations have formally adopted innovation processes to stimulate new thinking on the provision of humanitarian assistance' (Betts and Bloom 2014: 5). Efforts to date include the launch of dedicated innovation agendas within UN agencies and leading INGOs, while traditional humanitarians are forging innovation partnerships with donors, private sector, academia, and other 'non-traditional' actors (DFID 2012; Ramalingam et al. 2009; Steed 2010).

Independently – and, increasingly, as a community – participants of this humanitarian innovation agenda seek to foster a humanitarian ecosystem more conducive to adaptation and change, one which can 'invite new ideas, provide transparency about resources, and facilitate [the] scaling up' of improved approaches to humanitarian challenges (Betts and Bloom 2014: 21). With the inclusion of 'Managing Innovation' as one of the four major themes of the 2016 World Humanitarian Summit (WHS), recognition is growing of the important role innovation plays in improving the humanitarian sector's capacity for responding to emerging challenges facing crisis-affected communities worldwide.[4]

Although definitions of humanitarian innovation remain conflated and, at times, contested, grounding can be found in the large body of innovation management theory describing processes of diffusion and the adoption of new ideas in both business and social challenges (Brown and Wyatt 2010; Johnson 2011; Mulgan 2007; Rogers 1962, 1971). In the following discussion, we draw from HIP's theory-based definition of humanitarian innovation as a ***process for adaptation and improvement,*** which includes locating and scaling humanitarian solutions to problems in the form of products, processes, and wider business models (Betts and Bloom 2014)**.**

Innovations can occur in a variety of forms, including **product innovations** (changes to a product or service which improves efficacy and efficiency), **process innovations** (changes to the delivery of a product or service), as well as changes to the entire underlying business model of how products or services are delivered (Ramalingam et al. 2009: 15-16). Regardless of its form, however, innovation should not be confused with invention – innovations may represent novel ideas, but can also include adapting pre-existing solutions to a different context, most successfully through iterative learning from frequent failure (Babineaux and Krumboltz 2014).

To this end, we also adopt HIP's model of the cyclical nature of innovation, with an emphasis on continuous learning and feedback in four stages: **1) defining a problem or identifying an opportunity; 2) finding potential solutions; 3) testing, adapting and implementing a solution; and 4) appropriate scaling of the solution** (Betts and Bloom 2014: 14).

[4] WHS (2014) 'Transformation through Innovation', WHS: https://www.worldhumanitariansummit.org/whs_Innovation (accessed 01/07/2015).

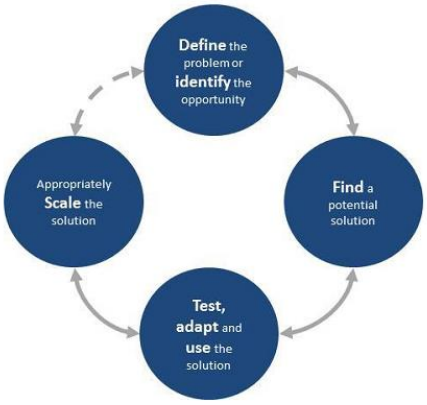

Figure 1: The innovation process used by the Humanitarian Innovation Project (Betts and Bloom, 2013)

Through this lens, humanitarian innovation becomes a point of analytical departure for research considering how humanitarian problem-solvers can best define, scale, and refine innovative products and processes, and partner strategically with other actors in research, development, and innovation management, in order to ultimately improve the delivery of humanitarian assistance to vulnerable populations.

2.1.2. Learning from 'non-traditional' humanitarian innovation partners

Despite progress in the nascent stages of its innovation agenda, the humanitarian community faces several challenges unique to its sector, including serious ethical constraints related to innovating new solutions for humanitarian aid (HIP 2015; Raymond and Card 2015). Additionally, organisational cultures in many international aid organisations present cultures and environments which are not conducive to effective innovation, including a regular lack of commitment to risk-taking necessary for innovation to succeed, and routine gaps in approaches to organisational learning needed for innovation to flourish. These issues are interrelated with a widespread evidence gap and lack of appropriate methodologies for measuring the actual impact of humanitarian innovation projects, and a general lack of innovation resources for supporting innovation efforts in the humanitarian sector (Betts and Bloom 2014; Ramalingam et al. 2009; Ramalingam et al. 2015: 15, 40).

In seeking to address these limitations, the humanitarian innovation debate has begun to better recognise the opportunities for synergistic lessons-learning and innovation partnerships lying with 'outside' actors (Ramalingam et al. 2015:11). This premise is well-supported in wider innovation theory, particularly the concept of 'cross-fertilization' – the idea that partnerships between different individuals and organisations, often with very different ideas and approaches, have a higher likelihood of generating new ideas and novel breakthroughs for shared problems (Adner 2012; Johnson 2011).

There is tremendous potential for the joint identification, scaling, and direct adoption of new products and processes from analogous sectors into humanitarian practice, as well as their assistance through strategic partnerships, in the co-development and management of humanitarian innovation projects. 'Non-traditional' actors possessing comparatively greater research and development (R&D) capabilities and resources can also assist humanitarian organisations in developing relevant new innovations, while at the same time shouldering some of the risks associated with innovation processes.

To date, progress has been most clearly evidenced in humanitarian innovation partnerships with the private sector, a growing number of which have provided valuable contributions to both humanitarian lessons-learning on innovation management, and the identification and co-development of new humanitarian products and process (Betts and Bloom 2014).

Despite rhetoric about the importance of innovation partnerships, however, humanitarian engagement with external actors has been slow and remains limited. This is partly the result of humanitarian unease in partnering with external actors who may hold different and, at times, conflicting profit-seeking agendas potentially at odds with humanitarian principles. As Ramalingam et al. (2015: 26) note, however, impediments are also linked to wider dysfunctions in 'decision-making issues, fitful engagement and different cultures and ways of doing business' between both communities.

In seeking to leverage innovative approaches, models, and inspirations from outside the 'closed' loop of the aid sector, while also safeguarding humanitarian principles, the humanitarian innovation debate thus requires new thinking and new solutions. Here, the research community has begun to play a critical role in building understanding of systematic strategies for strategic engagement between humanitarian innovators and non-traditional actors, such as business and affected communities.[5]

Research on humanitarian innovation, however, remains significantly under-developed in several regards (Rush et al. 2014). In particular, it largely continues to overlook the roles, synergies, and risks other non-traditional actors pose for the wider humanitarian innovation ecosystem, including affected communities themselves (Betts et al. 2014). It is within this gap that we locate questions related to the role of military actors, and their current notable absence, in the humanitarian innovation discussion.

2.2. Militaries and humanitarian emergencies

Analysis of military-humanitarian engagement and coordination – commonly known as civil-military coordination (CMCoord)[6] – claims a sizeable academic and policy literature (Egeland 2013; Metcalfe et al. 2012, Wheeler and Harmer, eds. 2006; Wiharta et al. 2008). A predominant focus of this research explores the fundamental tension at the heart of CMCoord: namely, that military forces offer certain essential, often irreproducible, capabilities needed in humanitarian emergencies, but at the same time also represent real and perceived risks to humanitarian principles.

International military actors interact with humanitarians in two distinct paradigms.

First, as an option of last resort, international military forces are often asked by the aid community to contribute certain key non-lethal assets to support both humanitarian organisations and affected governments in **natural disaster humanitarian response.** The most common contributions include

[5] See, for example, the work of Oxford's Humanitarian Innovation Project (www.oxhip.org), the Harvard Humanitarian Initiative (hhi.harvard.edu), the Active Learning Network for Accountability & Partnerships (www.alnap.org), and Enhancing Learning and Research for Humanitarian Action (www.elhra.org), which hosts the Humanitarian Innovation Fund (www.elhra.org/hif).

[6] Several overlapping terms are used by different policy communities in discussing civil-military coordination (Metcalfe et al, 2012: 10.) We here adopt the term '**CMCoord**', preferred by the UN Office for the Coordination of Humanitarian Affairs (OCHA) and the Inter-Agency Standing Committee (IASC), to refer specifically to humanitarian civil-military coordination. (NATO military doctrine, by comparison, refers to civil-military coordination by the acronym CIMIC. See NATO, 2003.)

equipment, personnel, and logistical support provided by military air and sea lift capabilities – what one US Army officer describes as the 'wholesaler role for humanitarian emergency logistics' (interview, US Army War College, 16/10/15). Militaries also provide the humanitarian operational space with vital capabilities for command and communication; intelligence, surveillance, and reconnaissance (ISR); specialist resources for engineering, medical support, and demining. In each of these areas, militaries tend to be vastly more equipped than their civilian counterparts, due to much larger budgets, and their ability to deploy to operational contexts with superior speed. This is particularly important for large-scale emergency humanitarian assistance crises which otherwise quickly overwhelm the traditional aid sector (IASC 2004; IASC 2011; NMCG 2011; SCHR 2010; Wiharta et al. 2008).

Second, in **complex emergencies**, militaries are typically the only actors able to provide physical security to aid workers and vulnerable populations targeted by armed actors, or at a larger scale, to stabilise the underlying conflict driving the humanitarian emergency itself. Here, militaries may simultaneously provide humanitarian and development aid while actively participating as combatants in the underlying military conflict.

In both settings, but particularly in complex emergencies, core humanitarian principles of humanity, impartiality, and neutrality are vulnerable to compromise by militaries in pursuit of competing national security objectives, particularly when militaries and donor governments attempt to use either their own resources or those of the international aid community, for political or military gain (HPG 2010; Metcalfe et al. 2012: 5). As a result, interactions between militaries and humanitarian organisations are, in theory, constrained by a **range of principle-based CMCoord guidance** – including general civil-military guidance (IASC 2004; IFC/ICRC 1996; Interaction 2011; SCHR 2010) and emergency-specific guidance (IASC 2011; OCHA 2011), as well as specifications on the accepted use of specific military and civilian defence assets and armed military escorts (IASC 2003; IASC 2007).

2.2.1. Increasing 'militarisation' of humanitarian space

A major shift in CMCoord of particular interest here is the **increasing prominence and assertiveness** of military actors in operational spaces traditionally reserved for the 'core' humanitarian community.

The escalation of foreign military involvement in humanitarian contexts is empirically well-supported (Hanley 2010; Wiharta et al. 2008). As Phillips (2011: 33) writes, 'Since 1997 more military assets have been deployed around the world for the purposes of natural disaster relief and complex humanitarian emergencies than at any other time in the international community's history'. Recent foreign military contributions to large-scale humanitarian natural disasters – which in each case entail close coordination with the affected country's own national military and police forces – include the US military's role in Haiti following the 2010 earthquake and in the Philippines following Typhoon Haiyan (Bollettino 2015; CFE-DMHA 2014), and UK and US contributions to the Ebola response in Sierra Leone and Liberia (Kamradt-Scott et al. 2015).

This trend also includes a prominent rise in the use of military force to provide security in complex emergencies, which has developed through the tumultuous evolution of post-Cold War peace operations, post-2000 'stabilization' operations, and a range of actions taken by militaries to provide physical security to aid workers who are themselves increasingly targeted by local combatants (Collinson et al. 2010; Collinson and Duffield 2013).

While ALNAP (2012: 10) observes that humanitarian operations still remain 'a relatively small part of what militaries do and far removed from their core business', this reorientation of military mandates towards direct humanitarian action 'only stands to intensify as military provision of aid increasingly becomes the norm and is supported by growing budget allocations'. A number of interrelated geostrategic factors are behind greater militarisation of the aid space and the integration of humanitarian and development agendas into military operations, but two are particularly prominent.

First is a growing set of **'pull' factors** encouraging the use of military assets to support an increasingly-overstretched and under-resourced humanitarian sector in responding to humanitarian emergencies of unprecedented scale, frequency, duration, and complexity. This is only set to increase in the future, as natural disasters – particularly those affecting littoral, urban, and complexly-networked populations – occur with greater frequency (Duffield 2010; Hanley 2010; Lipner and Henley 2010; Wiharta et al. 2008). While existing humanitarian guidance prescribes a role for militaries as 'last resort' partners, this is changing – particularly for the national militaries of many Southern countries, which, Ferris (2012) notes, are fast-becoming their 'first resort' humanitarian response organisation during disasters.[7] Humanitarians are also increasingly deployed into dangerous environments for longer durations, which has introduced new strains in the management of physical security risks aimed at national and international staff, as well as beneficiaries (Collison and Duffield 2013).

Second, a confluence of political rationales are also **'pushing'** governments to deploy their militaries in the same operational environments where humanitarian relief missions are most likely to be active. Military deployments to humanitarian emergencies have a long-standing precedent as tools of 'soft-power' military diplomacy by states, used to sway both foreign governments and the 'hearts and minds' of local populations (Yates and Bergin 2011). Moreover, as Metcalfe et al. (2012: 5) point out, bureaucratic pressures have encouraged military entry into humanitarian operations 'to demonstrate the added value of national militaries at a time when defence budgets are coming under pressure', an agenda closely linked to the political economy of defence industry contractors discussed further below. More broadly, involvement in humanitarian operations, Wiharta et al. (2008: 9) suggest, is also driven by many Western militaries seeking a 'realignment' of their post-Cold War organisational identities, particularly their 'search for new roles as "forces for good" or "humanitarian warriors"'.

Perhaps the single most dramatic and contentious 'push' into humanitarian space, however, has come from the rise of **stabilization agendas**, sharpened in the last decade and a half as the result of a major trend in international security related to the Global War on Terror, the Second Iraq War, and NATO operations in Afghanistan, which 'have explicitly sought to combine humanitarian, military and other spheres of action under an over-arching political objective' (Metcalfe et al. 2012: 6).

Contemporary stabilisation doctrine draws from military experiences in counter-insurgency doctrine developed throughout the 20th century, and from international peace operations throughout the 1990s (Barakat and Zyck 2011; Gordon 2011; Metcalfe et al. 2012; Wilder 2009;). Critically, it assigns military actors a direct role in the delivery of humanitarian assistance while

[7] The effects of climate change on future littoral, urbanised natural disaster response and the implications of an increasingly routinised role for military naval support was a particularly recurrent theme in several discussions with military practitioners in this research (Interview, US Naval War College, 9/10/2015; Interview, MoD; 27/06/2015).

simultaneously conducting warfare (MoD 2009; NATO 2010; US Army 2008). Although the record of success in recent stabilisation operations remains a point of major debate, organisational momentum and major investments in reorienting military culture over the last decade and a half strongly suggest that stabilisation will remain a key driver of military interest in humanitarian space for the foreseeable future (Collinson et al. 2010; Fishstein 2010; Paris 2013). A similar trend towards the integration of military and aid action in humanitarian response can be seen in the emergence of the UN Integrated Missions model (ALNAP 2012; Metcalfe et al. 2011).

2.2.2. Military-humanitarian tensions

Traditional humanitarian organisations have reacted with deep concern and anxiety to the so-called 'militarisation' of humanitarian space, driven by a fear that participation by military actors will result in the erosion of humanitarian principles, restrictions in access to affected populations, and increased insecurity to their staff in complex emergencies.

Slim (2011: 3) succinctly frames humanitarian fears resulting from the shrinking of military-humanitarian distance into three useful categories.

First is '**complicity**' – the fear that, through coordination with militaries, 'they [humanitarians] will become complicit with violence if the state's military relief is biased and unprincipled'. Here, the increasing presence of military actors in humanitarian contexts has heightened concerns that that the key principles of humanity, impartiality, and neutrality which define and guide humanitarian work are increasingly jeopardised by real or perceived over-association with military actors. Tensions regarding military threats to humanitarian principles are particularly high in complex emergencies, where debates arise over the use of armed escorts (most prominently in Iraq, Afghanistan and Somalia), and in contexts in which military forces may also be parties to the conflict or responsible for the broader stabilization agenda (Collinson et al. 2010, Fishstein 2010; Wheeler and Harmer 2006). The alignment of security and aid in Western donor states' foreign security agendas, furthermore, has led to greater pressure on humanitarians reliant on funds from these same donors to intervene in more complex emergencies, where they are increasingly also targeted for perceived affiliations with foreign or local militaries (Collinson and Duffield 2013).

In turn, Slim identifies the linked humanitarian fears of **'contagion'** – 'the risk of being associated by the population and government opponents with a particular political and military agenda', with potential implications for access and, increasingly, the physical security of their own staff and beneficiaries (Slim 2011: 3). Such fears are often well-founded (ALNAP 2012 and 2014; Egeland et al. 2011; Stoddard et al. 2010). In recent years, examples including the use of polio healthcare workers for covert intelligence-gathering by US intelligence in Pakistan and the contentious experiences of Provincial Reconstruction Teams (PRTs) in Afghanistan and Iraq, have directly fed into the increased targeting of aid workers by armed actors who assume humanitarian agencies are associated with Western or local state interventionist agendas (Shah 2011; USAID 2014). In other instances, actions by international militaries themselves may accidentally or deliberately result in harm to aid workers and their beneficiaries, such as the recent targeting of a MSF hospital in Kunduz by the US military.[8]

Further complicating the issue is the danger that increasing military presence will contribute to the fragmentation of humanitarian coherence. As mentioned above, a body of established CMCoord guidance exists to protect humanitarian principles by defining the appropriate boundaries of

[8] MSF (2015) 'Kunduz Air Strike'. Médicins Sans Frontières. Available at: http://www.msf.org/topics/kunduz-hospital-airstrike (accessed 5/10/2015).

military-humanitarian engagement. In practice, however, adherence to CMCoord guidance varies between different INGOs, as does their experience, understanding, and interpretations of interacting with armed actors (Egeland et al. 2011; IASC Global Health Cluster 2011: 2; Weiss 2013: 84).

Despite the concerted efforts of coordinating entities such as OCHA's Humanitarian Civil-Military Coordination (UN-CMCoord)[9] and several key NGO and inter-NGO fora discussed further below, this diversity of views amongst humanitarians makes coherence and coordination around CMCoord issues a major challenge (Bennett 2011; Metcalfe et al. 2011; Sida 2005). Ultimately, as Metcalfe et al. (2012: 10-11) observe, 'contradictory and often inconsistent positions adopted by many humanitarian actors are undermining the relationship with the military and weakening the influence that humanitarian actors could have on their policies and practices'. Indeed, as ALNAP (2015: 13) writes, 'many humanitarian organisations have willingly compromised a principled approach in their own conduct through close alignment with political and military activities and actors'.

Lastly, Slim (2011: 3) notes a general humanitarian discomfort with 'the significant cultural differences' between the loosely-networked humanitarian and the hierarchical structures of military organisations. These differences routinely manifest in the form of distrust, scepticism, and stereotyping – present on both sides (Barry and Jeffreys 2002; Clarke 2002; Collinson and Elhawary 2012; Hofman 2011). Notably, the CMCoord literature also captures military actors' own frustrations and concerns about coordination with humanitarian counterparts. Militaries have, for example, long argued that the use of military assets is necessary because humanitarian actors are often slow to deploy and, as Clarke (2002: 208) writes, militaries also 'make much of the alleged incapability of the humanitarian community to contribute to unity of effort'.

2.3. Research gaps and opportunities

In summary, military expansion in the aid space, and related humanitarian agendas to improve CMCoord, are only set to increase in prominence and urgency. The often uneasy relationship between humanitarians and military represents one of the most pressing issues currently facing the humanitarian system. Given this unavoidable intersection, military actors are a highly relevant topic for any systems-level discussion of humanitarianism – including humanitarian innovation.

At the same time, while CMCoord remains a sensitive and often uncomfortable area of debate, there are major research gaps in our understanding of how engagement should occur between militaries and humanitarians. As Metcalfe et al. (2012: iii) write, civil-military scholarship has 'tended to focus on conceptual issues and have been primarily concerned with questions of principle, with less analysis and debate on how the relationship works on a practical level'.

In this context, the active diffusion of military products and processes into humanitarian practice, via commercial channels of diffusion, represents an intersection of military and humanitarian innovation ecosystems rarely acknowledged or problematised. We contend that this topic represents an important missed opportunity for advancing research and understanding, one which has the possibility of contributing to both CMCoord and humanitarian innovation scholarships.

[9] OCHA 'Humanitarian Civil-Military Coordination'. Available at: http://www.unocha.org/what-we-do/coordination-tools/UN-CMCoord/overview (accessed 01/07/2015).

The contributions of a small number of authors and experts already contain several persuasive initial arguments for engaging with military actors as a subject of study and debate for humanitarian innovation (Achkar et al. 2013; Deloitte 2015a; Duffield 2013; Kent and Ratcliffe 2008; Sandvik et al. 2014; Sandvik and Lohne 2014). We begin in the section below with a consideration of militaries as a lessons-learning source for the humanitarian innovation agenda.

3 Humanitarian lessons-learning from military innovation

Given the complex and often fractious nature of the broader civil-military relationship, it is perhaps unsurprising that the military has yet to be broached as a subject of serious discussion in the humanitarian innovation discourse. Outside their established roles as partners of last-resort in natural disaster response, militaries are rarely approached by humanitarians for innovative lessons, good practice, new ideas or inspiration. NGO and UN practitioners across the sector routinely note that militaries provide excellent logistical burden-sharing support to humanitarians during the early stages of natural disasters, but rarely consider what they might 'teach' humanitarians about improving their own core practices (Interview, OCHA official, 5/10/15; interviews, BRC 10/6/15; 17/8/15).

However, closer study of military innovation ecosystems offers an opportunity for new humanitarian lessons-learning on innovation, both as a general reference point for innovation management, and in the search for scalable new dual-use products and processes.

3.1. Introducing military research and development (R&D)

Military R&D, carried out through government-funded partnerships between military, private sector, and academia, has long represented a key source of cutting-edge technological innovations in both wider civilian society and, by extension, humanitarian practice. As Phillips (2011: 35) notes, the extraordinary operational demands of warfare incentivises the 'rapid development of technology', typically 'over and above that found in other government departments, agencies, non-governmental organisations or elsewhere'.

Military R&D has historically been provided with vast resourcing by states eager to maintain an edge in technology relevant for national security (Brozska 2007). Although global military R&D expenditure has declined since its Cold War peak, it still accounted in 2006 for an estimated **$85 billion (**Brozska 2007**).**

The US is by far the largest investor in military research – in 2014, for instance, the US Department of Defense (DoD) alone allocated $63.5 billion for research, defence, testing and evaluation (DoD 2014:.6-1). These funds, in turn, support a network of over 80 federal labs and 26 testing and evaluation centres spread throughout the US military services and government research centres (NSF 2015). The DoD's preeminent research entity, the Defense Advanced Research Projects Agency (DARPA), which pursues a mandate to 'make pivotal investments in breakthrough technologies for national security', likewise enjoys a unique degree of bureaucratic autonomy and generous resourcing, currently projected at $2.97 billion for 2016.[10]

[10] 'DARPA (2015) Budget', DARPA. Available at: http://www.darpa.mil/about-us/budget (accessed 26/10/2015).

These figures are striking compared to analogous figures for humanitarian investments in R&D, which range from DFID's $8.2 million commitment to smaller investments of between $300,000 to $2.6 million from other actors such as UNHCR, UNICEF, MSF, and World Vision – far below the $75 million innovation investment threshold it recommends (Deloitte 2015b).

Defence-related R&D also draws from, and is driven by, strong commercial interests tied to expansive national and international defence-industrial bases, made up of commercial contractors and academic researchers undertaking new military research, development, testing and evaluation activities on behalf of their military clients (Bitzinger 2009; Cameron and Barnes 2014; Neuman 2010). Trends towards military research privatization and a reliance on commercial off-the-shelf technologies (COTs) have increased in the last decade, with major associated changes in military R&D architectures. These include the privatization of part of the UK Defence Evaluation and Research Agency to form QinetiQ, which provides for both commercial and military customers (Brozska 2007: 15).[11]

Indeed, Duffield (2013) makes the important point that, while many of the technological foundations for contemporary ICT innovations used by humanitarians originally come from the military, '[t]oday it is the corporate-sector that increasingly plays the role of banker and innovator'. As he notes, humanitarians are increasingly 'dependent upon forging their own public-private partnerships in order to leverage private and commercial services' related to ICT, and militaries are 'now the main customers for private geospatial and cyber-products'.

Moreover, as militaries are more frequently drawn into humanitarian and development missions, their own large and well-funded innovation ecosystems are increasingly oriented towards design challenges that overlap with many similar strategic and operational issues facing the aid community (Interview, US Army War College, 16/10/15). Thus the British Red Cross NGO-Military Contact Group (NMCG) observes, for example, how 'conflicts in Iraq and Afghanistan have challenged a military structure optimised to fight the Cold War and led to new investment in technical capacity for reconstruction or other development-type activities' (2009: 1; Interview, BRC, 10/06/15).

A resulting convergence between military technologies and humanitarian challenges has also been identified by several authors as an explicit opportunity for synergistic lessons. Kent and Ratcliffe (2008: xii) suggest, for instance, that 'numerous projects could be adapted to humanitarian purposes' from such military R&D.

Below, we briefly consider several areas where scalable military products have already made a major impact on the humanitarian innovation ecosystem, opening up the potential for future humanitarian innovation lessons-learning from militaries subjects.

3.1.1. Information communication technologies (ICT)

Military innovation is directly responsible for much of the key past and emerging ICT product knowledge-base which has dominated humanitarian innovation discussions to date (OCHA 2013b; IFRC 2013). Interestingly, however, the adaptation and *adoption* of ICT products and knowledge has elicited little concern among humanitarians – in stark contrast to reactions regarding other areas where militaries hold expertise.

[11] 'Qinetiq': www.QinetiQ.com (accessed 23/10/2015).

Indeed, the military origins of modern commercial ICT – a dominant theme of humanitarian innovation discussions to date (OCHA 2013b; IFRC 2013) – is well documented (Guttieri 2014; Leslie 1992: 199-233; Wentz et al. 2008). ICT research conducted or directly funded by the US military alone is credited in the last half-century with seminal ICT breakthroughs ranging from integrated circuits (Ceruzzi 2003: 187) to the foundational architecture of the world-wide web and email (Leiner et al. 2009), graphic-user interfaces (Myers 1998), GPS (Alexandrow 2009), 'onion routing' (the basis for Tor online anonymity software) (Altman 2008), and interactive maps (later commercially adapted for products such as Google Streetview) (Naone 2008), among many others. As Guttieri (2014: 2) notes, '[u]ntil very recently, to talk about ICT innovation was to focus on exclusive government proprietary technologies, often developed under security protocols, that later spawned commercially-available technologies'.

Military ICT has also been a particularly important source of civilian remote-sensing technology (Guttieri 2014). Duffield (2013) dates the loosening of a 'military monopoly' on remote sensing technology to only the mid-1990s, when the US government rapidly deregulated and commercialised its propriety systems and software. During this time, its military GPS network, imaging sensors and data sets were declassified and made available for commercial use – a move which, in turn, included the first-time sanctioning of private US companies to launch their own high-resolution satellites (Duffield 2013).

This trend of ICT innovation is set to continue as near-future military R&D breakthroughs will continue to influence, and perhaps fundamentally alter, new technologies: the US DoD and UK MoD are both investing heavily, for instance, in research areas such as Terahertz-range communications (Ackerman 2014), improved geo-location technology which uses the Earth's magnetic field instead of expensive satellite infrastructures[12], and remote-controlled robotics for use in natural disaster environments.[13]

The military lineage of ICT, and particularly remote sensing technology, is most clearly acknowledged by humanitarians in the contested emergence of civilian **unmanned aerial vehicle (UAV) technology**. Originally developed for military surveillance and targeted air-strikes, UAVs – commonly referred to as drones – are rapidly entering humanitarian use as a highly-visible and controversial new tool of humanitarian response (Sandvik and Lohne 2014). They have been used primarily for surveillance and observation, including crisis mapping and search and rescue operations (OCHA 2014b: 5; Hlad 2014; Sandvik and Lohne 2014). Recent efforts using drones to find stranded survivors after the 2015 earthquakes in Nepal exemplify the help drones can provide in dangerous and complex disaster situations (Wang et al. 2015). Similarly, in 2015 MSF began to use surveillance drones to support search, rescue, and medical aid operations for migrants crossing the Mediterranean (MSF 2015).

At the same time, the development of the next 'generation' of humanitarian drones remains closely linked to the military-industrial complex that birthed them, and will be for the foreseeable future. Emerging drone technology, such as the Kaman K-Max being developed by defence contractors Lockheed Martin and Kaman Aerospace, is intended to provide cargo lift capacity for resupplying troops in difficult-to-access terrain – a task which some commentators have identified for its dual-use potential in aiding humanitarian logistics (Chow 2012; Sandvik and Lohne 2014: 147).

[12] DARPA (2015) 'Quantum-Assisted Sensing and Readout'. Available at: http://www.darpa.mil/program/quantum-assisted-sensing-and-readout (accessed 26/10/2015).
[13] DARPA Robotics Challenge (2015) 'DARPA Robotics Challenge'. Available at: http://www.theroboticschallenge.org/ (accessed 26/10/2015).

Moreover, some of the most obvious and scalable learning opportunities for humanitarians come not only from the diffusion of military ICT into humanitarian usage, but also in the form of **process innovations** for using this technology more effectively. It stands to reason, for instance, that the same military organisations responsible for the diffusion of new technologies with civilian applications have also developed complementary processes for using them effectively.

One example is in geospatial technology, which is still relatively new for humanitarian geospatial analysts yet has long been used and refined by the military intelligence community. Humanitarian mapping processes, in particular, are still in need of improvement. As Achkar et al. (2013: 5) note, the humanitarian and human rights communities lack standard methodologies for analysis of the large amounts of geospatial data produced by these new remote-sensing technologies, which exist in an already-refined state within military intelligence, surveillance and reconnaissance (ISR) doctrine. Advocating a clear lessons-learning opportunity, they stress that 'the creation of a basic doctrine for this new field of [humanitarian] remote sensing must come from the rich legacy of military use that has preceded it in order to incorporate tested analytic systems that have evolved in this industry over time'.

Furthering this overlap, military and intelligence communities have in recent years sought to refine their established methodologies for providing better ISR support specifically to humanitarian relief operations. Sovada (2008), for instance, chronicles how US military's ISR support for humanitarian emergencies dramatically improved during the period between its response to the 2005 Hurricane Katrina and the 2007 California Wildfire, via the interim development of an integrated, pre-established ISR plan for humanitarian natural disaster response.

3.1.2. Humanitarian medicine

The diffusion of essential products and processes from military to humanitarian medicine also has a long tradition, one particularly well-recognised in trauma care. Reflecting on the history of modern trauma care, Chatfield-Ball et al. (2015: 93-94) write that the 'battlefield has been a key area for innovations in trauma care and throughout the great wars of the last two centuries, military and civilian trauma care have evolved synergistically'. More recently, protracted military engagements in Iraq and Afghanistan 'have changed the nature of injuries seen on the battlefield leading to further trauma management innovation' in military medicine (see also Belmont et al. 2007; Eastridge et al. 2006).

Key innovations in emergency military medicine include, for instance, the major haemorrhagic protocol the trauma management framework, and the modular field hospital (Chatfield-Ball et al. 2015).[14] Indeed, as one medical INGO logistican noted, 'the main thing we changed about the modular field hospital concept from the military was ordering them in white instead of green'.[15]

In public health, military health research has further contributed to key innovations in understanding of parasitology, including schistosomiasis, trypanosomiasis and gastrointestinal parasites. It has established efficacy of key anti-malarial drugs including Malarone, primaquine, and tafenoquine, and led development of anti-malarial sprays including DEET and permethrine (Crum et al. 2005; Kitchen et al. 2009; Peake et al. 2011). Military biomedical research has also led to important vaccines against communicable diseases including equine encephalitis, meningococcal

[14] Interview, Dr. Miriam Orcutt, 6/4/2015/.

[15] Interview, RSM, 7/5/2015.

meningitis, adenovirus respiratory disease, Rift Valley fever, anthrax, and experimental vaccines for malaria and HIV/AIDS (Artenstein 2005).

More recently during the West African Ebola response, vaccine development was drawn from knowledge accrued through significant US military biomedical research on Ebola, which has been funded for years as a bioterrorism threat priority. Development of the promising early experimental Ebola drug ZMapp was supported by the US Army Medical Research Institute of Infectious Disease (USAMRIID) and the US Defense Threat Reduction Agency, in partnership with two pharmaceutical companies, Mapp Biopharmaceutical and Dreyfus, Inc. Other US military contributions during the Ebola response include rapid-test Ebola screening kits, including the FilmArray BioThreat Panel, developed through a $240 million grant awarded through a DoD innovation competition, and USAMRIID's development of an anti-Ebola antiseptic, Provodine (Coleman 2015; Kaplan and Easton-Calabria 2015).

Military biomedical research will continue to be a major source of medical innovation for addressing future health emergencies. DARPA, for instance, recently initiated the Rapid Threat Assessment (RTA) program, a five-year initiative aimed at creating new technologies for accelerated diagnosis of biological and chemical threat agents. Although primarily designed to generate rapid countermeasures for military health protection, the RTA programme presents major dual-use civilian applications for disease treatment, particularly in the rapid production of medical countermeasures for rapid-onset pandemics and, longer term, emerging infectious disease drug development.[16]

3.1.3. Strategic planning

Another significant area for innovation is humanitarian strategic planning, which remains weak, limited by pervasive reactivity, short planning horizons, and unclear end-state objectives in both strategy and programme design (HFP 2011: 32; Kent and Ratcliffe 2008: 3). Here, Kent and Ratcliffe (2008: 11) write, humanitarian processes contrast particularly strongly with military approaches to strategic planning, which tend to be 'unparalleled in most non-military organisations' and are the result of large-scale information networks, strong institutional support for strategic planning, and defined, proven processes and models for establishing clear planning goals.[17] This suggests a further area where the adaptation of fundamental principles underlying military processes, particularly around strategic planning and intelligence analysis, may have relevance for informing humanitarian practice.

Indeed, although their origins are rarely acknowledged, several of the most widely-used tools in humanitarian planning have military origins. For instance, the **logical framework** approach and matrix, or 'logframes', originated as a 1960s US military planning framework. The logframe approach, ubiquitous in contemporary humanitarian project and programme planning, was subsequently diffused over three decades to USAID and later, via adoption by several major UN and European aid agencies, to the international development arena (Hummelbrunner, in Fujita, ed. 2010: 1; Nancholas 1998). In an observation with relevance to the frequent practitioner critiques of logframes' perceived rigidity, Hummelbrunner (2010: 1) observes that the planning tool still betrays

[16] DARPA (2015) 'Rapid Threat Assessment'. Available at: http://www.darpa.mil/program/rapid-threat-assessment (accessed 23/10/2015).

[17] As one naval officer noted, many of the fundamentals of military planning are 'fully applicable, fully scalable, and fully teachable for civilian use', noting that the US Navy and a number of private consultancies regularly teach courses in the application of military planning techniques to civilian conflict planning for non-military audiences (Interview, US Naval War College, 9/10/15).

it roots through its management style, originally tailored for military organisations, and 'marked by strong central authority and control around a relatively clear set of goals'.

Another example is **After-Action Reviews (AARs),** a structured participatory debriefing process that has become a widely-adopted knowledge management and accountability tool in humanitarian practice (OCHA 2013a; Ramalingam 2006: 64-66). Originally developed by the US Army in the 1970s, AARs were first introduced as a foundational step towards encouraging the Army's service-wide culture of continuous learning and knowledge management (Darling et al. 2005). Increasingly, **mission-to-task matrixes**, an internal management tool designed to help document military command planning, is also becoming – in the words of one US Army officer – 'civilianized' through usage in USAID (Interview, US Army War College, 16/10/15; DoD 2002).

Kent and Ratcliffe (2008: 34) suggest that while higher-level military planning efforts often exhibit notable flaws, military organisations nonetheless 'recognize the value in speculation and devote far greater resources to anticipating the future than does the humanitarian sector'. As Ramalingam et al. (2015: 17) note, this limitation also applies to humanitarian strategic planning around emerging innovations, which has an 'evident [gap] both in efforts to identify the needs and opportunities for innovation and in scanning/discovering new and alternative approaches'. As they write,

> *Where new ideas and products have been matched to specific problems, it tends to happen in a scattergun, crisis-specific and somewhat idiosyncratic fashion – shaped more by the vagaries of chance and happenstance than by the systematic analysis of needs and strategic use of resources.* (2015: 61)

By comparison, military 'sense and respond' capabilities emphasise building on so-called 'horizon-scanning' capacities, or the identification of probable future outcomes and situations based on analysis from a broad range of fields, from sociology to engineering (Gustafson 2010; Interview, NATO, 27/11/14).

Two examples of military strategic planning mechanisms relevant for humanitarian lessons-learning include the **US Army's Training and Doctrine Analysis Center (TRAC)**[18] and the **UK MoD's Development Concepts and Doctrine Centre (DCDC)**[19].

As Kent and Ratcliffe (2008: 30) explain, TRAC conducts 'research on "over-the-horizon" emerging threats, challenges, and technologies set between five and fifteen years in the future', so that 'new threats are identified and analysed long before they become imminent'. This window, they note, not only exceeds humanitarian strategic planning, which for the very few organisations with the resources to do so still 'typically does not exceed one year', but also 'standard long-term planning in the private sector', which tends to extend between 3-5 years.

Likewise, the NMCG (2015) points to DCDC as a potential source of humanitarian lessons-learning on strategic planning. DCDC was created in 1998 to augment the MoD's horizon-scanning capacity by providing forecasting of strategic future trends up to and past 2045, including many of the same near-future challenges – such as climate change, urbanization, and the disruption of complex social systems during emergencies – which, Kent and Ratcliffe write, 'mirror those faced by humanitarian actors' (2008: 30). Findings from DCDC's rigorous trends analysis are compiled into an annual

[18] 'TRADOC Analysis Center', US Army: http://www.trac.army.mil/ (accessed 15/09/2015).
[19] 'Development Concepts and Doctrine Centre', UK MoD: https://www.gov.uk/government/groups/development-concepts-and-doctrine-centre (accessed 15/09/2015).

Global Strategic Trends document, which contextualises MoD policymaker's long-term decision-making (MoD 2014; DCDC 2006).

3.1.4. Military approaches to innovation management

Lastly, military approaches to managing their own innovation processes also hold valuable opportunities to derive insights for improving humanitarian innovation management. As Deloitte (2015a: 77) notes, the extraordinarily competitive demands of warfare – an 'intensely high-pressure environment where lives are consistently at stake' – provide militaries a uniquely 'strong incentive for rapid knowledge sharing and innovation'. And a large and well-developed body of security studies scholarship focused on military innovation (for example, Farrell and Terriff 2002; Posen 1984; Rosen 1991) tells us that innovation management is not only at the core of military organisational identity, but that militaries' approach to innovation is distinct from that of actors in other sectors (Grissom 2007; Luthra 2008: 563).

Several analysts have explicitly begun to urge greater orientation towards militaries to improve humanitarian innovation. Weiss (2013: 195), for instance, has written that while humanitarians 'will undoubtedly take offense with this generalization', military organisations nonetheless 'tend to better values learning, and supervisors invest substantial resources in institutional infrastructure to assemble and act on lessons than their humanitarian counterparts'. Military approaches to innovation management, he concludes, represent 'an essential cultural difference that humanitarians should emulate'. Roxborough (2014) likewise contends that militaries, while often overlooked in the field of organisational sociology, have much to teach about innovation management good practices. And HFP (2011: 34) argues that 'crisis management could potentially be enhanced by exposing humanitarian organisations to military communities that regularly meet the challenge of innovation'.

For instance, in terms of their approach to capturing innovative good practices, militaries are far more committed to the documentation, refinement, and dissemination of innovations and learning across organisations than the humanitarian community, which faces serious limitations in its existing approaches to learning and dissemination of good practices (Ramalingam et al. 2009). In a recent report prepared for the WHS, for instance, Deloitte (2015a: 8) notes the 'high' relevance of US military's approaches to innovation management for humanitarian innovation lessons-learning, particularly its 'strong centralized governing body processes to source and disseminate innovations' and 'rigorous training institutions, systems, and doctrine'.

In the US Army, this commitment to lessons-learning begins at the 'bottom-up' with structured AARs, which enables the capture of practitioner knowledge drawn from the battlefield. This ground-level data is, in turn, 'codified, stored in a structured database, and spread through training, doctrine and strategy' by military innovation managers who ensure good practices are 'updated regularly to reflect changes in the operating environment and organisational learning' (Deloitte 2015a: 75-78). Here, a key mechanism for the codification of new innovations and continuous learning is the **US Army Center for Army Lessons Learned (CALL)**.[20] Established in 1985, CALL has more than 250 full-time staff engaged in knowledge management activities. Field-based 'Knowledge Officers' are embedded in combat units to observe and collect findings from on-the-ground battlefield observations, which they then pass along for rapid dissemination to other units. 'Lessons Learned Integrators' are further responsible for disseminating knowledge within units and military schools, while volunteer staff are deployed as members of the Theatre Observation Detachment program for

[20] 'US Center for Army Lessons Learned', US Army: http://usacac.army.mil/organizations/mccoe/call (accessed 16/10/2015).

further learning capacity. Thus, each military unit shares in a streamlined collection-to-dissemination mechanism available for organisation-wide knowledge sharing (Deloitte 2015a; US Army 2015).

Deloitte (2015a: 101) writes that the success of CALL's model lies in its ability to offer the US Army capacity for '[r]eal time collaboration of knowledge resources with operational staff and leadership', supported by 'dedicated resources and staff'. They note that, in addition to a high volume of observations, insights and lessons collected (20,000 in 2008), CALL's model has also been successfully scaled to other militaries, such as the Israeli military's own Center for Lessons Learned.

Translating CALL's good practice model to the humanitarian context faces several limitations in scale, most notably the substantial resources required to staff and coordinate a knowledge management hub. CALL also benefits from the centralised command structure of a military organisation that reduces barriers to knowledge sharing – barriers which exist in the disaggregated humanitarian community. Nonetheless, as Deloitte suggests, CALL offers a clear example of how 'effective knowledge capture and exchange', essential for innovation, can be advanced by:

> *[e]mbedding "knowledge-focused" resources (especially personnel) in with "mission-focused" resources and empowering them with an organisational mandate to collect, curate, and share insights allows for effective knowledge capture and exchange* (Deloitte 2015a: 101).

The US military has also invested heavily in diverse digital knowledge-sharing platforms for the rapid sharing of knowledge, such as Army Knowledge Online, Defense Acquisition Portal, Defense Technical Information Center, and the Battlefield Command Knowledge System (Deloitte 2015a; Interview, US Army officer, 25/02/14).

Several of these platforms show particular creative utility in fostering open collaboration with external actors – an aforementioned goal, and challenge, for the humanitarian innovation community. In seeking to encourage greater collaboration with innovation partners outside the military, for instance, the US Department of Intelligence Analysis (DIA) created '**NeedipeDIA**', an open online platform to allow innovators to learn of and present proposals to address needs cited by the military.[21] A list of DIA needs, divided into nine core need categories, is published on an unrestricted-access website as well as a classified platform, which interested parties can then respond to with a two-page white paper. Each need also has an Open Broad Agency Announcement attached, which enables people to formally enter the government acquisition process (Deloitte 2015a: 103-104).

Deloitte (2015a: 105-106) suggests NeedepeDIA offers a reference point for the coordination of valuable open online platforms to match humanitarian innovation needs with solutions, as well as lessons in the importance of carefully 'consider[ing] how to engage new players and familiarize them with the appropriate acquisition/procurement processes (if applicable) or other collaboration channels'.

In terms of product innovation management, **DARPA's** unique approach to innovation management presents clear evidence of the returns that risk-friendly spaces bring to innovation. DARPA explicitly focuses on 'high-risk/high-payoff technologies and military concepts with broader horizon than commercial analogues'. To encourage an innovation-friendly climate, DoD

[21] 'NeedipeDIA', DIA: http://www.dia.mil/Business/Needipedia.aspx (accessed 10/10/2015).

leadership has intentionally invested DARPA's six main offices with a generous budget, and also substantial independence authority to embark on high-risk/high-reward projects with potential for failure (Dubois 2003). Due in part to its independence, these investments have been resoundingly validated in an extraordinary track-record of success in new innovations that have changed military operations, wider society and, by extension, humanitarian operations.[22]

A final example of innovation management is the **US Army Rapid Equipping Force (REF),** which offers a novel model for rapid design, testing, and scaling of new product innovations.[23] The REF, created in 2003, represents a US Army solution to the lengthy process of developing, prototyping, acquiring, and integrating material. REF undertakes the entire process in under 180 days through embedding researchers and scientists into combat units to identify obstacles firsthand and better understand how to overcome them. The REF model has proven successful, and by 2007, had 'delivered more than 550 types of equipment and more than 75,000 individual items to soldiers in the field. The average time from receiving a request from the field to delivering a solution to the soldiers was 111 days' (Deloitte 2015a).

The lessons of REF, Deloitte (2015a: 102) concludes, suggest that '[t]he humanitarian sector may benefit from approaches that enable rapid iteration and provide imperfect solutions quickly as opposed to perfect solutions that take more time'.Moreover, it shows that humanitarians might 'also consider embedding scientists and/or researchers directly in humanitarian operations to quickly identify and communicate needs'.

At the same time, a major theme of military innovation literature is that militaries often serve as warnings against innovation *mis*management. This scholarship is replete with analysis of how intrinsic military cultures of conformity and tradition, risk-aversion (particularly in staffing and promotion), and bureaucratic inertia impede effective innovation (Grissom 2000, Luthra 2008: 563; Roxborough 2000)**.** While this literature cannot be examined in depth here, we note that these well-documented experiences in innovation failure also offer valuable lessons in obstacles and challenges inherent in the innovation process, particularly when trying to bring innovation change to rules-heavy bureaucratic organisations such as the UN. They thus further justify engaging with this evidence-base and identifying information relevant for the humanitarian innovation agenda.

3.2. Next research steps

In summary, the learning synergies between military and humanitarian innovation ecosystems calls for greater study. As the NMCG (2015: 6) recently acknowledged, '[t]here is clearly a lot of research and development that originates in the military community that could provide real benefit to the humanitarian community and populations on the ground'.

Yet, while the small literature discussed above has taken initial steps to acknowledge this possibility, it has not generated detailed case study analysis of military products and processes with dual-use scalability and relevance for humanitarian practice. Thus, humanitarian innovators and researchers risk overlooking an entire range of relevant lesson-learning opportunities from the military innovation ecosystem. Indeed, as Kent and Ratcliffe (2008: 30) suggest, there are 'potentially hundreds of case-study candidates to choose from for deeper exploration.'

[22] 'History and Timeline', DARPA: http://www.darpa.mil/about-us/darpa-history-and-timeline (accessed 04/10/2015).
[23] 'Rapid Equipping Force', US Army: http://www.ref.army.mil/ (accessed 10/10/2015).

However, as Ramalingam et al. (2015: 64) note, while humanitarian innovators 'might look to military innovation, funded by governments and executed by a variety of public and private sector actors, as a source of useful ideas', they also warn that any such lessons-learning exercise must first account for major fundamental 'differences in goals, cultures, incentives and mind-sets', between military and humanitarian end-users, alongside the 'considerable difference in available resources', 'emphasis placed on training and skills', and 'relative maturity and awareness of innovation as a concept and a practice'. As one UN OCHA official put it, 'it's less *who* we're learning about innovation from, whether that's the private sector or the military – it's how the differences between their sector and ours map onto innovation lessons-learning exercises' (Interview, OCHA official. 5/10/15).

This is an important point, but has not been tested by humanitarian innovation scholarship to date. Little if any systematic effort has been dedicated to considering the extent to which differences between military and humanitarian actors can be negotiated in practice to enable transferable lessons-learning. There has also been little research heretofore on areas where humanitarians might look in the military innovation ecosystem for the most scalable dual-use technologies and processes.

A necessary first step for any such synergistic learning is a systematic consideration of areas where the most relevant points of learning synergy between the military and humanitarian innovation ecosystems lie. Within these areas of overlap, specific military products, processes, and approaches to innovation management can invite detailed case studies, which explore respective strengths and weaknesses in their past or future adaption to humanitarian use.

A mapping exercise of this detail is beyond the scope of this working paper, but as a first step, subsequent research aimed at lessons-learning opportunities between military and humanitarian practice could begin with the preceding areas of synergies in ICT, health, and strategic planning. These areas, and the preceding examples provided for each, are summarised in Table 1.

Area of innovation learning	**Examples**
Information communication technologies (ICT)	• Geospatial remote-sensing technologies and methodologies for analysis • UAV technologies for surveillance and logistics • Terahertz-range communication • Robotics for natural disaster response
Humanitarian medicine	• Trauma medicine • Parasitology and vaccine R&D • Rapid diagnostic technologies
Strategic planning	• Planning methods (Logframes, AARs, Mission-to-Task Matrixes) • Horizon-scanning (US Army TRAC, UK MoD DCDC)
Innovation management	• US Army CALL • Digital Knowledge-Sharing Platforms (NeedipDIA) • DARPA • US Army REF

Table 1: Potential areas for further exploration of military innovation ecosystems

Other clear synergistic learning opportunities exist in military methodologies used **in simulation, and gaming,** which are often done at a scale and sophistication far beyond humanitarian practice (Kent and Ratcliffe 2008: 33; Interview, US Naval War College; 9/10/15). Militaries are also extremely creative in their strategies for rebuilding disrupted supply chains and circumventing **logistical challenges** in conflict and natural disasters (Pettit and Beresford 2007; Interview, US Army War College, 16/10/15). Specific process innovations can also stem from military good practice and methodologies for streamlining and fusing different intelligence sources – geospatial, human, signals, open-source – for real-time analysis and better situational awareness of the humanitarian space. By no means exhaustive, these areas nonetheless provide a potential series of initial departure-points for further exploration.

Such a lessons-learning agenda is obviously not without controversy. Problematizing recent diffusions of dual-use technologies from military R&D to humanitarian practice, including humanitarian drones, Sandvik (forthcoming) warns that such technologies represent 'a 'war dividend' flowing from military spending on the war on terror'.[24]

In response, we argue that broader critiques of contested experiments in security governance – such as the 'War on Terror', troubled efforts at stabilization in Afghanistan and Iraq, and the securitization of domestic surveillance – should not preclude parallel consideration of the practical contributions 'war dividends' can offer civilian society and, by extension, humanitarian practice. As noted above, military technologies regularly transfer into daily civilian life via commercial channels. The diffusion of these dual-use innovations resulted in formative breakthroughs which have fundamentally contributed to civilian society, while remaining intrinsically linked with controversial security agendas and their associated political economies (Goldman and Eliason 2003; Leslie 1992; Martin 1997; McLoughlin et al. 2000).[25]

At the same time, we strongly agree with Sandvik's call for greater critical attention towards the uptake of humanitarian technologies with military provenience. As we have stated, lessons-learning is only half of a comprehensive research agenda, one which must also take into account the critical implications of military actors within present and future humanitarian innovation efforts. To this end, in the following section, we consider several serious concerns related to innovation diffusion between militaries and humanitarians.

4 Critical perspectives on military-humanitarian innovation diffusion

Along with opportunities for better understanding military contributions to the humanitarian innovation ecosystem, there is an equally important need to critically engage with **the risks and implications** of these same military innovation diffusions. Critical perspectives are essential for simultaneously contextualising and problematising the potential learning synergies between military and humanitarian communities previously discussed. Moreover, given the extent to which militaries are *already* part of humanitarian practice, and hold innovations that will *continue* to diffuse into the foreseeable future, greater critical inquiry into the risks of military innovation for humanitarian space is urgently needed.

[24] Sandvik, forthcoming; conversation with author, 22/09/2015.

[25] Guttieri (2014: 15), for instance, notes that Cold War-era federal funding of major military research projects at Stanford and MIT made Silicon Valley and Massachusetts Route 128 centres of innovation, as these same research teams founded dozens of spin-off companies and labs located nearby.

Technological diffusion is already a well-established subject for critical engagement (Bijker and Law 1992; Herrera 2003; McCarthy 2013). As Sandvik and Lohne (2014: 148) write, a large body of scholarship exploring relationships between technological change and politics demonstrates how the diffusion of new technologies into society introduces not only new technical capabilities, but also acts of 'political contestation' and 'political settlements', in which 'the realities of professionalism, finance and politics' intersect to create new forms of power (see also MacKenzie and Wajcman 1999; McCarthy 2013).

Only a very small amount of critical work, however, has begun to explore these issues as they relate to the humanitarian innovation discourse. With only a very few exceptions (Burns 2014; Duffield 2013a, 2013b, 2014Sandvik et al. 2014; Sandvik and Lohne 2014), critical work exploring the intersection of military actors with the humanitarian innovation ecosystem is rarer still. Sandvik et al. (2014: 34) accuse the humanitarian innovation discourse of largely overlooking critical perspectives by 'actively – if not explicitly – negotiating its own knowledge politics, through a privileged position from which it can leverage competence and authority on data and technology' (see also Burns 2014). As a corrective, they call for far greater systematic critical scholarship in order to interrogate the dynamics of humanitarian innovation, and the constitutive effects of new technologies on humanitarian identity.

Immediate opportunities for addressing this critical research gap include, **first**, better understanding the real and perceived dangers military innovation diffusion poses to humanitarian principles and, ultimately, the impact of these products, processes, and paradigms on affected populations themselves. **Second**, as a related point, inquiries are needed into the nature of the political economy driving the introduction of new military-derived products and processes into humanitarian space. **Third**, there is an opportunity to apply critical theory towards understanding the constitutive effects on humanitarian and, indeed, military identities of military-humanitarian knowledge-exchange. Each point is discussed briefly below.

4.1. Risks to humanitarian principles from military innovations

First, immediate and important questions must be asked regarding the risks military innovations pose to humanitarian principles and practice. Work on professional principle-based frameworks for guiding humanitarian innovation has recently begun (HIP 2015; WHS 2015). As Betts and Bloom (2014: 11) note, a growing number of '[h]umanitarian actors have called for a process to reflect on these ethical challenges, bringing together practitioners, the private sector, and academia, as well as experts in applied ethics and the development of humanitarian codes of conduct'. Emerging critical research, debate, and work around principle-based humanitarian innovation focuses predominantly on private sector ICT partners. It remains important, however, that this literature also takes militaries as brokers of ICT assets, capabilities, and data for humanitarian use into consideration.

For example, humanitarians currently lack fundamental guidance for the principled use of new ICT, including, as Raymond and Card (2015: 2) note, 'minimum standards or professional ethics for the provision and use of ICTs in humanitarian action'. Critically, there is little to no guidance 'for navigating an increasing reliance on third part actors…to provide basic data and infrastructure for the use and provisions of ICTs and critical data'.

Several risks to humanitarian principles related to ICT hold particular relevance for civil-military engagement. For instance, as Raymond and Card (2015: 7) discuss, there is an emerging challenge to humanitarian impartiality due to increasing reliance on 'data philanthropy' – i.e. 'donations of data, assets, and bandwidth from governments and private sector actors'. While data philanthropy has undoubtedly equipped humanitarians with valuable new capabilities in managing emergencies, growing reliance on external support for ICT also opens these same aid organisations to potential manipulation and co-option, particularly through the subtle shaping of the data used for humanitarian planning efforts. One example can be seen in the 2010 Haiti earthquake response, which included substantial sharing of data between the U.S. Government, the UN, and so-called civilian 'ICT Volunteers' that was partially made available on US military platforms (US Department of State 2010).

Conversely, external ICT partners can also withhold data access and consent to humanitarians to block humanitarian access to populations in need. As Raymond and Card (2015: 9) state, the control which governments, their militaries, and private sector actors have over data flows means that they can 'put restrictions on cyberspace and telecommunications the same as a military checkpoint can block a humanitarian convoy from delivering food to a village', while 'civilians attempting to call for help can be silenced by having their cellular grid disconnected at crucial moments of impending harm the same as they can be silenced when faced with threats of physical violence from armed militias'.

Moreover, there is an inherent danger that, through the mismanagement of sensitive data, humanitarian organisations may unintentionally offer 'tactical military or operational advantage to parties engaged in hostilities', including not only perpetrators of human rights abuses, but also international and national military actors actively involved in parallel or coordinated relief efforts during natural disasters and complex emergencies (Raymond and Card 2015: 5).

Many of these principle-based issues are made concrete in the evolving application of specific military-derived ICT innovations in humanitarian space. Nowhere has this been better recognised than in relation to humanitarian drone usage, particularly in conflict settings. In addition to ethics debates, general challenges that govern the effective use of drones include the legality of flying locations (with practical challenges such as navigating traditional air traffic), concern over ensuring privacy during data collection, and the related need for transparency and informed consent for communities observed by drones (OCHA 2014b; Raymond et al. 2012).

4.2. The political economy of military-humanitarian technology diffusion

There is a pressing need for new research that explores the significant but little understood **political economy** behind the rise of humanitarian technology, driven by defence and intelligence surveillance industries seeking new markets and the 'brand' of legitimacy that partnerships with humanitarian actors can provide.

As Sandvik and Lohne (2014: 150) write, the production and diffusion of dual-use military and commercial technologies 'raise questions about costs, lobbying, and the framing of political agendas', best addressed by applied political economy analysis. In particular, important questions need to be asked regarding the influence of development and marketing strategies on the formation of regulatory efforts around emerging humanitarian technologies, and the processes of labelling and legitimising new technologies by governments and international organisations.

To this end, a small body of work has sought to interrogate the political economy driving the rapid emergence of humanitarian drone technology, drawing upon parallel analysis of the defence industry's aggressive embrace of drone technology over the last two decades, which has resulted in a lucrative global drone market of $89 billion a year (Hall and Coyne 2013; Sandvik and Lohne 2014).

Sandvik and Lohne (2014: 149) observe how, in recent years, this same drone lobby has sought to expand to the humanitarian market, in part as a result of cuts in the US defence budget. Here, they argue, the concept of the 'humanitarian drone' carries with it a 'strong commercial logic' that requires critical engagement. They point to the lobbying efforts of the UAV industry, represented by a growing number of trade associations advancing the concept of humanitarian drones 'as a means of gaining legitimacy' in the eyes of 'regulators, politicians, and domestic (northern) audiences' (2014: 151).

Yet, as they also point out, the same humanitarian innovation discourse which should be interrogating this agenda has, to date, been largely optimistic and under-reflexively embraced UAV technology. The danger is that without greater critical awareness, humanitarian proponents of drone technology themselves 'risk becoming an important co-constructor of the UAV industry's moral-economy narrative' (Sandvik and Lohne 2014: 151). They thus call for more critical research to engage and deconstruct the political economy of 'humanitarian' drones, including the dynamics of development, marketing, labelling, and legitimization, which are fast-normalizing this new humanitarian technology.

These questions are relevant for drones, but can be applied more broadly to many of the product innovation examples discussed above. Here, researchers have at their disposal a rich body of existing security studies political economy scholarship, which provide theoretical and empirical foundations for further development of this critical theme (Booth, 1997; Buzan, 2008; Kirshner, 1998).

This research agenda may also benefit most immediately from more direct engagement with firms who provide commercial off-the-shelf technologies (COTs) to both military and humanitarian markets, and the motivations, perceptions, incentives and challenges they perceive in navigating both markets.

At this year's AidEx Conference, for example, many attending commercial suppliers of humanitarian products also held military clients. Many interviewed as part of this research were both aware and sensitive to the issue, very carefully separating their marketing for aid sector and military audiences. Indeed, one trade representative, who routinely advises companies to separate their marketing for aid and military markets, shared that one 'dual-market' supplier had brought an armoured vehicle to their display booth in a previous year – a misstep, he believes, which led to a prominent humanitarian NGO refusing to attend the following year (Interview, AidEx, 5/6/14).[26]

Other commercial suppliers mentioned their frustration at poorly optimised humanitarian procurement processes for negotiating contracts, and reported better experiences with both military trade fairs and the 'fast-tracking' of military procurement processes. The CEO of one firm which markets water filtration products to both military, humanitarian, and civilian camping markets, for instance, explained that they began selling to the UK MoD at military trade fairs, and were then fast-tracked through procurement into a contract. He remarked that 'the military is very professional compared to NGOs' in negotiating contracts and that 'there is more money in military procurement'

[26] The authors are grateful to Ms. Louise Bloom for conducting this interview.

(Interview, AidEx, 5/6/14).[27] Another shelter manufacturer, set up in response to Hurricane Katrina, currently signs its biggest contracts with defence sector clients, providing a stable base to maintain its commitments to less-lucrative humanitarian markets (Interview, OCHA official, 5/10/15).

4.3. Constitutive effects of military innovations on humanitarian identity

Critical scholarship has the opportunity to ask big questions about ways in which military products and processes shape the constitutive identity of humanitarian actors themselves and, by extension, shape the nature of their relationships with beneficiaries. Drawing on Graham's (2011) work on the securitization of civilian urban policing, Sandvik and Lohne (2014: 150) adopt Foucault's 'boomerang effect' – 'whereby European colonial apparatuses, institutions and techniques of power were brought back to the West' – as a framework for examining how the diffusion of dual-use military innovations change humanitarian values, policy, and practice through their adoption by humanitarian actors (see also Graham 2011: xvii).

Military-derived concepts and technologies influence core humanitarian identity in multiple ways, notably in the changing practices and perceptions regarding risk, engagement with local communities, and the unintended challenges this changing relationship poses to established humanitarian practice. The management of risk is an area of rapidly-emerging focus in the humanitarian sector, as aid organisations are encouraged through mounting donor pressure to deploy to conflict zones that pose serious security challenges to their staff (Collinson and Duffield 2013). As Sandvik et al. (2014: 16) write, this 'amalgamation of danger and a higher degree of presence' has led to a new reliance on remote-management practices, i.e. the 'progressive withdrawal of many international aid personnel into fortified aid compounds, secure offices and residential complexes, alongside restrictive security and travel protocols'.

Risk, in this context, is transferred to the local staff, community-based organisations, and contractors increasingly relied upon by international staff for programme and project implementation. The resulting remote management strategies constitute what Duffield (2014) terms the **'bunkerization'** of humanitarian action (see also Collinson and Duffield 2013: 22-24).

The rise in humanitarian remote management practices has begun to raise concerns from analysts, who note a growing cultural shift among humanitarian organisations engaged in remote management: diminished relations with affected communities and weakened contextual knowledge of 'ground-truths' (Collinson and Duffield 2013; Stoddard et al. 2010). Less clearly articulated in the literature, however, is the role that military-derived technologies and concepts play in driving such changes.

Duffield (2011: 764-65) shows how bunkerization is, in its own right, an innovation diffused from military thinking about governmentality, power, and control. He notes that bunkers – 'defended spaces that can be hermetically sealed against a threatening and unknown environment' – have long represented a 'classic military response to environmental terror'. He traces the development of the modern bunker as a tool of governmentality to Cold War civil defence planning, which embraced the concept of 'an archipelago of defended circulation that in the event of war could be secured against a population abandoned to self-reliance'. Today, this lineage can still be seen not only in 'the fortified compounds of the international aid industry' but in contemporary manifestations of bunkerization in 'military green zones', 'policed central business districts', and 'tourist enclaves'.

[27] However, he also noted that working with military bureaucracy had its own significant challenges, and that, due to government bureaucracy, it was also 'like wading through treacle to get contracts through all of their systems'.

Sandvik and Lohne (2014: 153-156) illustrate how drones, a single technology recently diffused from military space carries several implications for humanitarian practice and identity. In the case of drones, this occurs by reshaping concepts such as distance and 'surgical precision' in humanitarian thinking. Drawing from Gregory (2011), they show how the use of military drones has already created 'spaces of constructed (in)visibilities', in which 'civilians are construed to be devoid of agency, as it is virtually impossible for victims of attacks to be recognised as civilians before it is too late'. To this end, they ask whether the diffusion of drone technology into humanitarian space might also 'replicate the seeing and un-seeing of human suffering that is characteristic of military campaigns' – in turn redrawing humanitarian perceptions of human suffering during emergencies.

These concerns demand greater sustained research engagement that is focused not just on concepts such as 'humanitarian' drones but the broader implications of the humanitarian community's increasing embrace of new digital mapping and remote-sensing technologies. Here, as well, military experiences in employing such technologies in their own operations provide both practical warnings and opportunities for critical reflection and caution.

4.4. Next research steps

It is essential for any research agenda addressing military actors within the humanitarian innovation ecosystem to include a strong critical perspective. Little is understood about the risks which the rapid emergence of new military innovations pose for humanitarian practice, the political economy driving paths of diffusion in the humanitarian ecosystem, or the fundamental constitutive impact on humanitarian action of their uptake and adoption by humanitarian organisations. Critical research aimed at exploring these questions addresses the general knowledge gap regarding innovation diffusion and exchange between militaries and humanitarians, but also contributes to filling the humanitarian innovation literature's wider gap in critical scholarship.

At the same time that we advocate this critical research agenda, we see no reason why this path must be in competition with the preceding research task of identifying possible areas for synergistic innovation exchange between military and humanitarian space. A well-informed, thoughtful debate should pursue these two parallel and complementary research streams, balancing an open receptivity to the potential benefits of military innovations with critical dialogue on the associated risks these same innovations pose in practice or in principle to humanitarianism.

With both research tracks in place – mapping and identifying opportunities and considering the risks – we proceed to the question of how constructive dialogue between military and humanitarian actors can be facilitated to contribute to both knowledge-building agendas.

5 Civil-Military coordination of humanitarian innovation learning

The preceding discussion has drawn attention to two complementary research agendas focused on exploring both learning synergies and critical risks related to the role of military actors in the humanitarian innovation ecosystem. A final area of exploration seeks to understand how the beneficial exchange of innovation knowledge might be facilitated between military and humanitarian audiences within the accepted parameters of principal-based civil-military engagement.

As noted above, the humanitarian innovation agenda is unambiguous in its rhetorical embrace of the need to 'look outwards' for inspiration and partnerships around innovation. At the same time, coordination over the search and discovery of new innovations outside the humanitarian community is limited. This is due in part to a lack of mechanisms for constructive dialogue and engagement around lessons-learning and co-development of innovations with non-traditional humanitarian partners (Ramalingam et al. 2015: 20).

While the CMCoord literature has largely focused on barriers to engagement between militaries and humanitarians, it also suggests several directions towards constructive, principled facilitation of engagement between both communities. Military-humanitarian coordination has been shown to be most constructive when common goals are obvious for both communities, for instance, the establishment of aid infrastructure following a natural disaster or the protection of civilians during complex emergencies (Metcalfe et al. 2012: 29). We suggest, to this end, that the exchange of relevant dual-use military innovations, as a means of improving international humanitarian capacity, represents its own novel space for constructive CMCoord around shared priorities.

Considering the potential for coordinating synergistic learning raises, however, a final set of research questions around the facilitation of military-humanitarian innovation exchange. For example, what might an effective lessons-learning platform for identifying, understanding and – critically – synergizing military and humanitarian knowledge look like in practice? How might existing platforms be adapted for this purpose or new mechanisms created? And can such engagement occur in a manner safe for humanitarian principles?

As a preliminary consideration of these questions, we propose that practical steps in facilitating humanitarian/military innovation exchange be disaggregated over a spectrum of engagement options, the feasibility of which calls for greater consideration and debate from both humanitarians and researchers. These options are summarised in the figure below.

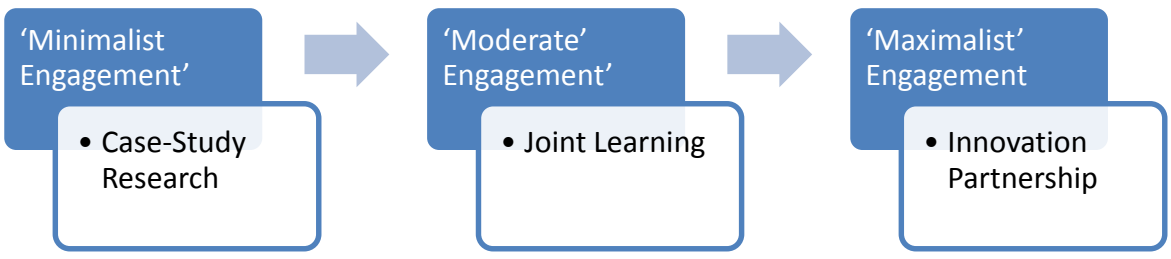

Figure 2: Spectrum of CMCoord models for humanitarian innovation learning

5.1. 'Minimalist' civil-military innovation coordination: case study research

First, **as a 'minimalist' option**, case study analysis of relevant military dual-use innovations and approaches to innovation management poses no obvious risk to humanitarian principles, and allows humanitarians to engage with or reject such research as they see fit. Indeed, given the extreme sensitivities present across civil-military discourse, 'arms-length' analysis of particularly promising product innovations and approaches to innovation management, as well as an active debate about the concurrent risks, may be the most appropriate first step in addressing possible innovation synergies between both communities. Such an approach would follow the systematic research agenda proposed in the preceding discussion of this paper, and would be best suited to rigorous academic scholarship. Although direct engagement with the military community is almost certainly necessary for the production of useful insights, dialogue necessary to this agenda can be carried out by independent researchers and therefore requires no direct contact between humanitarian organisations and military actors.

5.2. 'Moderate' civil-military innovation coordination: joint learning

As a **second, 'moderate'** model of lessons-learning engagement, there is also potential for military and humanitarian innovation experts to directly engage with each other through active co-learning. Such research and dialogue could involve the active contribution of military actors as reference points for good practice guidance and insights into adapting military innovations for humanitarian use. Military practitioners could contribute insights and expertise around innovation management to on-going humanitarian discussions, and be consulted for their technical experience with military product and process innovations adapted for humanitarian use. The NMCG (2015: 6) notes, for instance, that in situations where humanitarians stand to benefit from improved joint coordination of lessons-learning and evidence, '[c]ivil-military dialogue could be employed to better share these innovations earlier, or at scale'.

In facilitating the input of military actors for humanitarian innovation learning, **existing platforms of civil-military engagement** should be leveraged. Leading convenors of civil-humanitarian dialogue – such as InterAction[28], the United States Institute of Peace (USIP)[29], the NMCG[30], the Center for Civil-Military Excellence (CCOE),[31] and, most critically, UN OCHA CMCoord[32] – already bring together civilian, military, government, and academia for collaborative knowledge-exchange. They are therefore natural starting points in hosting conversations around innovation diffusion and exchange between militaries and humanitarians, which could initially take the form of workshops, seminars, and conferences. Guidance and good practice regarding civil-military dialogue and communication, generated by these same organisations, would also serve as a valuable initial reference point for structuring constructive input from militaries regarding humanitarian innovation.[33]

[28] http://www.interaction.org/ (accessed: November 1, 2015).

[29] http://www.usip.org/ (accessed: November 1, 2015).

[30] 'Improving Civil-Military Relations', British Red Cross: http://www.redcross.org.uk/What-we-do/Protecting-people-in-conflict/Improving-civil-military-relations (accessed: November 1, 2015).

[31] http://www.cimic-coe.org/ (accessed: November 1, 2015).

[32] 'OCHA Civil-Military Coordination': http://www.unocha.org/what-we-do/coordination-tools/UN-CMCoord/overview (accessed: November 1, 2015).

[33] http://www.usip.org/ (accessed: November 1, 2015).

Academia also has an important role to play in convening military-humanitarian dialogue around innovation. As Ramalingam et al. (2015: 18) write, effective coordination with private sector innovation partnerships is already 'usually at the behest of research-based organisations or other networks, supported by operational organisations', which in turn provide 'some kind of coordinating mechanism to collect and synthesise information'. Similarly, academia has a unique capacity to facilitate dialogue between military and humanitarian innovators in a neutral, safe environment, beginning with workshops and roundtables moderated under a format which permits anonymity and frankness (i.e. Chatham House rules, currently employed by the NMCG).

As another mechanism for joint learning, HFP (2011: 33) suggest greater collaboration in **joint training exercises**, which, they write, 'could both help familiarise humanitarian agencies with military systems, methods and cultures and visa-versa, as well as introduce[e] them to more effective planning mechanisms'.

Facilitating more active co-learning between two mutually-distrustful communities requires significant consideration of challenges. First, such engagement is unlikely to be welcome, appropriate, or successful if it is attempted in the sensitive context of ongoing emergencies, during which the very act of civil-military dialogue itself may pose risks to humanitarian impartiality and neutrality. As such, it is essential that any military contributions to humanitarian innovation learning occur at a time and place **well away from active emergency response**.

Second, there are significant challenges and little guidance around **information-sharing** between both communities, in part due to NGO concerns about data privacy and strict military classification policies (Metcalfe et al. 2012: 27). As the NMCG (2015: 6) writes, in any instance of engagement around innovation learning, '[b]oth the civilian and military communities have different thresholds for what they would be willing to share, and what they see as a risk of sharing information'. Such challenges will require the necessary limiting of conversation themes to areas of less-contentious dual-use innovations, such as relevant military processes for improving humanitarian planning approaches.

Third, given the diversity of military actors worldwide, it is important to consult with both Western militaries and **national militaries**. These militaries are the most frequent first responders to humanitarian natural disasters, and possess unique and potentially valuable field-based knowledge for innovation.

At the same time, examples of organic diffusions of innovations between soldiers and aid workers engaged in mutual learning efforts provide encouraging evidence on the feasibility of military-humanitarian learning. One such example is the Royal Society of Apothecaries' **Diploma in the Medical Care of Catastrophes (DMCC)**, a joint course and degree attended by both military and humanitarian medics, which arose from evident overlaps in the shared knowledge-base in conflict and emergency medicine. The founders of the course recognised medicine and education as an important common ground for CMCoord, and created a collaborative model between the military and humanitarian community. The course, running since 1993, is aimed at both military members and civilians focusing on medical care in catastrophes, and fosters the development of bridge-building professional relationships. It also synthesises good practices from both military and humanitarian medical knowledge, which are in turn taught to classes of combined practitioners from both communities (Interview, DMCC, 30/6/15).

Guttieri (2014: 10) identifies another 'civil-military experiment' in the **Research and Experimentation for Local and International Emergency First Responder (RELIEF)** exercise, hosted by the US Naval Postgraduate School and National Defense University, where civilian participants – which in past exercises included members of Harvard Humanitarian Initiative, Geeks Without Bounds, Random Hacks of Kindness, OpenStreetMap, and iRevolution.net – are invited to test new technologies with humanitarian applications.[34]

5.3. 'Maximalist' civil-military innovation coordination: innovation partnership

Finally, a **maximalist** option for civil-military coordination around humanitarian innovation would involve direct innovation partnerships aimed at the co-design, development, testing, and scaling of new products and processes to improve humanitarian capacity. This could be achieved through more intentionally aligning superior military R&D and lessons-learning capacities with humanitarian innovation needs. However, it would require considerable work in developing new civil-military coordination mechanisms, and might raise associated concerns about risks to humanitarian neutrality and impartiality.

This proposal has been most explicitly advanced by Kent and Ratcliffe (2008: 28), who suggest that military R&D capabilities represent an opportunity for civil-military burden-sharing outside of the traditional focus on operational military support during natural disasters, such as lift and communications. They argue that, like the private sector, militaries possess far greater resources for R&D, and a higher tolerance for risk than humanitarians. In reference to the US military, they observe that DoD's 'research and agenda spans an enormous range of opportunities that could address issues of humanitarian assistance', but that it currently has 'little specific orientation towards crisis management'. If properly aligned, military research labs could 'partner with public and private organisations in order for knowledge and capabilities to be shared for the greater good' in 'building national and international capacity in disaster prevention and relief' (2008: 32). To this end, they call for the humanitarian community to seriously consider how military R&D can be engaged through partnerships in the design, development, and diffusion of dual-use innovations.

As one model of collaboration, Kent and Ratcliffe (2008: 47) propose the concept of ad hoc '**collaboration pools**', in which military, private sector, and humanitarian actors are convened to address shared innovation challenges. These pools would, in theory, foster collaborative innovation because they 'thrive on information exchange and are experimental, adept at innovation, and committed to functional collaboration'. They recommend establishing such pools under UN OCHA's guidance, which would permit a high degree of autonomy but report on their progress and offer support through advocacy and resource promotion.

Such an approach might refer further to Deloitte's (2015a: 33) proposed '**Experience-Driven Validator**' model for structure. This concept sketches out a blueprint for an 'externally hosted, independent knowledge network', designed to facilitate innovation collaborations between humanitarians and non-traditional partners in order to 'translate and develop innovations from other sectors and leverage[e] practitioner experience to evaluate them in the field to ultimately endorse successful, high-impact innovations'.

Many countries already have established transfer mechanisms through **technology transfer offices** to encourage diffusion of public-sector defence R&D breakthroughs out to the private sector. These

[34] 'The Unofficial Site of the RELIEF "Camp Roberts" Humanitarian Experiments', Naval Postgraduate School/National Defense University: http://camproberts.org/ (accessed 18/09/2015).

include the **US Federal Laboratories Consortium (FLC)** [35] and the **UK Defence Science and Technologies Lab (DsTL)**.[36] Both agencies are designed so that defence contractors 'can approach it with a request for expertise in a particular domain, and are then introduced to the appropriate government R&D facility'. These government research centres are, conversely, encouraged to 'license their technologies or to enter into technology development partnerships to meet the needs of the private sector, [and] to enter into collaborative R&D agreements with companies looking for specific technology solutions' (Kent and Ratcliffe 2008: 31; DSTL I2 Symposium, 13/3/15). Kent and Ratcliffe (2008) argue that technology transfer offices have the potential to serve as established 'brokering' entities, connecting humanitarian calls for innovation with defence-sector expertise and wider government R&D networks to address thematic areas such as humanitarian medicine, WASH, remote sensing, and search and rescue.

In light of the critical risks stemming from innovation diffusion and exchange between militaries and humanitarians raised in Section III above, such calls for direct engagement between military R&D and the humanitarian community are clearly controversial. As such, they would require both rigorous interrogation and a stated framework for principle-based innovation before they could be seriously explored. Here again, both academia and established CMCoord platforms represent ideal fora for initial debates considering the pros and cons of such an approach.

5.4. Next research steps

In closing, we suggest that learning from military examples of products, processes, and approaches to innovation management can directly contribute to the humanitarian community's agenda of reaching outside itself for new perspectives on innovation. Coupling the proposed 'minimalist' lessons-learning approach with a complementary critical research agenda that examines the potential risks to humanitarian principles from military-derived innovations provides a productive starting point towards this end.

Our proposals of 'moderate' and 'maximalist' models of engagement offer, in turn, ground for greater debate on the pros and cons of direct collaborative engagement with militaries as innovation partners. While perhaps provocative, these questions challenge the boundaries of a humanitarian innovation rhetoric which espouses the need for greater engagement with 'non-traditional' partners, yet has not seriously confronted the risks and opportunities of military actors in helping to fulfil this role.

6 Conclusion

The preceding sections have argued for a systematic research agenda that explores the relationship between military actors and humanitarian innovation. Although militaries are a growing presence in international humanitarian space – and a source of legitimate concern and discussion – their involvement in the humanitarian innovation ecosystem has not been given serious attention by a growing body of humanitarian innovation scholarship and practice otherwise eager to engage with non-traditional sources of inspiration.

[35] www.federallabs.org (accessed 30/10/2015).

[36] https://www.gov.uk/government/organisations/defence-science-and-technology-laboratory (accessed 30/10/2015).

In considering this gap, we have turned to existing literature and interviews with both military and humanitarian practitioners to identify three immediate and inter-linked opportunities for further research.

- **First**, we have drawn from examples of military-humanitarian innovation diffusion of products and processes in illustrative areas relevant for civilian humanitarian practice to suggest the under-recognised opportunities for humanitarian innovation lessons-learning from militaries. To explore this potential seriously, further research **beginning with a systematic mapping exercise to identify cases of learning synergy between military and humanitarian space and followed by case-study analysis of particularly promising examples** is required. This could be accomplished through focusing on a particularly active area of pre-existing innovation diffusion and exchange between militaries and humanitarians, such as ICT, health, strategic planning or approaches to innovation management. Detailed case studies in one or more of these areas could focus on exploring certain military innovations with particular promise, relevance, and scalability for improving humanitarian impact, while also analysing the processes of diffusion and subsequent impact of past military-humanitarian innovation exchange.

- **Second,** the active and passive diffusion and exchange of dual-use technologies between military and humanitarian actors raises important critical questions regarding the risks military innovation diffusions pose to humanitarian principles and identity. However, critical scholarship has remained largely silent on the rapid diffusion of military technologies and approaches into humanitarian practice. **Greater critical scholarship** has an essential role in engaging and interrogating these developments, including the **risks posed to humanitarian principles by innovation diffusion and exchange between militaries and humanitarians, the political economy driving the diffusion of military-derived technologies into humanitarian space, and the constitutive effects on humanitarian identity as such innovations enter mainstream humanitarian practice**.

- **Third**, in full recognition of the opportunities, challenges, and critical implications of innovation diffusion and exchange between militaries and humanitarians, we have sought to provide insight on ways productive, principled facilitation of good practice and lessons-learning exchange between both military and humanitarian communities could be put into practice. However, to advance civil-military dialogue around innovation, **a coherent strategy for engagement within the current parameters of CMCoord guidance must first be discussed, debated, and critiqued**. As a starting point, we have suggested three potential approaches – one 'minimalist', based on distanced academic study of military humanitarian innovation ecosystems, another 'moderate', involving direct consultations with military experts as part of the humanitarian innovation agenda's lessons-learning efforts, and a third 'maximalist' approach involving direct innovation partnership between military and humanitarian communities.

Several additional considerations can help to strengthen research in each of these three areas:

- It is important to **disaggregate discussion related to CMCoord between the very different contexts of natural disaster and complex emergencies** in which civil-military relations are particularly problematic. For this reason, it seems most appropriate to limit initial lessons-learning inquiries to natural disaster contexts only, and any collaborative learning exercises away from sensitive on-going disasters. At the same time, however, critical research may

find complex emergencies of particular interest in exploring the problematic relationships of military-humanitarian technology diffusion.

- It is essential to carefully consider the **different perspectives and experiences of a range of actors throughout both military and humanitarian communities** relevant to discussions on humanitarian innovation. Although this paper focuses primarily on the US and UK militaries, subsequent **research should include a wide selection of countries, including other European NATO members** whose own military forces are active participants in supporting humanitarian operations. Research can be further disaggregated by comparing different approaches to innovation between military service branches (i.e. Army, Navy, Air Forces) and different levels on the chain of command (HQ, field, etc).

- **There are important differences between foreign militaries and the national militaries, gendarmerie, and police who are typically first-responders to their country's and region's humanitarian emergencies**. These actors, primarily Southern, often lack the capacity for large-scale product R&D and sophisticated knowledge-management systems of their Northern counterparts, but nonetheless hold knowledge, experience, and potentially-relevant innovations which are rarely consulted.[37] As such, they represent an important subject of study that should not be overlooked.

- Finally, this research agenda would benefit from research on **affected communities themselves** to learn of their own perspectives on the diffusion of military-derived technologies into humanitarian practice such as drones, and their own innovative solutions to physical security threats. Additionally, such research could include broader questions of when and under which circumstances local populations welcome CMCoord (interview, BRC, 13/08/15).

In closing, we advocate research aimed at identifying synergistic areas of lessons-learning between military and humanitarian communities, yet intentionally stop short of advancing calls for greater direct collaboration between civilian humanitarians and military actors. Instead, where engagement *is* actively sought by militaries – or, indeed, is already occurring – we suggest that carefully-constrained learning partnerships may be of direct benefit to humanitarian innovation efforts. Here, both academia and existing civil-military coordination platforms have a convening and facilitation role in bringing these communities together for the purposes of mutually-constructive collaborative learning on innovation. We believe innovation is an important area for learning and a valuable space for constructive engagement and dialogue between two communities long known for their strong mutual distrust. As such, it is worthy of further research and deliberation.

[37] Indeed, several US Army officers consulted during this research emphasised the importance of relatively unacknowledged platforms of military-to-military (M2) training programmes, in which good practices are exchanged in order to improve the emergency response capabilities of domestic militaries in natural disaster-prone regions. They viewed these as sites of cutting-edge innovation with potential lessons-learning benefits to humanitarians. They noted, for instance, that the US-Nepalese M2M training was 'essential' during the country's 2015 earthquake response, during which time Nepal's military played a first-responder role (Interview, US Army War College, 16/10/15).

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8 Appendix: Organisations consulted

United States Government

- Department of Defence (DoD)
  - US Naval War College (US NWC)
  - US Army War College (US AWC)
- United States Agency for International Development (USAID)
  - Office of US Foreign Disaster Assistance (OFDA)
- Department of State

United Kingdom Government

- Ministry of Defence (MoD)
  - UK Army
  - Defence Science and Technology Laboratory (DSTL)
- UK Stabilisation Unit

United Nations and Other International Organisations

- North Atlantic Treaty Organisation (NATO)
- United Nations Department of Peacekeeping Operations (UNDPKO)
- United Nations High Commissioner for Refugees (UNHCR)
- United Nations Office for the Coordination of Humanitarian Affairs (UNOCHA)
- World Health Organisation (WHO)

Nongovernmental Organisations and Private Sector

- AidEx
- British Red Cross (BRC)
- Human Rights Watch (HRW)
- International Crisis Group (ICG)
- Médecins Sans Frontières (MSF)
- Oxfam International
- Qinetiq

Academic Institutions/Policy Research Organisations

- Chatham House
- City University of New York (CUNY)
- Department of International Relations, University of Oxford
- Harvard Humanitarian Initiative (HHI)
- Humanitarian Futures Program (HFP), King's College London
- Overseas Development Institute (ODI)
- Peace Research Institute Oslo (PRIO)
- Royal Society of Apothecaries (RSA)
- Royal Society of Medicine (RSM)
- Royal United Services Institute (RUSI)
- United States Institute of Peace (USIP)