

Towards a Versatile Edge

Developing Land Forces for Future Conflict

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Introduction

This chapter draws together and builds on the thematic and empirical chapters to develop a synthesized vision of the contemporary opportunities and challenges of land warfare research, as well as the conceptual challenge of developing and utilizing land forces in future conflict. The chapter's aim is to provide a comprehensive picture of current theory and practice, identify fruitful pathways for future research, and develop an integrated understanding of the dynamic evolution of truly versatile land forces.

The chapter seeks to navigate and clarify the multiple and often contradictory forces at play as land forces develop to meet the future challenges outlined in the introduction to this volume. These forces include inherited and established understandings of combat principles as well as new and purportedly revolutionary concepts enabled by diverse developments in, for example, technology, digitalization, and C2 methods. Potential future operational environments are also diverse, and inextricably connected to the character of future wars, the opponents whom land forces must develop capabilities to fight, and the circumstances of tactical engagements.

In addition to several thematic and generic competing influences on land forces, the localized contexts of specific national land forces will be a fundamental determinant of change and continuity. Diverse military cultures, financial constraints, history, and tradition will affect the development of land warfare, as will national perceptions of future war, threats, and interpretations of security interests.

These forces are set to work in tandem at times, but also collide and compete for the attention of national decision makers and defence spending. The contribution of this chapter is therefore to establish a modicum of analytical

order in the complex field of land warfare. It seeks to establish where current academic research stands on the subject, and to outline a forward-looking agenda for describing and understanding the perspectives and problems facing academics as well as practitioners interested in the evolution of land forces in the years to come.

The chapter is outlined as follows. The first section sums up and discusses the volume's findings on the dynamics of twenty-first-century land warfare. We then describe a continuum of land operations, an expression of the heterogeneity of potential conflict environments in which land forces must be capable of operating. This operational complexity is visualized in a schematic model that takes account of how different levels of conflict intensity translate into demands and constraints on the utilization of land forces. The chapter then moves on to locating land operations in the broader operational environment before synthesizing the findings in what we label *the integrated versatility model*, outlining the preconditions for securing land warfare capability and the requirements for achieving a versatile edge in the future operational environment. Finally, we discuss ways forward for land warfare and outline an agenda for future research.

Dynamics of Twenty-first-century Land Warfare

The individual chapters of this volume have contributed a set of distinct perspectives on the past, present, and future of land warfare. These perspectives put to the fore both general observations regarding the enduring relevance of warfighting concepts and specific challenges relating to the evolution of tactics, technology, battlefield intelligence, and information flows as well as weapon range and lethality. Christopher Tuck makes a compelling argument for the continued relevance of manoeuvre warfare in the contemporary operational environment. Originating as a concept aiming to maximize the efficiency of mechanized, mobile warfare, the manoeuvrist approach can be extrapolated to the conduct and synchronization of warfare across domains, denoting the significance of tempo, surprise, and exploitation of own strengths and the opponent's vulnerabilities. However, as Tuck points out, whilst manoeuvre warfare as a concept or intellectual construct may remain well attuned to contemporary and future war, its actual conduct might become more circumscribed and problematic, particularly in the contexts of limited and irregular wars and urban operations.

A similar discrepancy between a warfighting concept's utility in the abstract and its applicability as a concrete military method can be observed

in the utilization of mission command. The command philosophy was widely adopted by Western militaries and is indeed a trope of military leadership and command. It denotes a distinct ethos and desired qualities in military officers, as well as an approach to warfighting that acknowledges the human nature of warfare and the necessity of dealing with uncertainty as a constant characteristic of war. Yet, as Nilsson points out, it is simultaneously unclear to what extent mission command can be applied consistently in the context of contemporary and future land operations. The increasing demands for informational superiority and synchronization, taken to new heights with the introduction of multi-domain operations and related concepts, seemingly create conflicting demands on command for vertical as well as horizontal coordination between services and domain capabilities. In turn, this creates incentives for redefining or delimiting the use of mission command, which is nevertheless set to retain a distinct utility in military practice.

The extent to which received truths will remain applicable to future land warfare is in question. As Friedman and Paulsson argue, there is a need for tactical theory, here presented as a set of tactical 'tenets' to provide a common language and understanding of what tactics may imply (mass, manoeuvre, firepower, and tempo, deception, surprise, confusion, shock, and moral cohesion). Yet how these tenets are to be translated and exercised in the future operational environment is a different question, and several chapters bring to our attention prospective trends in modern warfare that extensively change the preconditions under which land forces will operate, as well as the tactics they will have to exercise.

Disruptive technologies are doubtless among the most important factors affecting tomorrow's battlefield. As argued by Watling, paramount technological shifts, including but not limited to autonomous systems, layered precision fires, pervasive sensors, and AI, are expected to change many of the preconditions for land operations. The timeframes for developing and introducing these systems may be overly optimistic. However, their potential consequences include extremely quick reaction times between discovery and highly precise kinetic effect, potential information supremacy, and extreme information processing capacities. Should these developments be realized, land forces, particularly in their manoeuvre elements, will need to develop much more comprehensive means to avoid destruction, even to enter the battlefield. The challenge posed by competitors to US military hegemony, particularly China and Russia, also underlines the increasingly significant collective element of land warfare, in the form of increasing interdependence between allies and partners. In turn, concepts developed by the USA and

NATO to address this challenge will, as Curtis points out, put an increasing premium on the interoperability of Western forces.

Besides technology and interoperability, significant shifts in the human terrain create new challenges, given the likelihood that cities will be major battlefields in future wars. As Weissmann argues, urban terrain should be considered an increasingly salient part of the future operational environment due to the rapid ongoing urbanization process, as a majority of the world's population resides in large cities. This assertion is valid regardless of whether we are considering high-intensity conflict against peer-opponents, or localized irregular warfare. Indeed, urban warfare poses a different set of challenges compared to open manoeuvre-based warfare, raising questions regarding current applications of technology and tactics, weapons systems, and considerations of casualties and destruction.

A more comprehensive consideration of the role of land forces in future conflicts, beyond just their conduct on the battlefield, should also include a reconsideration of what motivates land forces to fight. As Sandman argues, our understanding of will and cohesion among soldiers tends to be limited to their immediate context, but should be considered in much broader terms, as a product of the societies to which they belong. This broader and more complex view of morale is indeed more in tune with a more integrated and complex view of future conflict.

In a similar vein, further specific questions regarding the organization and sustainment of Western land forces need to be addressed. For example, Storr argues that the current exercise of military command is ill-equipped to function in an environment that requires tempo and initiative on the battlefield. In this regard, headquarters are overstuffed and immobile, extensive planning processes tend to produce unnecessarily long and complex orders, and the entire command structure tends to generate and promote officers based on preconditions other than competence to lead in battle. Combat logistics is another area in need of attention, being highly vulnerable to Long Range Precision Fires (LRPF). Logistics will require increased mobility and protection in a future high-intensity conflict—a problem that transcends borders, governments, and military organizations across the European continent, according to Kinsey and Ti. Moreover, Bricknell presents the provision of military health services as a frequently overlooked component of land power, which will become increasingly important given the potential rate of casualties in future wars, but also increasingly vulnerable due to the increasing potential of deep battle. Simultaneously, the functions of military health systems (MHS) are expanding, as demonstrated by their utility in providing broader societal assistance during the COVID-19 pandemic.

The changing realities of land operations, as well as the anticipation of the future preconditions for land forces, have driven continuous adaptation, which has taken on different features depending on national context. As shown in the case studies presented in this volume, variations in strategic outlook, previous experiences of war, and military cultures shape adaptation in land forces, resulting in differences and similarities. Gudmundsson outlines how the diverging operational cultures of the US Army and US Marine Corps have played out in the US conduct of land operations in the twentieth century. As the US Army now undertakes yet another adaptation to new realities, in the form of multi-domain operations, this reflects a reaction to the prospective need to conduct high-intensity warfare against near-peer competitors in the form of China and Russia. Brad Marvel demonstrates in his chapter how China's warfighting concepts to a large extent mirror those of the USA, by introducing an equivalent of multi-domain thinking. China nevertheless places an even higher emphasis on dominating the cognitive and information dimensions, whilst pursuing the capability to rapidly mass capabilities for employing combat power that aims to exploit enemy weaknesses in all domains. Whether China's ambitious concept will prove feasible in practice is another question.

Göransson's chapter on Russia highlights that a narrow focus on high-intensity warfare in multiple domains provides a far too limited view of the prospective utilization of land forces. In Syria, the land component of Russia's operations has been marginal, deployed in support of an operation that has otherwise been dominated by an extensive air campaign. However, these forces have not been unimportant, as the use of special forces, military police, and military contractors, as well as auxiliary forces, served particular roles, indicating the flexibility of land forces in limited wars. The engagement seen in Syria is a likely model for future endeavours, especially for larger military powers and should therefore not be discarded as irrelevant. This underlines that the utility of land forces is not limited to regular fighting in high-intensity conflict.

Hecht and Shamir demonstrate how Israel has gone through several stages in its thinking and practice regarding the exercise of land power. Of particular importance in recent decades was Israel's inability to defeat Hezbollah in Lebanon during the 2006 war, the effect of prioritizing LRPF capabilities at the expense of manoeuvre units. As the authors point out, a debate continues in Israel regarding whether land forces should provide sensor capability for LRPF or whether land manoeuvre capability is a key capability that cannot be replaced. The UK case demonstrates the dilemmas involved in developing a multi-purpose army and how different visions of future conflict give rise

to competing priorities and demands, depending on what type of units are deemed to be needed. According to Galbreath and Neads, the UK faces the key questions of whether to prepare for large-scale modern conflict with significant adversaries and/or sub-threshold competition and hybrid warfare, which require different forces, units, and equipment. These approaches also differ in terms of the scale and costs of military procurement and preparation and drive the development and envisioned future use of land forces in different directions. As shown by Schmitt and Tenebaum, the French army is facing a similar dilemma, as its forces undergo transition from a paradigm of expeditionary deployment to preparation for strategic competition and high-intensity warfare.

Finally, Boston's exposé of the massive transformation processes of Poland, Czech Republic, Hungary, and Slovakia, simultaneously indicates that substantial change and adaptation are possible in military forces, and that these processes indeed take time. The journey from being part of the Warsaw Pact military infrastructure to NATO membership, with smaller but more professional forces, has been an arduous undertaking. Yet the fact that tactics, techniques, and procedures (TTPs) and other aspects of military practice have proven resilient to new circumstances speak to the slow process of military adaptation and reform. Also, the current process of readapting to new missions and roles as NATO allies underlines that downsizing is easy but growing and especially training cadres of new officers and soldiers take generations.

In sum, the chapters of this volume highlight the growing complexity of land operations in the twenty-first century, whereby strategic campaigns, operational contexts, and tactical preconditions for fighting have become highly heterogeneous. In turn, the contemporary and future operational environments will present many converging and competing demands on land forces. The conclusions speak to the need for developing truly multi-purpose capabilities for warfare on land, with extensive implications for the organization of land forces, as well as equipment procurement and training for the entire spectrum of possible land operations in the future, including the capability to operate across the entire conflict spectrum, from peacetime tasks to high-intensity combat, and across domains.

The Continuum of Land Operations

As shown in this book, comprehending the challenges of future land warfare is a highly complex, but very important endeavour. Views on how land forces should be organized, equipped, and trained have historically varied

with the perceived character of future wars and the missions that land forces are expected to accomplish. Several paradigmatic shifts in perspective regarding the utilization of land forces can be identified in the last century, akin to pendulum swings, which have had substantial effects on defence planning and on armies across the Western world. The massive conventional confrontation with large peer adversaries that formed the key dimensioning challenge of the Second World War and the Cold War was replaced by the US experience in Vietnam, which made clear the need for different forces and tactics than those possessed by the USA at the time. The US defeat in Vietnam nevertheless disqualified the need for capabilities to fight insurgencies, in US thinking—and the conclusion was instead that US land forces should not be utilized in this type of conflict. The focus then shifted to developing agile conventional capabilities to confront the numerically superior USSR in Europe, via the AirLand battle and Manoeuvre Warfare Doctrines, only to face seeming irrelevance as the Warsaw Pact disbanded in 1991. The wars of the 1990s, including the Gulf War, wars in the Balkans, and the Kosovo campaign, and of the 2000s in Afghanistan and Iraq, provided a different set of conclusions. Although conventional land power played a significant role in the two wars in Iraq, the experience of post-Cold war conflict implied a less significant role for large, heavily equipped, and manoeuvrable land forces than that envisioned in the 1980s, and underlined the importance of land warfare against unconventional opponents, as well as lighter and more modular expeditionary forces. In the 2010s, the pendulum swung again. Russia's invasion of Ukraine and its aggressive posturing against eastern NATO members, as well as China's emergence as a determined competitor in the global arena, underlined once more the significance of modernized conventional land forces dimensioned to fight high-technological peer or near-peer adversaries, and an unprecedented need to integrate their capacity with capabilities in other warfare domains.

However, these historical shifts in focus also underline that the future of land warfare cannot fully be anticipated and that land forces may be deployed in different types of conflict environments, requiring different sets of capabilities. Land forces face multidimensional challenges and demands and therefore need to be organized, structured, and trained in a manner that highlights versatility as a key property of land forces. This includes an integrative approach in relation to both domains and allies and partners, as well as awareness and readiness to evaluate and adapt to new developments in technology, integrating these technologies where appropriate or discarding them as needed. It also includes a dynamic and proactive approach to TTPs, which must evolve in sync with realities in the operational environment as well as capabilities, and must not stagnate into dated and static checklists or set rules.

This will enable land forces to adapt in a changing and evolving security environment, where several external forces impact the preconditions for warfare. This will also enable land forces to take a proactive and flexible approach to existing challenges and devise new approaches to problems that are yet to emerge.

However, before outlining the framework for a versatile approach to land warfare, we must establish a modicum of structure for the myriad elements and factors that influence land forces. It is useful to envision these questions/challenges in terms of two distinct spectra, namely the intensity of conflict and the role and purpose of land operations. These two dimensions are sketched out in Figure 19.1, where the horizontal axis denotes the level of conflict intensity, the vertical axis indicates the land operations continuum, and the diagonal line—with intentionally blurred edges to illustrate the approximation involved—denotes the resulting utilization of land forces.

Conflict intensity. Naturally, a conflict’s level of intensity will be a key determinant of the role of land forces therein. This applies to (1) the tasks and objectives to be accomplished, (2) the scale of deployment, and (3) the capabilities required to deliver the desired effects. It is common (and useful) to envision the possible range of conflict intensity in an ideal-typical spectrum

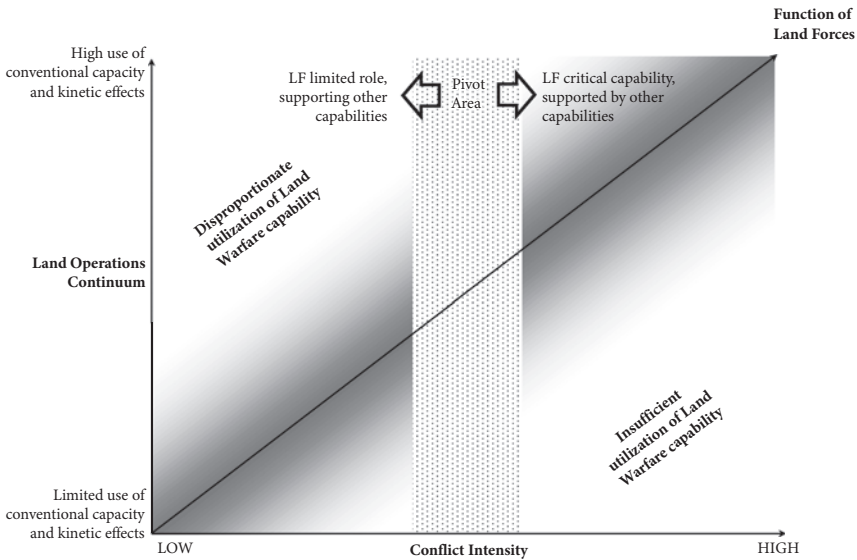


Fig. 19.1 The land operations continuum model

of low- to high-intensity conflict.¹ Low-intensity conflict here denotes conflict with no or very limited utilization of kinetic force. This applies to, for example, post-conflict environments where forces mainly serve peacekeeping or peace-supporting missions. Low-intensity counterinsurgency missions also belong to this side of the spectrum, as do several thinkable activities relating to competition below the threshold of armed conflict or in a grey zone context, where land forces mainly function as a deterrent and no or few significant combat actions take place. More intense expeditionary missions, such as those in Afghanistan and Iraq after the conclusion of major fighting, fall in the middle of the spectrum but remain located on the 'left' side. This since combat involving land forces, although occasionally intense, for the most part took place on the lower tactical levels and predominantly aimed to support the objectives of agencies other than the military.

On the 'right' side of the spectrum is limited war, that is, a war which in large part takes on regular/conventional features, but where the antagonists (or the dominant one) takes precautions to keep the war limited and avoid escalation beyond a specific theatre in order to accomplish objectives without risking a confrontation with major adversaries. Of course, a war's limited nature is a matter of perspective; a stronger party may fight a limited war, whilst the weaker party fights an existential one. Post-Cold War examples include the 1991 Gulf War, the 2003 invasion of Iraq, and Russia's wars in Georgia and in Ukraine during its first invasion in 2014-15. Whilst a limited war can indeed be of high intensity, it is delimited to a localized geography and/or delimited in the means utilized.

In contrast, high-intensity conflict in this case denotes all-out war between peer or near-peer competitors, without any clear geographical delimitation and utilizing all means at their disposal, across all warfighting domains and throughout the ladder of escalation.

In theory, any conflict can be located at any point on the spectrum at a specific time.

Land operations continuum. To visualize approximately what these different levels of conflict intensity might entail, in terms of the demands on land forces and their expected utility, the land operations continuum denotes the emphasis on conventional capability for land warfare, in the respective categories of conflict. The logic implied is that the emphasis on conventional

¹ See, e.g. Frank G. Hoffman, 'The Contemporary Spectrum of Conflict: Protracted, Gray Zone, Ambiguous, and Hybrid Modes of War', Heritage Foundation, 2015, accessed January 26, 2022, <https://www.heritage.org/military-strength-topical-essays/2016-essays/the-contemporary-spectrum-conflict-protracted-gray>; *Allied Joint Doctrine for Land Operations (AJP-3.2 Edition A)* (Brussels: NATO, 2016); Linton Wells II, 'Cognitive-Emotional Conflict—Adversary Will and Social Resilience', *PRISM* 7, 2 (2017): 5–17.

land warfare capabilities, or the demand on land forces to deliver coordinated kinetic effects, will grow exponentially depending on the intensity of conflict. In a low-intensity environment, land forces, if they are deployed at all, will mainly serve functions other than combat, for example peacekeeping or peace support missions or other supporting activities. Counterinsurgency missions require land forces to deliver kinetic force, but often limited to lower tactical levels. Limited (conventional) wars may indeed involve a substantial land component, but in a delimited theatre. Conversely, high-intensity conflict will employ land forces to their full conventional capacity and require that these as well as other capabilities are coordinated across domains.

The continuum also envisions a pivot area, in which the role of land forces shifts from being limited and mainly supportive of other activities, to constituting a critical capability that is instead supported by other capabilities and activities. This area is intentionally wide, symbolizing the problem for the military as well as political leadership in determining when a conflict has transformed, or should escalate, into a higher level of intensity demanding a more substantial involvement of land forces. The point, however, is that on the left-hand side of the continuum, the centre of gravity in the conflict focuses on activities other than conventional military ones. For example, these might include diplomacy, narrative promotion, economic sanctions, or various unconventional means of warfare. On the right-hand side of the spectrum, however, conventional military force instead comprises the main activity and focus of the actors involved, and other available means deployed in the conflict are geared toward supporting the military effort.

Indeed, the continuum attaches great importance to perceptions regarding the limits of legitimate or appropriate utilization of land forces, which are expected to change in pace with the intensity of conflict. The areas above and below the continuum respectively symbolize the disproportionate and insufficient utilization of land warfare capability. The area above the continuum denotes disproportionate use of force, perceptions of which are envisioned to shrink in pace with conflict intensity. Conversely, the potential for insufficient utilization of land forces is projected to grow as conflicts intensify, symbolized by the area below the continuum. Questions pertaining to these two areas relate to the specific implications of deploying land forces in a conflict and the tasks they are expected to fulfil. The deployment of land forces is a sign of commitment with acceptance of risks far more substantial than those of a more limited utilization of air or maritime power alone. Deploying 'boots on the ground' in a conflict drastically increases the likelihood of human casualties, which, in turn, becomes more acceptable as conflicts become more intense. This risk also relates to the political ability to motivate engagement in the conflict, where engagement in a high-intensity conflict will

likely justify far greater human sacrifice than one of lower intensity. Examples of this dynamic include the tolerance of US casualties in the Second World War, compared to the Vietnam War.

The deployment of land forces in a conflict also implies a risk of conflict escalation, since their presence introduces a unique dynamic in a conflict. Warfare on land is more difficult to control in terms of resources and capabilities that ultimately become involved in fighting. This also relates to conflict intensity, since the perception of disproportionate use of force will have consequences for the ability to engage in a conflict. Consider, for example, a minor tactical engagement in a low-intensity conflict environment, which nevertheless escalates and ultimately produces substantial casualties as well as collateral damage in terms of civilian lives and property. This could prove detrimental, politically and in the eyes of the public, to continued engagement in that conflict. In a high-intensity conflict, on the other hand, this would likely appear legitimate given the mission of land forces and the stakes involved.

The question of perceptions and legitimacy also has relevance for the utilization of irregular or proxy forces in different types of conflict. Low-intensity conflict can be assumed to incentivize disassociation of kinetic violence from governments and regular militaries. Thus, assigning tasks that potentially involve disproportionate use of force, for example controversial combat missions to proxy forces or military contractors is seen as particularly attractive in low-intensity conflict environments, in order to establish a distance and deniability in relation to kinetic violence and the risks involved. Examples include Russia's warfare in Ukraine before 2022 and in Syria, which has significantly relied on local proxy forces as well as military contractors like the Wagner Group. Another example is the US strategy to decrease its own military commitment in Iraq and Afghanistan by training and equipping national land forces in these countries. Of course, similar forces may very well be deployed in high-intensity conflicts but are expected to be less important as a military-political tool. That is, conflict intensity relates to the relative significance of unconventional and conventional forces, strategies, and tactics in the conflict.

Locating Land Operations

The land operations continuum visualized the heterogeneity of possible conflict environments in which land forces might be deployed, and the wide spectrum of possible tasks they might be required to carry out. In sum, land operations could take place virtually anywhere and everywhere across

the spectrum of conflict intensity, yet with substantial variations in their expected effects. This section seeks to locate land forces in the broader operational environment—an exercise intended to provide a basis for discussing both the particular issues pertaining to land forces, and their role as an integrated part of military strategy and operations, inseparable from other components. Indeed, the role of land forces cuts across the strategic, operational, and tactical levels of a military operation.

As visualized in Figure 19.2, the operational environment can be schematically outlined as five concentric circles that symbolize, respectively, the overarching strategic context of the operational environment; the possible range of conflict intensity; interoperability; multi-domain operations; and the land forces themselves. Together, the four outer circles can be considered constitutive for land operations, since they decisively enable and/or constrain activities in the land domain.

The model is land forces-centric, placing these in the middle. However, land forces do not operate in a vacuum; they never act alone in any form of operation or conflict, since military operations always include other warfighting domains. Whilst this does not necessarily imply fully integrated multi-domain operations, the land domain can never be completely separated from the air, land, cyber, and space dimensions of the contemporary battlefield; nor does a land operation include only land capabilities. The third circle denotes the interoperability dimension, which is the ability to work together with allies and partners—an increasingly important aspect in military operations. NATO is a case in point, where interoperability is defined as ‘the ability for Allies to act together coherently, effectively and efficiently to achieve tactical, operational and strategic objectives [enabling] forces, units and/or systems to operate together and allows them to share common doctrine and

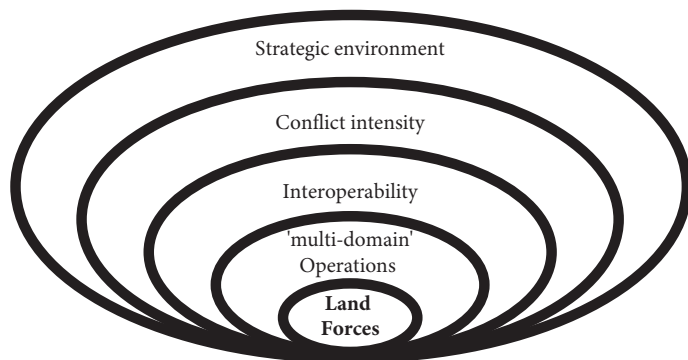


Fig. 19.2 The operating environment model

procedures, each other's infrastructure and bases, and to be able to communicate.² Whilst interoperability may not always be a requirement in specific scenarios, the ability to coordinate land forces of different national origins is nevertheless an important dimension of the operational environment.

The outer circles symbolize, respectively, the strategic environment and conflict intensity, and thus frame the environment in which land forces operate. The strategic environment is the overarching context of the operational environment, consisting of the interests and perceived needs that inform motives, possibilities, and constraints and affect all other levels of the operating environment. Conflict intensity, in turn, narrows the operational environment, as varying levels of conflict intensity give rise to different operational needs.

Having located land forces in the operational environment, we now zoom in on some of the factors of immediate concern to land forces, arising from the peculiarities of the land domain. Indeed, whereas the most basic issue pertaining to land forces relates to their own capabilities, that is, what they can and cannot do, this question cannot be understood or discussed in isolation but needs to be contextualized. Since warfare and combat are always an interaction between intelligent opponents, land capabilities and military power cannot be measured with a one-sided scale but is always relative and relational. In other words, one's own capabilities have no intrinsic or inherent value—they must be assessed in relation to an adversary. The German spring offensive through the Ardennes is a case in point; although the Maginot Line provided solid defensive positions, these were of little value against an adversary that could utilize its superior capability for movement to simply circumvent these positions. Likewise, in the 1967 and 1973 wars, Israeli forces proved capable of defeating several numerically stronger armies chiefly through more competent force employment—a far more efficient utilization of own capabilities relative to the opponent.

Moreover, different specific dimensions of the land domain remain crucial to land warfare. The physical terrain, and utilizing it to one's advantage, has always been a hallmark aspect of land warfare. Yet aspects of the human terrain and the information environment are also features that must be seriously considered in the contemporary land environment. Whilst these dimensions have not been unimportant historically, they are arguably becoming increasingly crucial in the contemporary land domain. Indeed, a battle cannot be

² 'Interoperability: Connecting Forces', NATO, accessed 14 December 2021, https://www.nato.int/cps/en/natolive/topics_84112.htm. See also Backgrounder: Interoperability for Joint Operations, NATO, July 2006, https://www.nato.int/nato_static_fl2014/assets/pdf/pdf_publications/20120116_interoperability-en.pdf.

won exclusively in the physical terrain; defeat and victory are increasingly defined in the human terrain and the information environment.

Nor can these three dimensions be analytically separated, since actions and development in one will unavoidably affect the others. Actions in the physical and human terrain will affect narratives in the information environment, which are today disseminated at lightning speed via a plethora of information outlets. In turn, consideration of the information environment delimits the possible range of actions in the physical and human terrain, how military activities can be carried out, and what type of forces and capabilities are required.

One prominent example is the trajectory of the Vietnam war, where a one-sided US focus on defeating the enemy in the physical terrain proved decidedly counterproductive and eventually led the superpower to defeat. Measures of capability and success including force ratios, body counts, carpet bombings, and capacity for herbicidal de-leafing of jungles only strengthened the resolve and military recruitment of the North Vietnamese Army and South Vietnamese guerrillas. Simultaneously, US and international media provided graphic documentation of the indiscriminate and disproportionate use of force, eventually making the war not only unwinnable, but also utterly illegitimate in the eyes of the US public.

The illustration in Figure 19.3 shows how, in the land domain, the capabilities of land forces should be understood as a function of the interaction between one's own capabilities and those of the adversary, the physical and human terrains, and the information environment.

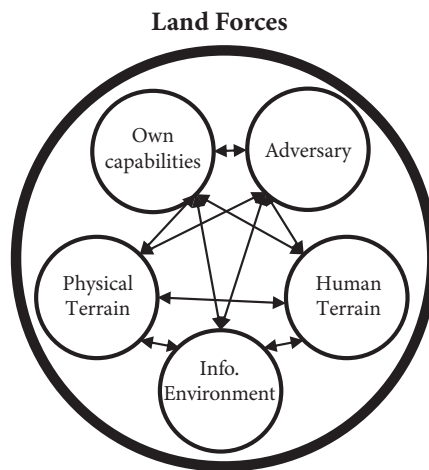


Fig. 19.3 Land forces capabilities in the land domain model

Towards a Versatile Edge: Securing Land Warfare Capability

Against the backdrop of the multidimensional demands placed on land forces in contemporary and future operational environments, the development of land warfare capabilities will require a conscious multi-pronged approach toward gaining a versatile edge on tomorrow's battlefields. In turn, this concerns both the build-up or construction of capabilities and how they are deployed and utilized in future conflict.

We argue that the achievement of *versatility* should be a crucial aim of contemporary land forces. To retain a competitive edge, the land forces of tomorrow must be capable of resolving a wide spectrum of tasks, and of providing utility across a complex operational landscape consisting of innumerable thinkable situations and circumstances. This is not to say that certain components or parts cannot be considered in narrow focus—in fact, this might even be a requirement—but versatility must be the main point of departure for land forces at the organizational level.

Versatility builds on two *interrelated and mutually reinforcing* qualities of a military organization (Figure 19.4). These are *adaptability* and *flexibility*, which together compose the underlying preconditions for truly versatile land forces. In simplest terms, adaptability concerns the ability of organizational change to efficiently deal with a new situation. Adaptability is a property

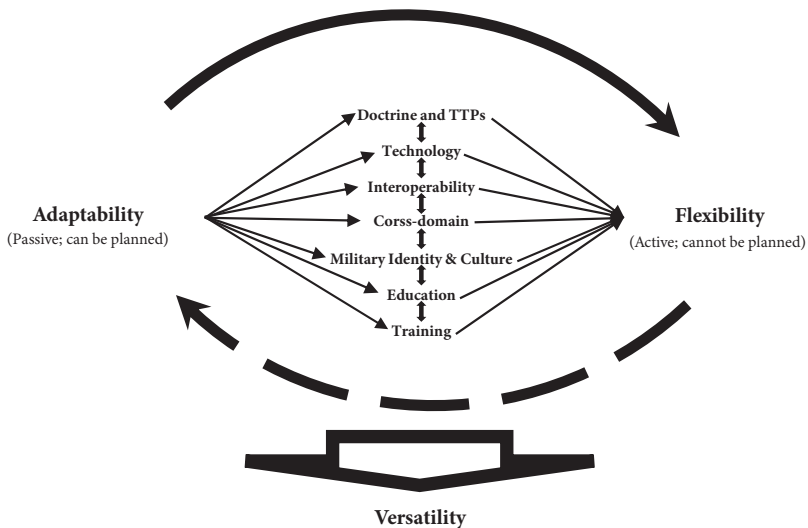


Fig. 19.4 The integrated versatility model

of the organization, a capacity that can be planned and constructed, and concerns the development of land force capabilities. It can also be termed a passive property, in that it enables a spectrum of possible actions, rather than constituting action *per se*. Flexibility, on the other hand, denotes the active utilization of the options granted by adaptability.³ It constitutes the capacity for active adaptation in the face of unforeseen circumstances and therefore cannot be planned (although capacity for flexibility can be developed in preparation). Flexibility is therefore an acquired quality that is ready to be executed when needed, as new conditions or situations require change in actions and behaviours. Whilst the two concepts may be independent in theory, we argue that adaptability is a *de facto* precondition for flexibility. If land forces lack adaptability, this will at best delimit and at worst deny them the ability to be flexible. A highly adaptable force will be more flexible, and in turn, a flexible force will be more adaptable.

We envision adaptability and flexibility to develop through seven interrelated factors: (1) doctrine and tactics, techniques and procedures (TTPs), (2) technology, (3) interoperability, (4) cross-domain ability, (5) military identity and culture, (6) education, and (7) training. Doctrine and tactics, techniques and procedures (TTPs), refers to conceptual constructs, including instructions and guidelines in different doctrines and handbooks, along with tactics, techniques, and procedures outlined in these, as well as their execution in military practice. Technology denotes how different technologies are adopted, implemented, and utilized in the force. Interoperability and cross-domain ability refer to how well-prepared and experienced land forces are to operate jointly with others across borders, functions, and domains. Military identity and culture refers to the traditions and culture that foster and create innate beliefs and identities among military staff, their self-perceptions, and the sets of values, conventions, or social practices associated with being an officer or soldier.⁴ Finally, education concerns the process through which individual members of the force are taught, trained, and learn, whilst training

³ The view on flexibility presented here draws on Finkel's argument that various historical attempts to prevent surprise on the battlefield, through research and intelligence gathering, have consistently failed. Thus uncertainty about future attacks and the course of action an opponent will follow are factors which defence forces have to live with and manage, by building sufficient conceptual/doctrinal, organizational and technological, and cognitive and command and control flexibility into military organizations so as to be able to deal with surprises during an ongoing war (Meir Finkel, *On Flexibility: Recovery from Technological and Doctrinal Surprise on the Battlefield* (Stanford, CA: Stanford University Press, 2011). See also Meir Finkel, *Military Agility: Ensuring Rapid and Effective Transition from Peace to War* (Lexington: University Press of Kentucky, 2020).

⁴ Mikael Weissmann and Peter Ahlström, 'Mirror, Mirror on the Wall, Who Is the Most Offensive of Them All?—Explaining the Offensive Bias in Military Tactical Thinking', *Defence Studies* 19, no. 2 (2019), <https://doi.org/10.1080/14702436.2019.1599287>.

is focused on the force as a collective and the skills it learns to be able to operate as such.

Adaptability in land forces results from the combination of the seven listed factors. The ability of a force to change or be changed is an aggregate function of the seven factors, where some might be positive, and others negative in each unique case. For perfect adaptability, there would in theory be a perfect match between the doctrine and TPPs that regulate and guide the force, the way that technology is utilized, the capacity for interoperability and cross-domain operations, and the way the force is trained, its officers and soldiers educated and the identity and culture, that is, the *esprit de corps*. This is, of course, never the case in reality, and the level of adaptability will by definition be a suboptimal function of the seven factors. In addition to these, the level of flexibility that is achieved will in turn influence the level of adaptability, either in a positive or negative sense.

Since flexibility is an acquired capability building on the adaptability of the forces, the capacity to be flexible can increase (or decrease) depending on how the seven factors are utilized and coordinated in the development of land forces. The ability to successfully shift or transform preparedness to action, or to turn an adaptable force into a flexible one, relies on doctrine and TTPs that allow for, and preferably encourage, flexibility on the battlefield.

Technology can hinder or empower flexibility and needs to be adopted in a way that is non-constraining. For example, the implementation of command-and-control systems can both encourage battlefield flexibility, through shared situational awareness, and establish rigid decision systems that counteract this purpose. Interoperability and cross-domain capability are also key features of flexibility on an increasingly integrated battlefield. The final three factors provide an interconnected set of preconditions for a force's ability to be flexible. A military culture and identity that allows and preferably promotes independent and creative thinking is a key cognitive precept for flexibility, which will always be hampered in the absence of such. In turn, education and training of the force and its members is important to build the capacity and ability to successfully handle new conditions or situations that emerge at short notice. And, of course, education and training are also crucial components in creating the *esprit de corps* referred to above.

In sum, adaptability and flexibility are mutually reinforcing, and both depend on the integrated effects of the seven factors. In turn, it is the integration of adaptability and flexibility that awards land forces versatility. Hence, the integrated versatility model.

It should be noted that the seven factors do not indicate discrete processes but rather an interrelated system of functions. Together, the functions make

up the capability of a land force to wage war. They cannot be separated since training builds on doctrine and TTPs, whilst technology is a component in all training as well as doctrine and TPPs. Technology is also important for interoperability, as equipment and systems need to be compatible. Likewise, similarities in identity and culture facilitate interoperability and are affected by education and training. In short, whilst possible to delimit and analyse individually, only together can the significance of these factors be fully understood and their combined impact seen. Moreover, the combined result can build an adaptable force capable of flexibility. In combination, these interconnected concepts form the basis for the versatile edge, the precondition for success on tomorrow's battlefield.

In sum, securing land warfare capability requires a land force with a high level of adaptability and flexibility. Adaptability and flexibility will together create the versatility needed on tomorrow's battlefield. To succeed in developing the required qualities, all seven forces/factors must be included in the development of tomorrow's land forces. Of course, victory may be possible without them, but such victories will be harder to reach, less decisive, less likely, and perhaps far more costly.

Ways Forward: Practical Implications and Agenda for Future Research

The previous sections presented a conceptual understanding of land forces in relation to their roles in different types of conflicts, their location in the operational environment, and the inherent properties of a military organization fostering versatility. We now sketch out some practical implications of the findings presented in the volume for the land domain, and suggest a set of focus areas for future research on land operations and land warfare.

Practical implications. One key challenge for military forces seeking to address the complexity of contemporary and future warfare is finding ways to translate knowledge and experience epitomized in conceptual understandings of future war and ways to fight into practice. Succeeding in this area requires considerable work to develop actionable conceptual approaches to warfare, and to ensure their comprehensive representation in doctrine and handbooks. However, doctrinal development must also be thoroughly implemented in the fabric of the organization, which is frequently a slow and arduous process, particularly if this involves rethinking of established practices and norms. One of the most important areas of doctrine implementation is the education and training of soldiers and officers, at all levels.

In an operational context that increasingly requires international collaboration and collective action, practical implementation presents specific challenges, as national militaries must develop approaches that permit interoperability, whilst simultaneously ensuring that they are optimized for national security needs. These requirements might be largely compatible, but can at times be contradictory. One example is decisions on material procurements, where narrow short-term national defence needs may compete with broader strategic and political considerations as well as interoperability.

Besides practical implications, there is a need for future research in several areas. Whilst we do not claim to present an exhaustive list of themes in need of more research, we have identified the following six areas as topics that stand out as particularly important in relation to the development of versatile land forces.

First, we need to develop a more dynamic understanding of the opponent. This includes better anticipation of the agency of a thinking opponent. It is also paramount to acknowledge the diversity in the types of opponents that land forces are likely to face in future conflicts, which may range from high-technological peer or near-peer adversaries in the form of states, to irregular forces in the form of low-technological but resilient insurgents and terrorists. Considering that the combined Western military forces also include states that are NATO partners but not allies, these states must also develop the means to resist a numerically as well as technologically superior opponent.

Second, urban areas will be an increasingly important arena for future land warfare. Urban operations and warfare should therefore acquire a greater significance in our understanding of the operational environment. Large cities are the centre of gravity for political and economic interaction and although urban warfare is a nightmare that one reasonably hopes to avoid, it is not always possible to choose the battlefield and it is therefore better to prepare thoroughly for this eventuality.

Third, developing functional and efficient command of land forces will be key to achieving a versatile edge. This challenge relates to a number of ongoing transformation processes affecting military forces, including the evolution of existing command concepts, technological shifts most importantly connected with information management, and the considerable challenge of cross-domain synchronization and force integration.

Fourth, emerging and breakthrough technologies are set to have a major impact on, and will possibly revolutionize, warfare. The relationship between technological development and warfare has been and must continue to be a significant area of research. Of particular significance are the proliferation of sensors and unmanned aerial systems, the advent of artificial intelligence,

robotics, and automation, and the anticipation of quantum computing, which have the potential to challenge the very nature of land warfare as it is currently conceived.

Fifth, intelligence will be of crucial importance in the future operating environment and is in need of further attention. Closely related to areas two and three, the collection, analysis, and dissemination of intelligence faces new challenges in the contemporary information environment, which places significant demands on capabilities to identify crucial information in the proliferation of available data. Nevertheless, the demand for reliable and actionable intelligence is greater than ever before, and informational advantage is a decisive factor to victory. This is further underscored by the prevalence of grey zone problems; as contemporary antagonistic competition to a very large degree takes place in a spectrum between peace and war, where an interconnected world makes the battlespace difficult to confine geographically.⁵

Sixth, this leads us to the question of what roles, functions, and actions land forces can perform in the grey zone. Land forces are indeed an important component in comprehensive and total defence and the engagement of hybrid threats, yet their potential and utilization in the grey zone remains underexplored.⁶ This is equally a question of what land forces could and should be doing, and what they should not do.

Finally, whilst not necessarily a research agenda per se, it is essential to ensure the continual integration of research findings in these areas, together with experience and best practices, in professional military education (PME). Together, these components constitute a formula for developing land warfare capabilities with a versatile edge, ready for tomorrow's battlefields.

⁵ Niklas Nilsson, Mikael Weissmann, Björn Palmertz, Per Thunholm, and Henrik Häggström, 'Security Challenges in the Grey Zone: Hybrid Threats and Hybrid Warfare', in *Hybrid Warfare: Security and Asymmetric Conflict in International Relations*, edited by Mikael Weissmann, Niklas Nilsson, Björn Palmertz, and Per Thunholm (London: I.B. Tauris, 2021).

⁶ Mikael Weissmann, 'Conceptualizing and Countering Hybrid Threats and Hybrid Warfare: The Role of the Military in the Grey Zone', in *Hybrid Warfare: Security and Asymmetric Conflict in International Relations*, edited by Mikael Weissmann, Niklas Nilsson, Björn Palmertz, and Per Thunholm (London: I.B. Tauris, 2021).