Land Operations 2021

Adaptive Dispersed Operations

The Force Employment Concept for Canada's Army of Tomorrow

National Defence Défense National

Canada

LAND OPERATIONS 2021
ADAPTIVE DISPERSED OPERATIONS
THE FORCE EMPLOYMENT CONCEPT FOR CANADA'S ARMY OF TOMORROW

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PREFACE

As the 21st Century unfolds, Canada's Armed Forces must be ready to operate within an international security arena marked by uncertainty, volatility, and risk in order to meet national security needs and expectations. Increasingly, the likelihood of large force-on-force exchanges will be eclipsed by irregular warfare conducted by highly adaptive, technologically enabled adversaries, media-savvy foes intent less on defeating armed forces than eroding an adversary's will to fight, rogue states bent on challenging the status quo and transnational criminal organizations ready, willing and able to buy, sell and trade everything from drugs to armaments for their own gain. Furthermore, turmoil will often occur in urban areas, with adversaries taking full advantage of the complex physical, moral and informational environments that large, densely populated cities provide.

Nor will tomorrow's security challenges be confined to the external arena. In an increasingly interconnected, interdependent and information-based world, lines between the external and the domestic will be increasingly blurred. Climate change, natural disasters and even the flow of goods and people know no boundaries and the ability to operate and interact within networks and share information will increase dramatically in significance—posing both new opportunities and challenges.

It is within this uncertain context that Canada's Land Force must continue to operate effectively as a full partner within the Canadian integrated joint force team. As such, the Army must work towards a fuller understanding of the character of the future security environment and its implications for future armed conflict. Moreover, it must foster operational concepts and doctrine that are clear, relevant and always forward-looking. Finally, it must seek capabilities that ensure its effectiveness in the future multidimensional battlespace at home and abroad.

To mitigate the unpredictability of future conflict and prepare the Army for the challenges it will face in the future, the Army has produced *Land Operations 2021: The Force Employment Concept for Canada's Army of Tomorrow*, which serves as the guide for Land Force development through to the year 2021. This capstone document was developed from a series of operating, functional, and enabling concepts that collectively describe an approach to future land operations characterized by the deliberate use of dispersion and aggregation undertaken by adaptive forces in order to create and sustain tactical advantage over adept, adaptive adversaries. In this environment, land forces will be a major contributor to the networked joint team producing integrated effects through adaptive dispersed operations.

The fundamental objective of the adaptive dispersed operating concept is to defend Canada at home and abroad by contributing to the maintenance of long-term stability and security in regions of conflict. Consequently, the concept envisages land forces fully capable of full spectrum engagement across a continuum of operations from peacetime military engagement to major combat. Regardless of where these operations take place—in a domestic or expeditionary context—the tenets of the concept are uniformly applicable. Thus, land forces trained, organized and equipped to undertake adaptive dispersed operations will be equally effective in meeting the challenges of the future security environment in Canada or abroad.

This force employment concept is ambitious and forward thinking, but at the same time well grounded in the lessons that we have captured from today's operations. In

essence, it is a conceptual guide, from which force generation must evolve, acknowledging where we are, what we have achieved, and what we must do to ensure continued success in the future.

Andrew B. Leslie
Lieutenant General
Commander Land Forces Command

INTRODUCTION

STRATEGIC CONTEXT

In future, the Government of Canada will continue to rely upon its military forces as a key instrument of Canadian foreign policy. Not only will the Canadian Forces (CF) offer an essential means of pursuing national interests and values but also of ensuring our status abroad. Indeed, the effective use of military forces not only helps ensure that Canada will retain a "seat at the table" in a range of international organizations and coalitions but also the ability to function as a trading nation and a responsible and respected member of the international community. Ultimately, Canada's future security and prosperity requires a stable, predictable international system, and the CF will remain an essential means by which Canada can assist in achieving this stability.

The mission of Canada's armed forces is derived from government Defence Policy and from Department of National Defence (DND) guidance. It is further refined to provide specific direction to each environment through the departmental policy process, departmental strategy documents and the annual Defence Plan. Nevertheless, DND's core mandate is—and will continue to be—the defence of Canada and Canadian interests and military contribution to international peace and security.

For the Land Force, this requires a capacity to generate combat-effective, multipurpose forces to meet Canada's defence objectives, i.e. protect the national interest, contribute to international peace and security and protect prosperity, peace, order and good government at home. Accordingly, the Land Force must be prepared to undertake both expeditionary and domestic missions, and be capable of conducting tasks across the spectrum of conflict and the continuum of operations. To this end, it must be both strategically relevant and tactically decisive. Given the security environment Canada increasingly confronts, these goals require forces that are combat-effective, but also highly mobile, adaptive, networked, sustainable and capable of operating in a joint, interagency, multinational and public (JIMP) context.

FUTURE SECURITY ENVIRONMENT

In general, the future security environment will continue to exhibit high volatility and uncertainty. Already, ongoing trends (e.g. globalization, rapid scientific and technological innovation, demographic change, shifting regional power balances, the growing prominence of non-state actors) are leading to considerable change in the nature of conflict and its conduct. The result is that traditional threats and challenges are increasingly being eclipsed by newer dangers. While the prospect of inter-state war will not disappear, future challenges will be more diverse—with asymmetric attacks launched by transnational terror groups, and the political instability, civil war and humanitarian crises characteristic of fragile countries making up the lion's share of turmoil in the early 21st century.

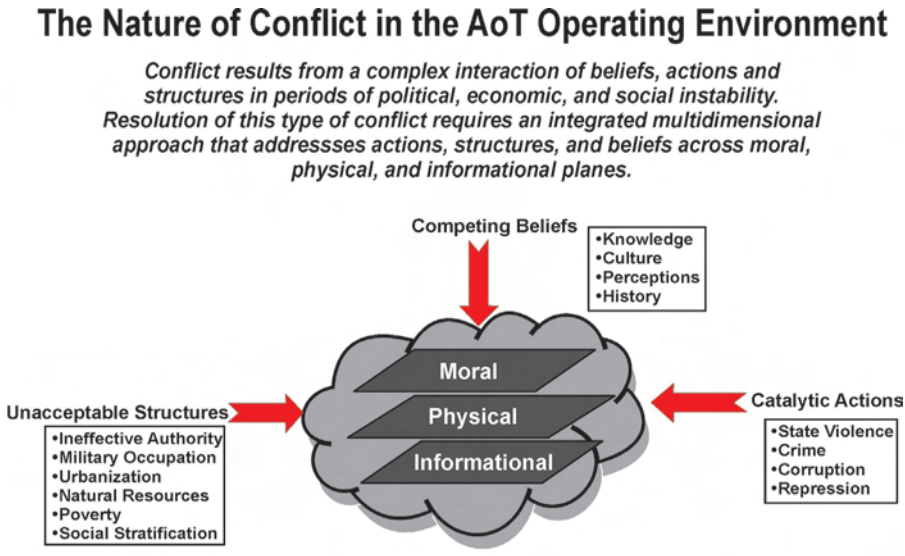
Increasingly, the likelihood of large force-on-force exchanges will be eclipsed by irregular warfare conducted by highly adaptive, technologically enabled adversaries; media-savvy foes intent less on defeating armed forces than eroding an adversary's will to fight, rogue states bent on challenging the status quo, and transnational criminal organizations ready, willing and able to buy, sell and trade everything from drugs to armaments for their own gain. Furthermore, turmoil will often occur in urban areas, with adversaries taking full advantage of the complex physical, moral and informational environments inherent in large, densely populated cities.

Nor will tomorrow's security challenges be confined to the external arena. In an increasingly interconnected, interdependent and information-based world, lines between the external and the domestic will be increasingly blurred. Climate change, natural disasters and even the flow of goods and people know no boundaries, and the ability to operate and interact within networks and share information will increase dramatically in significance—posing both new opportunities and challenges. Accordingly, developments in the global realm will increasingly have domestic consequences.

Changing realities on the home front may complicate matters further. For instance, as Canada's population ages and becomes more diverse—ethnically, religiously and culturally—how we view and respond to emerging security challenges may well differ considerably from past practice.

To be sure, many of the broad contours of future conflict will resemble those present today. Yet a key difference will be that potential adversaries are likely to be even more adaptive and the threats they pose even more varied. Both globalization and exponential technological change will offer to a wide array of actors the capacity to achieve a degree of influence and reach unlike anything seen in the past. This—combined with human ingenuity—will provide adversaries with an increased capacity to organize, network and mount significant challenges on a number of fronts—from the physical to the informational to the moral. With greater access to a range of "enablers" including cell phones, the Internet and a wide array of weapons and weapon-related technologies, the adversary's mobility, reach and lethality will increase. So too will the capacity of rivals to quickly adapt to Western strategies and capabilities, and to exploit Western strengths and weaknesses to their advantage. Furthermore, conflict itself is likely to be far more complex.

Notably, conflict generally reflects a complex, three-dimensional web of actions, structures, and beliefs in which each dimension shapes and is shaped by the other.



Actions consist of those events, behaviours and acts that characterize the nature of the conflict. They encompass the individual and group behaviours of all of those involved in the conflict, be they irregular combatants, security forces, aid workers, local

and national leaders, or the population. The most obvious actions centre on violence, and can run from acts of intimidation to terrorism to major combat actions. Actions may also consist of precipitous events that spark outbreaks of violence and retaliatory or repressive acts—perhaps incited by asymmetric adversaries. Given that they can be planned, executed, seen and measured, actions tend to overshadow the other dimensions of the conflict. However, while actions by themselves represent the tactical aspects of the conflict, their strategic impact lies within the structures and beliefs that comprise the deeper roots of strife.

Structures represent the conditions that frame conflict—and terms such as stability, instability, infrastructure, economic development, and humanitarian assistance describe the structural elements of conflicts in the future security environment. In future, irregular combatants will attempt to dismantle existing structures, exploit those that are viewed as corrupt or repressive, and attempt to create new ones in their stead. Such structural elements (political, economic, social or security) form the essential physical and conditional battle space over which future conflicts will be fought. They also work to define outcomes once conflicts end.

As for beliefs, they comprise those attitudes, perceptions, prejudices, ideologies, cultures and social identities that fuel conflict, and are the psychological imperatives that drive and are driven by actions and structures. Beliefs encompass more than just the conscious decision or willingness to side with one belligerent or the other. They represent the preconditions and mental filters that determine how individuals and groups perceive the actions and structures that surround them.[1]

In the future, and given our increasingly globalized, interdependent world, each dimension of the conflict web promises to encompass more actors, more motivations and more varied strategies and means for achieving the goals of those involved. Throughout, and far more so than in the past, however, conflict and its conduct will involve less emphasis on its physical and more on its informational and moral aspects. In short, the perceptual, psychological and ideational will increasingly eclipse the physical as the chief battlegrounds of conflict. And the human dimensions of conflict will be ever more salient—and significant.

Indeed, such an environment requires military forces capable of operating effectively across the physical, moral and informational planes of any conflict. In the physical realm, this involves dealing with physical structures, belligerent forces and non-combatant populations within the conflict itself, as well as their actions and effects. On the moral front, it involves issues and actions relating to the motivation, conviction and commitment of conflict participants in pursuit of their conflict objectives. On an informational plane, it involves action aimed at those individuals, organizations and systems that collect, process, and disseminate information and includes the information itself. Exploiting, corrupting, disrupting and destroying information represent just some of the possibilities.

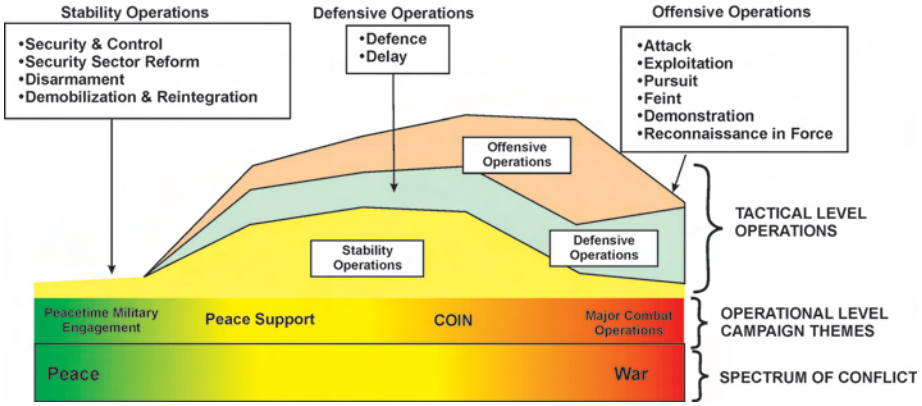
Each outcome of a conflict action represents a unique product of the interaction of effects across conflicts physical, moral and informational planes. While actions and their effects on the physical and the informational planes may be easier to quantify, it is the effects that actions produce on the moral plane that will be most significant in achieving desired end-states. Put simply, moral forces will exert greater influence on the nature and outcomes of conflict than forces in either the physical or informational realms.

1. This discussion is drawn from recent concepts of conflict and conflict resolution found in R. Scott Moore, *A Concept for Counterinsurgency in the 21st Century*, Hicks & Associates Inc, Center for Adaptive Strategies and Threats, February 2006.

Accordingly, conflict engagement will require intuition to understand the essence of complex problems, ingenuity to devise innovative solutions and strength of purpose to act effectively. It will also demand land forces that are ready and able to undertake operations along a continuum that encompasses offensive, defensive and stability operations conducted along the entire spectrum of conflict. To be sure, major combat and major combat operations will focus primarily on offensive and defensive actions and aim at defeating the enemy's forces and/or securing terrain. Yet stability operations will also take place, often in dynamic and complex environments in which tactical objectives are intrinsically linked to longer-term political objectives that may in turn be influenced by domestic and international media and public perceptions (The following table illustrates the types of actions which may be undertaken during offensive, defensive or stability operations).

The Continuum of Operations

Within the continuum, AoT forces will engage in a range of tactical activities across the spectrum of conflict from peacetime military engagement to major combat



Regardless of the type of operation undertaken, the realities of the future security environment will demand land forces that are capable of rapid transition from one operation to the next, as well as conduct of the three types of operations simultaneously if and when necessary. Most importantly, it will require far greater attention to the moral and informational aspects and consequences of future operations.

FROM INTERIM ARMY TO ARMY OF TOMORROW

The Canadian Oxford Dictionary defines an army as "an organized force armed for fighting on land." For a nation state, an army is a group of citizens made up of both regular and reserve components trained, organized and equipped to fight on land for national interests as determined by the duly elected government. Central to its raison d'être is the primary function of conducting combat or warfighting.

However, the army does not exist solely for combat or warfighting. Its characteristics—discipline, flexibility, agility, well-trained, highly-educated, well-organized, self-sufficient, well-equipped and connected by effective communications—forge a powerful resource suited to meet any national or international emergency or

contingency. The army, therefore, must be prepared to support domestic security missions to assist civil authorities when governmental or civilian institutions are incapable of resolving human crises or natural events, and to externally support international security operations whether in the offensive, defensive or stability realms.

To ensure its efficacy in either warfighting or tasks other than warfighting, it is necessary that the army inculcate its ethos and its values of duty, integrity, discipline and honour. Cohesion and will are historically identified as the most important requirements of combat forces. Cohesion is the unity that binds individual soldiers toward a common purpose and creates the will to succeed. It is built on a sense of belonging and purpose, good morale and discipline. How leaders and soldiers are trained, educated, led and prepared for the roles they perform are critical determinants of success. Soldiers instilled with discipline and military ethos and who are bonded into a cohesive whole form the framework upon which an army is developed. They permit an army to execute its tasks under the most demanding of situations.

Operational readiness is the state of preparedness of a unit to perform the missions for which it is organized or designed. It is closely associated with operational effectiveness, i.e. the degree to which forces are capable of performing their assigned missions in relation to known enemy capabilities or specific mission requirements. The level of operational readiness and effectiveness of units will have great bearing on their ability to launch and successfully conduct operations. Ensuring operational readiness entails setting training objectives and standards, establishing criteria for measuring unit proficiency and capabilities, ensuring that unit organizations, command and control arrangements, and weapons and equipment are appropriate for potential operations and most importantly, ensuring that units are cohesive, well-led and have high a standard of discipline and morale.

The emphasis on the army's competency—land warfare across the spectrum of conflict—will be most essential to ultimate success. It is a historically accepted fact that an army trained for combat is best able to adapt to other missions such as stabilization and assistance operations—however, the land operations doctrine and associated skills required to go from winning battles (combat) to winning wars (interventions in failed or failing states, for example) do require a competency set and organizational models that go well beyond combat engagement. This requires an army grounded in combat effectiveness—and full spectrum operations effectiveness in particular—as war winning focuses more and more on capacity building and influence operations. A well-trained, equipped and led army is able to deliver to the CF land forces that are able to survive in the modern battlespace, able to win battles and able to contribute significantly to war winning (or any other contest of wills where use or the threat of the use of military force is required). This army provides security to Canadians and upholds Canada's constitutional imperatives of peace, order and good government in a manner that is relevant today and will be in the future.

In 1999 the CLS realized that if the Land Force was to indeed transform beyond its Cold War and early post-Cold War constructs, short-term savings were needed to ensure a tangible investment towards achieving longer-term goals for the Land Force. This allowed the Army of Today to function while preparing the institutional ground for a transformation towards the Army of Tomorrow (AoT). As an expedient to achieve this end state and knowing that the Land Force of Tomorrow might still be as much as a decade or more away, the Interim Army (IA) was created to provide an intermediate

milestone for conceptual and doctrinal design. The first product of the Interim Army, *Advancing with Purpose: the Army Strategy*, appeared in 2002.

The following year the force employment concept (FEC) for the IA appeared, while the Directorate of Land Strategic Concepts (DLSC) launched 'The Futures Project' with the aim of completing the conceptual design of the Army of Tomorrow that would evolve out of the Interim Army. This work began with the production of *Future Force: Concepts for Future Army Capabilities*, a thought piece presenting a conceptual framework designed to assist the Land Force leadership and those staff working on the Army of Tomorrow constructs. A companion to *Future Force* was published in 2005. Entitled *Crisis in Zefra*, this fictional narrative was an illustrative tool for the further exploration of many of the concepts first examined in *Future Force*. It presented one plausible future scenario for the AoT as well as a number of questions designed to encourage further debate across all ranks of the Land Force.

With the initial conceptual work completed, work began on a roadmap from the IA (arguably the Army of Today) to the Army of Tomorrow employing realistic constraints and restraints within a cyclical design process to produce an evolved hierarchy of concepts. The effort was completed during a series of contemporary lessons learned studies and definition workshops, seminar war games and army experiments during 2006 and included participation from across the CF as well as other government departments. This work, *Land Operations 2021: The Force Employment Concept for Canada's Army of Tomorrow*, lays out the paradigm of adaptive dispersed operations (ADO), which emerged from these studies, experiments and analyses.

CONCEPTUAL FRAMEWORK

METHODOLOGY

Even when not at war, professional volunteer armies continue to think about future conflicts; in particular what they might be like, where they might take place, against whom and to the extent that such things can be conjectured, why. As well, armies smart enough to think ahead do what they can to be ready for the next conflict by examining future concepts, preparing doctrine, developing the proper physical, intellectual and social capital for their armies, as well as training their soldiers for tasks both possible and probable. Yet despite the best efforts and preparations of any army, predicting the future is almost always fraught with uncertainty.

To mitigate the unpredictability of future conflict the Land Force has engaged in a continuous program of capability development since the end of the Second World War. Today, Canada's Land Force is often described as a strategically relevant, tactically decisive, knowledge-based, medium-weight force. Its doctrine is based on the manoeuvre approach to operations in which shattering the enemy's overall cohesion and will to fight is paramount, and is achieved by targeting his center of gravity.[2] This approach to Land Force operations had its genesis in the post-Cold War army concept debates of the early to mid-1990s and was further developed into the Interim Army following the decision to undertake extensive transformation activities across the Land Force at the end of the decade. The methodology pursued to develop the Interim Army was built upon the output of three parallel sub-processes: the consideration of the future security environment and capability-based planning scenario outputs, future capability requirements and future concepts.

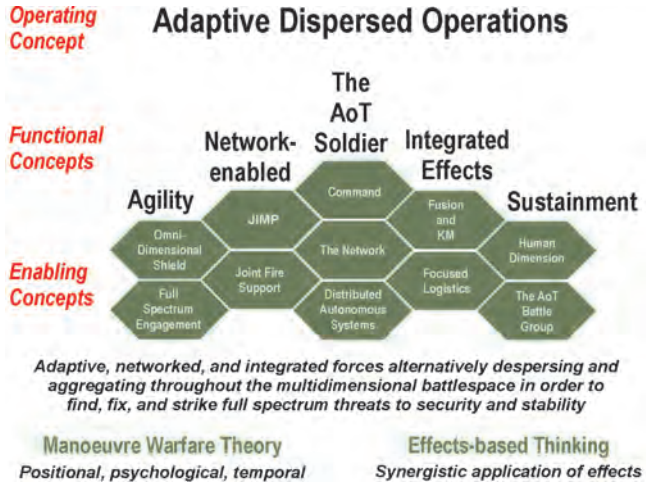
The methodology pursued in developing the Army of Tomorrow followed similar lines of investigation while appreciating changes in the physical, moral, and informational planes. Each sub-process responded to one of the following questions: First, what are the defining features of the future security environment? This sub-process involved consideration of four alternative futures, and resulted in the publication of the *Future Security Environment*. FSE defined the environment and its characteristics, while the ongoing science and technology (S&T) trend analysis continuously provided us with opportunities and challenges. Human resource studies examined our evolving demographics and posited the cognitive skill requirements and other human development aspects.

Second, what are the force capabilities and characteristics required by a Canadian Land Force that will be called upon to operate in that environment? The resultant study posited the future army capability requirements portfolio of required capabilities. *Future Force* defined those capability requirements and characteristics that the Land Force would require to operate in the future security environment. The resultant listing of capabilities and characteristics were rolled up into a portfolio of enabling capabilities and characteristics.

Finally, what are the alternative concepts and characteristics essential to realize those capabilities? An aggregation of the *enabling capabilities* and characteristics resulted in the eleven enabling concepts that underpin the Army of Tomorrow. An enabling concept is a description of how a particular task or procedure is performed within the context of a broader functional area, using a particular capability, such as a specific technology, training or education program, organization or facility. An enabling

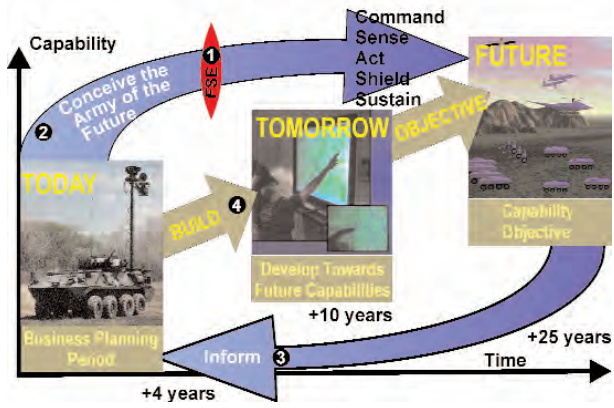
2. B-GL-321-004/FP-001. *Battle Group in Operations*, (draft dated April 2005), p. 1.

concept describes the accomplishment of a particular task that makes possible the performance of a broader military function or sub-function. Considerations of the AoT enabling concepts produced these five key functional concepts. These functional concepts contain descriptions of particular fields of specialization within the overall operating concept. The integration of the functional concepts produce the operating or force employment concept, which describes how the various functional activities relate and are integrated into a cohesive operating system.



The design process leading to the Army of Tomorrow can be termed "backcasting", as shown in the following diagram. Backcasting comprises the cyclical development process (as previously outlined), determines how things need to be changed today in order to transform the Army of Today into the Army of Tomorrow. In sum, the backcasting process begins with an examination of the future security environment, using the operating functions: command, sense, act, shield and sustain (1). The examination results in a definition of the required capabilities needed to operate in such an environment (2). The required capabilities are then backcast through the Defence Services Program and used to inform the business planning and training processes (3) and to inform the acquisition process of those capabilities to develop or acquire (4) them in time to meet the emergent challenges.

The Evolving Army



From this process three models were developed based on our expectation that we would continue to prosecute land warfare within a joint, interagency and multinational concept of intervention. Fighting and operations will persist as formation level undertakings; therefore these models are based on JIMP capable brigade or task forces that will transition land formations and their battle groups from today through to 2021 and beyond. The first is a "current build" force leveraging our Afghanistan experiences and building formal tactical affiliations while ensuring Land Force expansion targets under-strength or new capabilities as required. The second model is an experimental battle group that will test and evaluate concepts and doctrine through a series of technology demonstrations and exercises. The third model is the optimized formation and its battle group(s) that will evolve from the experimental formation and battle group experiences.

OPERATIONAL FUNCTIONALITY

The Land Force will continue to use the five operational functions as a framework for concept and combat development. The strength of the operational functions stems from the indivisible integration of capabilities and the incorporation of the moral, physical and informational planes. The functions retain their viability in a continuum that stretches from the strategic to the front line soldier. The operational functions are now in wide use across the Land Force and have been formally adopted into doctrine. They will continue to provide the framework for Land Force concept development. They are briefly described as follows:

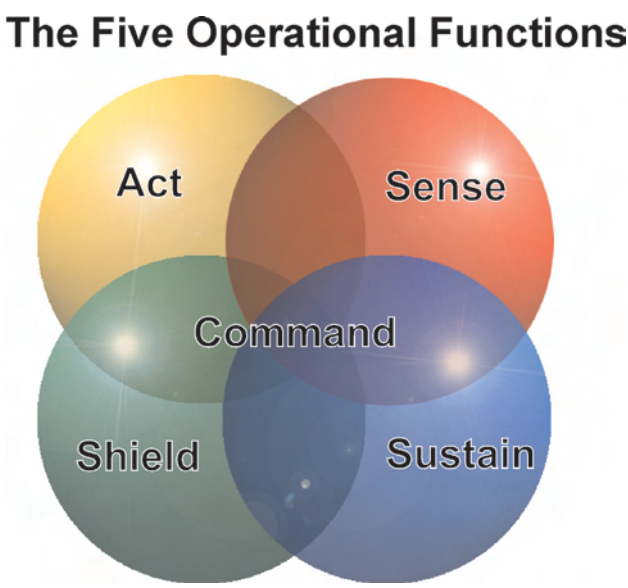
- **Command** integrates all the operational functions into a single, comprehensive strategic, operational or tactical level concept. It is the nexus of all activities, integrating all functions towards the attainment of specific operational goals. The human nature of command will remain paramount, whereby a command-centric approach will be shaped by mission command.

- **Sense** integrates sensor and sensor analysis capabilities into a single concept. This initiative breaks previous sensor and information stovepipes, allowing for comprehensive sensor fusion and all source analysis within a single system. This concept moves beyond the simple collection of data or information to provide commanders with timely and relevant knowledge.

- **Act** integrates manoeuvre, firepower and offensive information operations to create a desired effect and end state through the synchronized application of the entire array of available capabilities, both lethal and non-lethal. The concept is relevant across the continuum of operations, from domestic and humanitarian missions to combat.

- **Shield** provides for the protection of a force's survivability and freedom of action. Shield is a layered, integrated and comprehensive operational function that seeks to prevent any impact on friendly forces across the physical, moral and informational plane that could affect survivability or freedom of action.

- **Sustain** integrates strategic, operational and tactical levels of support to generate and maintain force capability. This function addresses issues of sustainment on the physical and moral planes. It integrates the provision of materiel and personnel support to ensure the sustainment of combat power. It fully integrates all levels towards the attainment of this objective, linking combat activities to the national base.



Capability development is a complex process that takes place on many fronts. Emerging concepts must be examined and, if appropriate, adapted for our army. Key to success is the use of information and knowledge to create awareness and understanding. Properly exploited, increased network connectivity will provide the means to integrate capabilities across the five operational functions and in turn enhance the application of combat power. Situational awareness (SA) and understanding will allow the Land Force to attack enemy weaknesses from a position of strength. The emphasis will be on effects not methodology. Increased SA notwithstanding, however, the fog and friction of war will not entirely dissipate. All soldiers, regardless of occupation or component, must have the skills to fight, survive and prevail. A flexible organizational structure will enable forces to be tailored to specific missions from across the five operational functions and including integral and coalition capabilities as required.

MODULARITY

Modularity is a set of principles for managing complexity. Modularity endows an organization with flexibility. A modular system is tolerant of uncertainty, allows for parallel efforts and development and allows for specific design changes, repairs, or upgrades without impacting upon the rest of the system. It invites rapid innovation, encourages networking, and sustains the simultaneous testing of many different approaches to complex problems. This makes modular systems particularly ideal for organizations that require the adaptability to function effectively in a decentralized manner in an unpredictable, constantly changing environment.

The organization seeking success must be able to link the resources and capabilities of its many sub-components in order to deal with rapidly changing environments in a flexible manner. To meet the increasingly complex demands of the future security environment, the Land Force embraces modular principles in its conceptual organizational structures. It will have defined architectures, interfaces, and standards, promote encapsulation and minimize interdependency. Modularity will allow

the Land Force to become adaptive and remain robust, and will provide the agility needed for rapid and sustained deployment of forces at home and abroad.

The modularized force will employ JIMP capable brigades and/or task forces, of which the basic close combat component will be the optimized battle group. Designed to provide optimum capabilities through affiliated groupings of core strengths, the battle group will strengthen social and task cohesion, discipline, and will establish personal and performance related reputations based on trust that extends beyond the immediate, intimate social group to strong leader-follower bonds. Operating within a formation and JIMP-enabled campaign plan, the battle group must be in the first instance a decisive combat force able to live, move and survive the contemporary land operational environment, and able to win battles. It is the formation, with JIMP partners, that plans, shapes, orders the prosecution of operations and exploits them with a view to achieving campaign objectives—these leading ultimately to 'winning the war'. Though often characterized as a 'medium-weight' force due to the fact that most deployments require this range of capability, modularity allows the Land Force the flexibility to provide the optimum mix for forces as needed for the specific mission at hand.

Within modular battle groups the capabilities required for the Land Force will evolve in accordance with the future security environment, conceptual and doctrinal options and the availability of resources. The battle groups should be large enough to allow for the development of a sufficiently broad spectrum of personal competencies to meet anticipated mission capabilities without overtaxing the resources available to commit to Land Force operations at home and abroad. This construct can be configured as required to meet a specific mission or aim, allowing the commander to take only what is needed for a given task without compromising the overall integrity of the combined effects that modular functional organization can deliver.

The Land Ops 2021 Force Employment Concept conceptualizes Land Force capabilities that ensure effectiveness in the future security environment at home and abroad. Land forces will be designed to survive the threats of the ever-evolving land battlespace, to win battles, in particular those that must be fought in accordance with intervention campaigns, as well as be a key contributor to the overall JIMP war-winning effort. These capabilities need to be resident in and commanded by land formations that operate at the operational and tactical levels, within a JIMP campaign framework, i.e full spectrum brigade and battle group. Formation mission elements, in particular our battle groups, will operate across a spectrum of organizational structures—from self-sustained independent action to coordinated action within a range of JIMP team possibilities. The Force Employment Concept synthesizes the understanding of the nature of land operations and requirements for land formations at the tactical level in order to be successful in operations. It emphasizes close combat in adaptive dispersed operations and its impact on our source of greatest combat power—our battle groups.

DELIVERING CAPABILITY

THE ADAPTIVE DISPERSED OPERATING CONCEPT

Given the anticipated future security environment and the conceptual designs required to meet its challenges, the Land Operations 2021 Force Employment Concept is founded on an operating concept of adaptive dispersed operations that will guide Land Force conflict intervention across the full spectrum of the future security environment. The fundamental purpose of the adaptive dispersed operations concept is to defend Canada at home and abroad by contributing to the maintenance of long-term stability and security in regions of conflict.

This operating concept envisages an operating environment characterized by complex, multidimensional conflict, a non-contiguous dispersed operational framework and an approach to operating within that environment based on adaptive dispersed land forces conducting simultaneous full spectrum engagement.

The Complex Operating Environment—Conflict within this environment reflects the relationships between the underlying actions, structures, and beliefs resident within the conflict. Each dimension must be understood both individually and as a part of the larger whole, i.e. in terms of how they affect and are affected by the others. Land operations undertaken to resolve the root causes of conflict in the future security environment must therefore address the multi-threat, multidimensional, multinational, joint and interagency aspects of the operating environment.

The Non-Contiguous Dispersed Operational Framework—The Land Ops 2021 Operational Framework—including the area of operations, the battlespace, and the battlefield organization—establishes areas of geographic and operational responsibility and provides the land force commander a method of visualizing the employment of land forces and resources for accomplishing the mission.

The Area of Operations (AO)—The AO is that tangible area, assigned by the higher commander, for which the commander is directly responsible. The AO will be large enough for the commander to accomplish the mission and shield the force. Additionally, the commander must be able to see and understand the entire AO and exercise command of all forces and resources within it. The commander must also be able to integrate the five operational functions within the AO and coordinate the actions of his subordinate commanders.

The development of new technologies, combined with the emergence of adept and adaptable adversaries with symmetrical and asymmetrical capabilities, will lead to an operational framework that is rapidly expanding, multidimensional and more distributed in terms of time, space, and purpose. AOs will therefore be more non-contiguous than contiguous and will be widely dispersed.

The Battlespace—Within the Land Ops 2021 operational framework, the battlespace includes the environment, factors, and conditions the commander must understand to successfully accomplish the mission and shield the force. This includes air, land, and sea spaces, enemy and friendly forces, infrastructure, weather, terrain, the electromagnetic spectrum and the information environment. The battlespace is conceptual. It is not assigned by the higher commander and is determined based on the commander's understanding of the situation and concept of operations. Commanders visualize and adapt the battlespace as the situation or mission changes. The term

battlespace is not synonymous with the AO and land forces conduct operations only within that portion of the battlespace delineated by the AO.

The Land Ops 2021 battlespace includes associated areas of influence, areas of interest, and the information environment:

- Areas of influence are those geographical areas in which the commander influences operations with the forces and resources under his command. In a battlespace characterized by adaptive dispersed operations, areas of influence may themselves be non-contiguous and vary in the degree to which the commander can exert influence.

- Areas of interest are those areas of concern to the commander, including areas of influence and adjacent areas. An area of interest extends to the objectives of current or planned operations. Areas of interest also include areas occupied by enemy forces that could jeopardize the accomplishment of the mission and may be global in scope. Areas of interest serve to focus sense and information operations activities at factors outside the AO that may affect the operation.

- The battlespace also includes that part of the information environment that encompasses information activity affecting the operation. The information environment contains information activities that collect, process, and disseminate information to national and international audiences but are beyond direct military influence. It includes space-based systems that provide data and information. To envision that part of the information environment that is within this battlespace, the commander determines the information activities that affect his operation and the capabilities of his and opposing command and sense systems.

The Battlefield Organization—The Land Ops 2021 battlefield organization allocates forces within the AO in terms of purpose. Purpose unifies all elements of the battlefield organization by providing a common focus for all actions. Given the non-contiguous nature of the battlespace, commanders will normally organize their forces according to purpose by determining whether each element's operation will be decisive, shaping, or sustaining:

- Decisive operations are those that directly accomplish the task assigned by the higher headquarters and conclusively determine the outcome of the operation or action. While there is only one decisive operation for any given unit or element, the decisive operation may include multiple actions conducted simultaneously throughout the AO. Commanders weight the decisive operation by economizing on forces and resources allocated to shaping operations.

- Shaping operations create and preserve conditions for the success of the decisive operation. Shaping operations include lethal and non-lethal activities conducted throughout the AO. They support the decisive operation by affecting enemy capabilities and forces or by influencing enemy decisions. Shaping operations use all operating functions to neutralize or reduce enemy capabilities.

- Sustaining operations enable shaping and decisive operations by providing combat service support, security, movement control, terrain management, and infrastructure development. Sustaining operations focus on preparing for the next phase of the operation and underwrite the tempo of the current operation. Sustaining operations assure the ability to take advantage of any opportunity and exploit success.

The Adaptive Dispersed Operating Concept—The Land Ops 2021 operating concept seeks to create and sustain operational advantage over adept, adaptive

adversaries through the employment of adaptive land forces alternatively dispersing and aggregating throughout the multidimensional battlespace.

Adaptive Forces—The complex, multidimensional, and continually changing nature of the Land Ops 2021 operational framework requires land forces that are agile, lethal and non-lethal, net-enabled, multipurpose, and full spectrum capable:

- Agile forces are capable of planning and conducting actions faster than the adversary can respond while maintaining the ability to respond to changes in the adversary actions faster than he can exploit those changes.

- Lethal and non-lethal forces can engage the adversary with precision and non-precision lethal and non-lethal effects delivered by line of sight, non-line of sight and beyond line of sight systems while manoeuvring to positions of advantage and conducting close engagement at the time and place of one's own choosing.

- Net-enabled forces operate within a network of Land Forces supported by joint sensor, fire support, and command and control (C2) systems linked by voice and data to create a level of situational awareness, mobility and battlespace effects that combine to overwhelm the adversary's understanding of the battlespace and his ability to react.

- Multipurpose forces provide full spectrum capability derived from a combination of integral capability plus the full use of joint and coalition assets. Integral capability is founded in turn on a range of leading edge technologies that provide enhanced deployability, mobility, survivability, lethality and modularity. A multipurpose force includes medium and light elements augmented as necessary by heavy elements. Medium elements exploit technology to achieve the level of lethality and protection formerly provided by heavy forces while light elements trade a measure of lethality and protection for enhanced responsiveness, deployability, and mobility. The high level of combat power inherent in medium elements is derived from both its integral capabilities and its ability to make full use of heavy elements and integrated effects. Light elements maximize flexibility and agility in order to compensate for reduced combat power and can be employed across the spectrum of conflict and continuum of operations in specific roles.

- Heavy elements reinforce medium and light elements to provide a higher degree of protection and lethality where required by the force.

- Full spectrum forces are capable of participating in all aspects of a whole of government campaign plan across the entire spectrum of conflict.

Adaptive Dispersed Operations—ADO envisage employing highly adaptive land forces dispersed—in terms of time, space, and purpose—throughout the width and depth of the battlespace in order to create and exploit opportunities, control the tempo of operations and overwhelm the adversary's understanding of that battlespace. The essence of adaptive dispersed operations is the ability to conduct coordinated, interdependent, full spectrum actions by widely dispersed teams across the moral, physical and informational planes of the battlespace, ordered and connected within an operational design created to achieve a desired end state. The fundamentals of dispersed operations, developed from the manoeuvre principles of find, fix and strike, include:

- developing situations prior to contact;

- manoeuvring to positions of advantage;

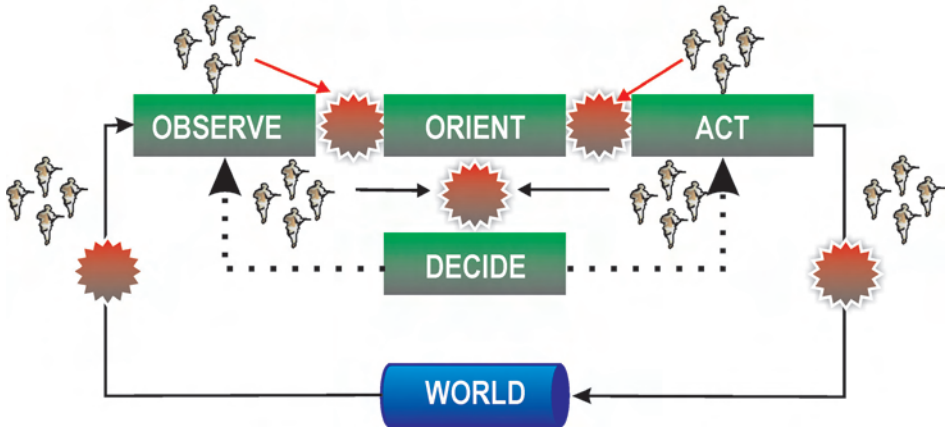
- influencing the adversary beyond the range of his weapons with lethal and non-lethal capabilities;
- destroying the enemy, when necessary, with precision and area effects;
- conducting close engagement, when necessary, at the time and place of own choosing; and
- transitioning between operations without loss of focus or momentum.

These fundamentals are applied across the moral, physical and informational planes of the battlespace. In short, adaptive dispersed operations call for networked and integrated land manoeuvre forces—supporting and supported by JIMP integrated effects—alternatively dispersing and aggregating over extended distances to identify, influence and defeat full spectrum threats throughout the multidimensional battlespace. Dispersion, in this context, is in relation to time, space and purpose.

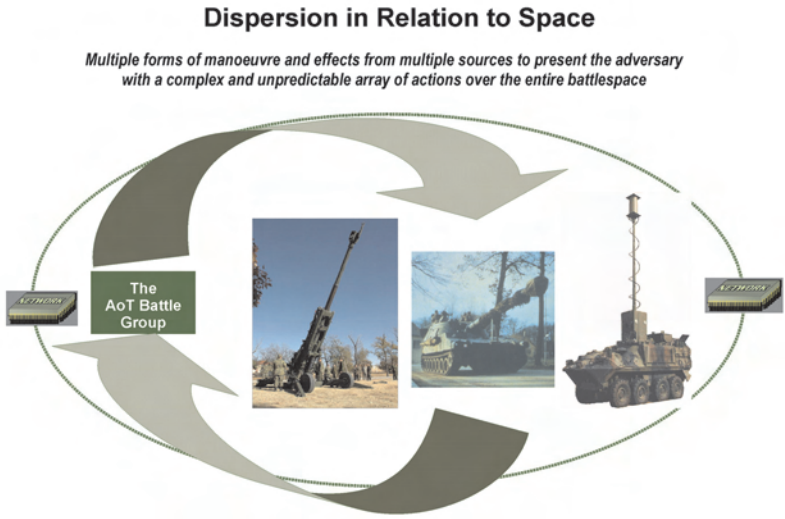
Dispersion in Time—Decentralizing decision making through mission command and net-enabled situational awareness to well-trained and experienced junior leaders—directly engaged in action—will allow the land commander to speed up or slow down the tempo of operational decision making and produce a combination of effects that present the adversary with a rapidly deteriorating, cascading situation, thereby disrupting his decision cycle. This will in turn disrupt the adversary's cohesion, enabling the land force to develop and conduct actions faster than the adversary can react, while retaining the ability to react to changes in the adversary's actions faster than he can exploit those changes.

Dispersion in Relation to Time

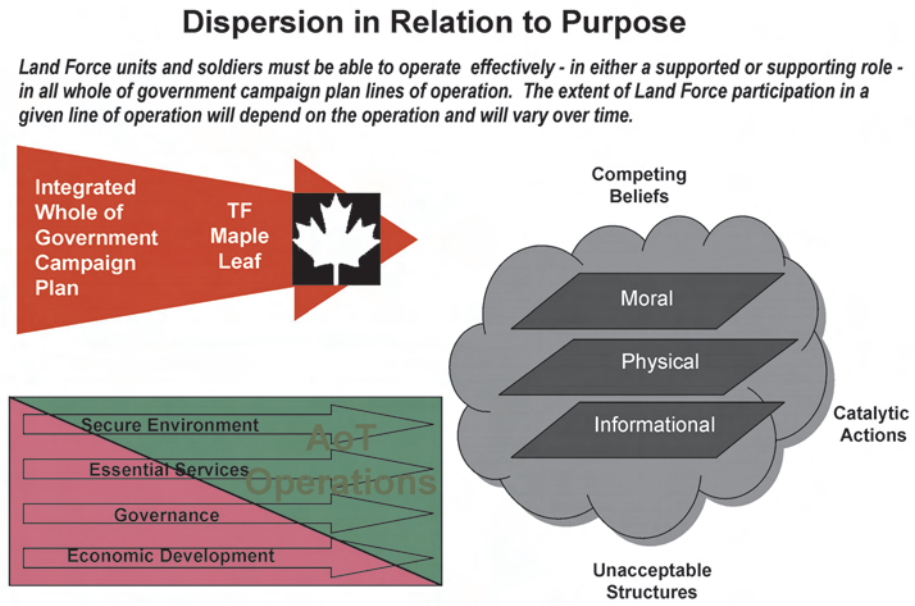
Decentralized tactical decision making to well-trained and experienced leaders directly engaged in operations will allow us to control the tempo of tactical decision making. This will, in turn, allow us to disrupt the adversary's decision cycle at times and places of our choosing.



Dispersion in Space—The ability to employ multiple forms of manoeuvre and to create effects from net-enabled and integrated forces, alternatively dispersing and aggregating over extended distances, will present the adversary with a complex and unpredictable array of actions over the entire battlespace, thereby increasing his sense of confusion.



Dispersion in Purpose—Given the complex and multidimensional nature of the future security environment, land forces will be required to undertake operations along a continuum that encompasses offensive, defensive and stability actions across the full spectrum of conflict from peacetime military engagement to major combat operations.



Land forces will often be simultaneously engaged in a range of offensive, defensive and stability activities across the full spectrum of operations. The ability to undertake simultaneous full spectrum actions, including combat operations, in order to establish a stable and secure environment, provision of essential services to persons in need, support to the legitimate governing authority and support to the economic development of the operating area will assist in achieving the desired effect on the structures, actions

and beliefs resident within the conflict. Land forces must therefore be able to operate effectively—in either a supported or supporting role—in all whole of government campaign plan lines of operation. The extent of land force participation in a given line of operation will depend on the operation and will vary over time.

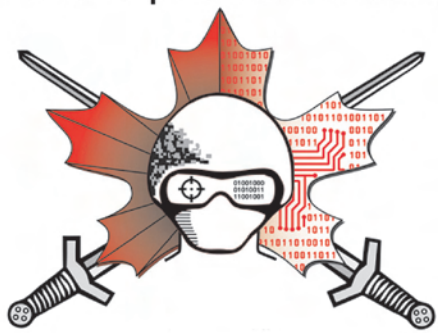
Adaptive dispersed operations are grounded in manoeuvre warfare theory and an effects-based approach, in that they are undertaken to create enhanced positional, psychological and temporal advantages over the adversary, vice attrition, and in that they employ a synergistic application of capabilities to produce cascading and cumulative effects to achieve a desired outcome. The ability to disperse land forces across the battlespace will enable the commander to expand his area of influence through the enhanced ability to collect information while also allowing him to find, fix and strike lucrative targets. Land forces dispersing and aggregating as required will also enable the commander to effectively identify and dominate decisive points. Decentralized decision making through common situational awareness and junior leaders empowered to make quick decisions based on commander's intent will enable the commander to create and exploit opportunities while simultaneously creating dilemmas for the adversary. By controlling the tempo of operations through decentralized execution, the land commander can disrupt the adversary's decision cycle and cohesion. The ability to psychologically dislocate the adversary by continually disrupting his decision cycle will, in turn, create opportunities for the land commander to impose his will at the time and the place of his choosing.

Dispersed operations undertaken by geographically dispersed teams will enable the land force to dominate a much larger battlespace and develop a better understanding of that battlespace through information provided by dispersed teams and sensors. Moreover, dispersed teams—empowered to take the appropriate action in a timely manner—provide an effective means of engaging local civilian authorities and interagency representatives involved in the whole of government campaign plan.

While dispersion provides many significant advantages, dispersed forces may not be appropriate for every situation the land force will encounter. Consequently, the dispersed force must be capable of rapid aggregation in order to conduct operations as a larger aggregated force. The constantly changing nature of the battlespace necessitates adaptive forces equally capable of operating in a dispersed or aggregated posture. In situations where the adversary can locally mass more combat power than the dispersed force, for example, the potential threat to a dispersed force will exceed the potential gain and the force would operate aggregated. Given the inherent risks of operating in a dispersed posture, a dispersed element should overmatch the adversary it is likely to encounter in terms of firepower, mobility, protection, information, and leadership. For example, in situations where local overmatch is unlikely at the team or section level, dispersion should be limited to the platoon or company level. As with all operations, a calculated risk assessment will be required before dispersing forces in any given situation. Commanders and staffs will therefore require a comprehensive understanding of dispersed operations and what they can and cannot achieve. Dispersed operations will also require that junior leaders make quick, bold decisions based on the principles of mission command. Commanders at all levels must be confident that their subordinates are capable of understanding their commander's intent and rapidly taking decisive action to achieve the desired end state. While a commander's trust in his subordinates will be partially enabled by his confidence in the training they undertake, it will also require a leadership culture that is conducive to decentralized decision making and collaborative planning.

A key enabler for dispersed operations is the networking of the soldier and junior combat leader. The CF Integrated Soldier System Project aims to deliver a progressively enhanced, integrated soldier system, which will significantly enhance the ability of the Land Force to conduct adaptive dispersed operations.

The Integrated Soldier System Project Enables the Dispersed Soldier and Leader



Two complementary versions of the integrated soldier system are envisioned by the project. The primary assaulter equipment set will enhance soldier capability through the provision of networked situational awareness that—in turn—enables precision navigation, electronic data storage and retrieval, target acquisition, connectivity with other soldiers, leaders, weapons, sensors and vehicles. The commander's equipment set incorporates assaulter capabilities plus additional functionality for interaction and coordination, planning and executing missions, and enhanced connectivity to vehicles and remote sensor platforms.

Advances in military technology, combined with a more complex and expanding battlespace, are contributing to battlefield situations in which small, dispersed teams have the situational awareness and ability to create decisive effects such that these teams can achieve decisive outcomes. Adaptive dispersed operations provide the land commander with enhanced capability to create operational and strategic level effects through the use of dispersed teams able to make rapid decisions in order to achieve the commander's desired end state.

NETWORK

In order to successfully address the wide range of challenges and operations expected of it in the future security environment, the Land Force must be highly adaptive, agile, combat-effective and able to work closely with both domestic security partners and international allies. Network-enabled operations (NEOps) will provide a key means of accomplishing this.

The concept involves the integration of information systems, weapons and other effects-producing platforms in ways that promise substantial gains in the effectiveness of military operations. At its crux lies the idea of networking, and the military advantages that the effective integration of information systems—both technological and human—can produce through the creation and exploitation of information. By linking knowledgeable entities in a battlespace, forces will be more capable of gaining information superiority and ultimately, greater mission effectiveness.

Such networking will extend beyond the Land Force—and will include personnel in the joint, interagency, multinational and public domains as required to effectively address the particular situation at hand. One result will be that Land Force interoperability with

other players—and thus access to the resources and expertise needed to adapt to and effectively address the highly complex challenges posed by the future security environment—will increase markedly.

The effective operation of a network-enabled force rests on four basic tenets:

- a robustly networked force will improve information sharing;
- information sharing will enhance the quality of information and shared situational awareness available;
- shared situational awareness will enable collaboration and self-self-synchronization as well as enhance sustainability and speed of command; and
- these will in turn dramatically increase mission effectiveness.

Properly implemented, network-enabled operations will involve a network of troops and supporting elements on the ground supported by joint sensor, fire support, and command and control systems linked by voice and data to create a level of situational awareness, battlefield mobility and fire support that will combine to overwhelm the adversary's understanding of the battlespace and his ability to react.

Simply put, effects in the battlespace will be better synchronized, speed of command will increase and the lethality, survivability and responsiveness of forces will improve. The result will be a capacity to conduct a more precise, agile style of manoeuvre operations in which land forces will be capable of engaging in near-continuous action. Not only will the capacity to more effectively and efficiently defeat our adversaries increase, but ultimately, our ability to engage in actions capable of breaking an adversary's will while leaving the majority of his forces intact.

In fact, by offering a more efficient means for forces to influence the behaviour of intended targets, a network-enabled force will facilitate an effects-based approach to operations (EBAO), i.e. coordinated sets of actions aimed at shaping the behaviour of intended targets, e.g. friends, allies, neutrals and foes in peace, crisis and war.

The network-enabled Land Force will reflect a range of shifts in the areas of people, processes and technology. Not only will this include a myriad of computer networking and information-sharing technologies and capabilities to facilitate effective storage as well as fast processing and distribution of key information, but personnel possessing a range of well-developed cognitive and behavioural skills. Also prevalent will be organizational procedures and arrangements for ensuring that the information gained through the exploitation of technologies is effectively harnessed to key policy aims and objectives.

Indeed, a network-enabled Land Force will feature:

- widespread and complete adherence to and implementation of a mission command philosophy, i.e. decentralized decision making;
- revised command and control practices and procedures, e.g. changes in accountability and division of responsibilities;
- changes in recruitment standards and in education and training, to better reflect NEOps related skills and requirements; and
- updated data sharing and management practices, that is movement from a "need to know" to a "willingness to share" culture.

As the Land Force will be highly dependant on the network, special efforts must also be made to ensure that it is dependable, secure from physical and cyber attack and that it has built-in redundancies should system elements fail. The Land Force will stress a balanced approach to networking—with emphasis placed on the network's technological and human dimensions. This will involve selecting the right technologies at the right time to complement the ever-crucial human dimension of a network-enabled Land Force.

HUMAN DIMENSION

Tomorrow's soldier is a Canadian citizen who volunteers to serve our nation. This soldier represents the profession of arms through his or her beliefs and expectations about military service, the expression of Canadian military values and by demonstrating the essential attributes of the society the soldier protects. Concepts such as unlimited liability, fighting spirit, teamwork and discipline form the very foundation of beliefs and expectations about military service. The soldier shares Canadian values, expectations and beliefs which include upholding democratic principles, maintaining the peace, ensuring order and good government, protecting people's rights and freedoms, respecting the dignity of all persons and obeying and supporting lawful authority. These expectations and beliefs, combined with the soldier's military values of duty, loyalty, integrity and courage, form the Canadian soldier's military ethos that shapes the professionalism that governs ethical conduct to perform duty with honour. This is a central tenet of Canadian Army culture.

The centre of gravity for tomorrow's soldier is the command environment. Current practices distribute the degree of expertise with rank and command authority. In the future security environment, military operations will exponentially increase in complexity. Its very nature will challenge the profession of arms to maintain its soldiers' leadership capabilities at all levels to achieve success. To meet the demands of full spectrum engagement, the Land Force will produce a soldier with a broader body of knowledge and skills. Tactical competencies and individual and collective war fighting skills that have traditionally defined the soldier as a warrior will be broadened to include the "soldier as a diplomat" and "the soldier as a scholar". The effects-based approach will cause an increase in the scope of responsibilities that will demand a great deal of expertise from soldiers so that they can be placed in positions of trust. To meet the challenges of the future security environment, adaptive dispersed operations will demand some delegation of decisions to lower leadership levels. The capacity for creative thinking and sound ethical judgment will, however, still be required at all levels to achieve success.

Within the CF Capital Equipment Programme, the Land Force has undertaken specific projects in support of the soldier. For example, the Integrated Soldier System Project addresses clothing and equipment requirements to enhance the future soldier's capabilities in the areas of lethality, command, control and communications (C3), survivability, sustainability and mobility. Weapons accessory improvements, terrain visualization, sensors, navigation and way-finding tools, information input and displays, intra-section communications systems and planning and briefing tools promise to help individual soldiers effectively execute the complex tasks they will encounter in the future security environment.

With the exponential growth in technology, the world is on the cusp of an evolution that may see the merging of humans and technology. As cognitive, psychological and physical enhancements become commonplace in society the Land Force will have to manage and adapt to this evolution to maximize soldier performance.

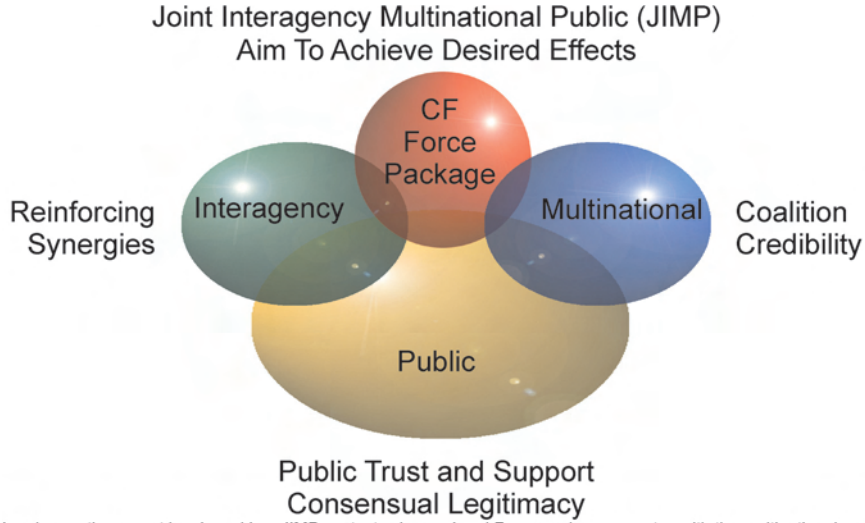
Tomorrow's soldiers will continue to adapt to environmental, physical, intellectual, psychological and social challenges. People have a range of physical and mental

abilities. Not everyone can be a soldier. Tomorrow's soldier must possess the physical competency, i.e. physical fitness and soldier skills; intellectual competency, i.e. planning, reasoning, visualization, and decision making; emotional competency, i.e. resiliency, hardiness and ability to cope with stress; and social competency, i.e. the ability to develop trust, respect and teamwork, to be effective. The Land Force will have a strategic personnel plan to ensure there is a comprehensive "soldier first" approach supported by personnel policies, programmes and practices. In support, a Land Force personnel research programme will monitor Land Force culture to align it with the desired end state. The Land Force will invest in its structural, intellectual and social capital by managing force generation employment and sustainment concepts to support the recruiting, selection, training, development, employment and retention of tomorrow's soldiers.

JIMP-CAPABLE

In the future security environment, military power alone will not fully achieve national objectives. In a world where conflict will continue to involve myriad ethnic, religious, ideological and material drivers, an ability to bring to bear all instruments of both national and coalition power and influence (i.e. diplomatic, economic, military, informational) on a problem in a coordinated, collaborative fashion will be essential to achieving effective results. So too will be an ability to address and if possible effectively engage the views and reactions of the public—both domestic and international—as well as the media—as operations unfold.

Government recognition of the need for such an integrated approach to future operations is strong. Accordingly, the Land Force requires an enhanced ability to operate in harmony with joint, interagency and other multinational partners. It must also take a coordinated approach to operations that recognize the public and media as crucial to the success of future operations. Outward-focused, integrated and multidisciplinary approaches must be the norm to address the complex problems and challenges posed by an increasingly multidimensional security environment.



Land operations must be viewed in a JIMP context, where a Land Force package operates with the multinational and interagency partners to attain unity of purpose and effort in achieving desired effects, all while considering the requirements for public trust and support, both domestically and internationally. Public consent will confer legitimacy to the operation.

The realization of such an approach will be achieved through a framework allowing the effective cooperation and collaboration of key personnel in the following four domains:

- joint—involving other national military elements and support organizations;
- interagency—involving other government departments (OGDs) and agencies (OGAs) both domestic and foreign;
- multinational—involving one or more allies or international coalition partners; and
- public—involving a variety of elements, including domestic and international publics, non-governmental organizations (NGO), public volunteer organizations (PVO), as well as media and commercial organizations (both domestic and foreign).

Adoption and effective application of this JIMP framework will not only enhance the prospects for cooperation and the development of unity of purpose among diverse partners toward desired end states, but will also better ensure an approach to operations in which diverse resources can be more effectively utilized to create intended effects. Indeed, a JIMP approach to operations will involve diplomatic, defence, development and commercial resources, aligned with those of numerous other agencies, coordinated with an integrated campaign plan and applied in areas of operations as needed.

Such a framework will feature:

- a 'team' approach capable of developing an integrated campaign plan in order to realize its operational objectives in full spectrum engagement;
- an ability to immediately plug into joint battlespace operating systems to interoperate effectively;
- the capacity to access key information so as to aid in tasks such as the identification of targets for attack and influence as well as determine JIMP resources required in operations;
- an ability to facilitate the building of interagency and multinational interoperability through collaborative planning mechanisms and protocols;
- an ability to integrate non-governmental agencies within the operational architecture and provide liaison as required to support these agencies in the execution of the mission;
- the ability to provide and implement effective communication with joint and other multinational agencies (including efficient interface between conventional and special forces); and
- an ability to clearly and effectively communicate mission goals, objectives and actions to the public and to members of the media as required.

Realization of a JIMP capable Land Force will be attained through:

- the elaboration and codification of JIMP procedures, protocols, and standards of "best practice;"
- leadership and coordination of the JIMP "team;"
- training and education for working in a JIMP environment;

- increasing capacity for communication and liaison with all JIMP players; and
- the creation of increased capacity to develop effective communication strategies for engaging the public and media as operations unfold.

Beyond this, the human and technological networks that an effective JIMP framework involves will be further developed and elaborated.

TACTICAL DECISIVENESS

COMMAND

Command is defined as the authority vested in an individual for the direction and control of military forces.[3] This involves the exercise and delegation of authority, acceptance of responsibility and a demonstration of leadership and competence. Command is the purposeful exercise of authority over structures, resources, people and activities.[4]

Command is, however, a human endeavour that relies on the attributes of individuals who play a role in the decision process and on the dynamics between commanders and subordinates. The day-to-day practice of command is challenging as it depends on culture, the need to accept risk and perhaps most importantly, on an ability to instil trust. It is the creative expression of human will necessary to accomplish a mission."[5] The human factor is critical, thus the need to focus on ways to better enable the human functions of command. Values, culture and personal attributes all contribute to the effectiveness of a commander.

In order for the Land Force to be successful, its leaders must fully understand the context of the future battlespace and learn to exploit it using all the technological resources available to them. The revolution in information technology, especially as applied to command, will compress time and space in military operations to create an unprecedented non-linear battlespace characterized by increased breadth, depth and height. In essence, the concept of battlespace has permitted a shift away from organizations of linear mass towards a simultaneous and full dimensional concentration of effects.[6]

The Land Force will be command-centric with a clear and unambiguous chain of command from the strategic to the tactical level, with commanders at each level clearly understanding their assigned authorities, responsibilities and accountabilities, thereby avoiding the need to meddle in another (usually subordinate) unit's mission. Command centricity is shaped by the doctrine of mission command, with commanders at every level possessing a comprehensive understanding of their commander's explicit and implicit intent and an overriding operational focus dedicated to the realization of this intent."[7]

Complementing the command-centric approach and mission command will be modifications to the operational planning process—the decision support process employed by the Land Staff—to integrate the results of individual command and staff estimates. Advances in technology and capacities of planning staffs will allow for devolution of planning and decision making to lower levels. Land forces conducting adaptive dispersed operations can expect to undertake campaign design—a plan for a series of related military operations aimed to accomplish a common objective, normally within a given time and space—traditionally the purview of higher-level headquarters. Following this change will be greater devolution of tasks to the sub-unit and sub-sub-unit

3. CFP 300-003, *Command*, Draft 3, 2005, pp. 2-3.
4. Canadian Defence Academy, *Leadership in the Canadian Forces*, 2005, p. 7.
5. Carole McCann and R. A. Pigeau, *Clarifying the Concepts of Control and Command*, Proceedings of the Command and Control Research and Technology Symposium, Newport, RI, 29 June-1 July 1999, p. 5.
6. Directorate of Land Strategic Concepts, *Future Force: Concepts for Future Army Capabilities*, Kingston, Ontario 2003, p. 99.
7. Director Land Concepts and Doctrine, *Capability Development Record—Command*, Draft—23 May 2006, p. 8.

levels. As a result, the structure of formation and battle group headquarters within the brigade group will change to include greater capacity in communications (personnel and infrastructure) enabling collaborative planning with JIMP partners and the capacity to take a lead role in coalition operations.

The future security environment will impose stringent demands on Land Force leaders at all levels. Future command will be characterized by increased operational tempo over extended areas within complex terrain. Technology, while supplying near real time situational awareness, will also demand faster decision cycles with decisions devolved to the lowest level, allowing commanders on the spot to capitalize on opportunities. At the same time, commanders at each level must resist the temptation to meddle in the actions of subordinate units, relying instead on the doctrine of mission command to ensure successful realization of intent. The Land Force will continue to emphasize the human nature of command whereby a command-centric approach shaped by mission command will lead to decisive action and the desired end state.

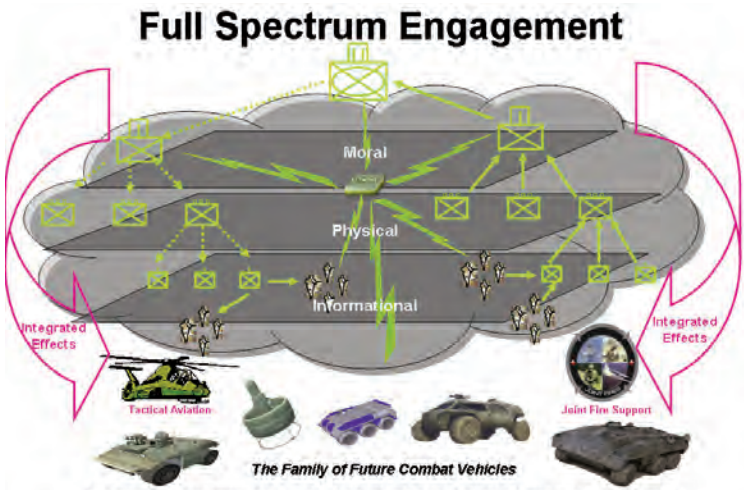
FULL SPECTRUM ENGAGEMENT

Adaptive dispersed operations requires movement and the creation of effects across the moral, physical, and informational planes of the conflict in order to position land forces at decisive points to dislocate or disrupt the adversary. As such, full spectrum engagement necessitates mobile forces capable of dispersing rapidly to achieve positional advantage over the adversary and aggregating quickly to enhance force protection throughout the multidimensional battlespace. Full spectrum engagement includes the following elements:

- operational manoeuvre to place land forces and resources at the critical place and time necessary to achieve positional advantage;

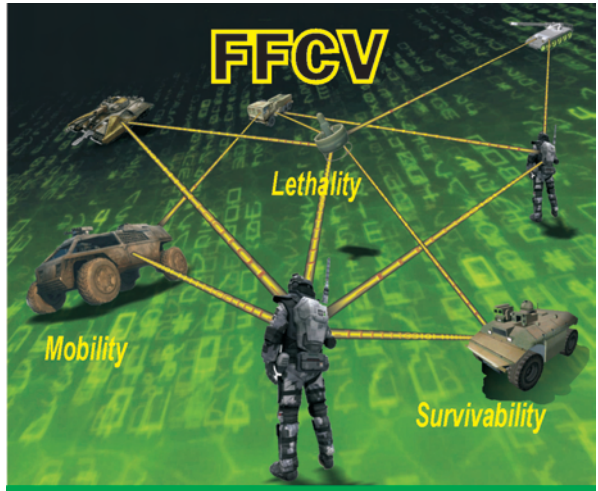
- tactical manoeuvre to position land forces to employ tactical capabilities to the best effect (tactical manoeuvre keeps the adversary off balance by confronting him with continually changing problems and by eliminating his options); and

- close engagement to defeat enemy forces, seize or retain advantageous positions and create appropriate effects anywhere in the multidimensional battlespace.



Full spectrum engagement (FSE) enables land commanders to position forces at decisive points to dislocate or disrupt the adversary. FSE is enabled, in turn, by the networked soldier, the family of future combat vehicles and integrated effects.

Key enablers for full spectrum engagement include the networked soldier, the Integrated Soldier System Project, integrated effects and the future family of combat vehicles.



The Family of Future Combat Vehicles

An integrated modular family of advanced technology medium and light vehicles - including unmanned ground and air vehicles - that enable full spectrum engagement across the five operational functions. The FFCV is integral to networking the soldier with the sensor and situational awareness; LOS, NLOS and BLOS fire support; and command and control systems operating within the future security environment.

INTEGRATED EFFECTS

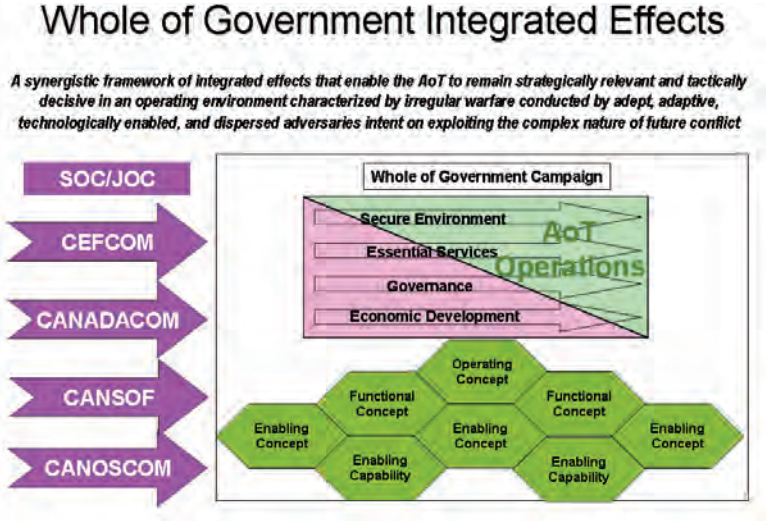
The Land Operations 2021 operating environment is characterized by complex, multidimensional conflict and irregular warfare conducted by adept, adaptive, technologically enabled and dispersed adversaries intent on exploiting the complex nature of conflict. In addition to a clear understanding of the multidimensional nature of conflict in this operating environment, effective conflict intervention requires the integrated creation of multidimensional effects spanning the strategic to the tactical.

Strategic integration of effects is provided through a whole of government (defence, diplomacy, economic, judiciary, police, agricultural, and environmental development, etc.) approach aimed at addressing the actions, structures and beliefs resident in a conflict. In order to create whole of government integrated effects, Land Force commanders and soldiers must be able to operate effectively—in either a supported or supporting role—in establishing stable and secure environments, providing essential services to the local population, promoting good governance by local authorities, and contributing to the economic development of the region. Consequently, the Land Force will require the right mix of military capability to ensure it can carry out all potential tasks related to defence, diplomacy and development. These tasks will require mastery of a wide variety of soldier skills including negotiation, compromise, cultural sensitivity and combat.

In addition to supporting the strategic integration of effects through participation in the whole of government campaign plan, land forces will be central to the integration of

effects at the operational level through the sharing of information and capability as a member of a fully integrated joint and coalition force. The overall goal is focused effects; the ability to deploy the right mix of forces at the right place, at the right time, producing the right result. The Land Force supports the operational integration of effects through the fielding of units and soldiers fully capable of operating within a standing contingency or mission specific task force in cooperation with special operations forces and effectively employing all available joint and coalition assets.

Through adaptive dispersed operations, land forces will operate tactically within an integrated framework and produce synergistic effects that will provide the mobility, situational awareness and access to military capability necessary to achieve favourable strategic and operational outcomes through tactical actions within the future security environment.



Key elements of these integrated effects:

♦ Adaptable tactical forces dispersed across the entire battlespace in order to create and exploit opportunities, control the tempo of operations and overwhelm the adversary's understanding of the battlespace.

♦ The ability to conduct coordinated, interdependent, full spectrum manoeuvre by widely dispersed teams throughout the width and depth of the battlespace; ordered and connected within an operational design created to achieve a desired end state.

♦ A robust and resilient network that encompasses a common operating picture capable of producing a level of situational awareness that fosters initiative, collaboration, and lateral coordination by dispersed leaders along with information management procedures and technologies capable of filtering, processing and analyzing the increased volume of data produced by dispersed elements.

♦ Networked land, air, and/or sea-based sensor, weapon and command and control (C2) systems that combine to provide the dispersed force with a mix of lethal and non-lethal area and precision options for engaging the adversary. Networked and integrated joint effects provide the dispersed team a degree of mutual support formerly provided by the friendly unit on the immediate flank. As such, the underlying joint fires capability requirement is the synchronization of integrated joint resources to create the desired

effect on multiple targets under a wide range of limiting operational conditions. These resources include lethal and non-lethal weapons, sensors, communications, C2, targeting and battle damage assessment systems.

SUSTAINMENT

The requirement to support dispersed elements will demand a highly integrated, adaptive and flexible sustainment system. As a force becomes more dispersed, the sustainment system must transition from a ground-based sustainment system to an air-based one, although there will likely be both ground and air-based sustainment activity throughout any given operation. Reliance on ground sustainment will restrict operations when dispersion goes below company level. The key to the sustainment of the Land Force in operations is the reintroduction of a robust echelon system down to the sub-unit level.

Airframes must be dedicated to both sustainment and medical evacuation. Evacuation particularly will depend on availability of airframes. Current concepts of double-tasking airframes will result in the failure of the sustainment system to support adaptive dispersed operations.

Combat skills and equipment will also be a priority for the sustainment system, as the adversary will continue to attack the 'soft' targets rather than attack our strength. Combat service support (CSS) platforms must be hardened and armed appropriately for the theatre of operations. A widely dispersed force will require that CSS elements are self-protecting throughout the area of operations.

Also critical to an adaptive and flexible sustainment system is a fully networked asset tracking and in-transit visibility capability. Only through the capability of tracking the location of all sustainment activity can the system truly support widely dispersed forces. It will also allow for a reduced logistics burden in terms of daily operational supply and forward stock holdings as there will be real-time total-asset visibility, which will allow better risk management of supply levels. This capability is critical to the efficient and effective use of resources supporting dispersed troops. Complete digitization of the force not only supports asset-tracking requirements but may also reduce maintenance demands through automatic failure reporting by built-in sensors in equipment. Networked sustainment planning tools are essential for a focused logistics capability.

Advances in technology such as robotic platforms and precision airdrop must be leveraged to reduce the strain on the sustainment system for dispersed operations. Robotic platforms could be used to carry or deliver supplies for small teams, while precision air delivery could support teams in less accessible locations. Other advances in portable power generation and water purification, as well as reductions in ammunition and fuel expenditures and maintenance requirements brought about by advanced technology, have the potential to significantly reduce the demands on the sustainment system.

AGILITY

In the future security environment, agility—a combination of robustness, resilience, responsiveness, flexibility, innovation and adaptation—will encompass strategic, operational, tactical and human facets. The Land Force will require a degree of agility that will permit the rapid projection of increasingly modular and mission-tailored forces capable of regrouping and re-tasking across the full spectrum of conflict.

Improvements in the network, mobility, force protection and integrated effects will

enable modular forces to find, fix and strike the adversary while conducting simultaneous operations throughout the depth of the battlespace. Land forces dispersed throughout this battlespace will act in concert to multiply the effects to be created in a given time and space, while their geographic dispersion will reduce their vulnerability to hostile action. A critical aspect of Land Force adaptability will be the capacity to conduct different types of operations (i.e. offensive, defensive and stability) simultaneously and to transition rapidly between them. The quality of sensors, the efficiency of the "kill chain", shielding capacity and platform capabilities will drive tactical and operational agility.

The Land Force must have the ability to generate modular forces that are interoperable and full-spectrum capable. Modularity requires a force structure that can generate units with capabilities tailored for a specific operation—offensive, defensive or stability. Therefore, a fluid force structure that permits a grouping of personnel across a broad spectrum of military competencies is required. At the same time, modularity must enhance task and social cohesion, discipline and the mastery of tasks that are expected to become more complex in the future.

To support future operations, rapid force projection capabilities such as fast shipping and strategic airlift will be required. The Land Force must also be capable of intra-theatre manoeuvre permitting rapid concentration of force in order to create a decisive effect. It will be necessary to protect lines of communication throughout the complex, non-contiguous battlespace. More capable, responsive and rapid force projection and intra-theatre lift capabilities will be required.

An adaptive human mind is fundamental to agility. This capability will have to be developed by training land commanders, staffs and personnel for demanding and complex operations. Sound preparation is thus essential to develop and then maintain the confidence that forms the basis for agility within a coalition context.

Sustainment of forces in the future security environment will place extreme demands upon combat service support units and elements. Adaptive dispersed operations will require a highly flexible and adaptive sustainment system capable of regrouping while sustainment activity is in progress with no break in battle rhythm. The sustainment system must be integrated at all levels and functions, including combat operations. Thus, in the ADO environment, CSS units will be trained and equipped to fight and survive in a non-contiguous area of operations.

The embodiment of agility is realized through the concept of tactical self-sufficiency—inherent flexibility allowing adaptation to a diverse set of tasks within complex terrain or a large, open area of operations. Within the formation, the battle group will embody all five operational functions allowing for the conduct of a wide range of tasks across the spectrum of conflict. Rapidly deployable all-arms manoeuvre units will be capable of independent action or of being "plugged-in" to a larger coalition, whether domestic or international.

It is imperative that the Land Force retains the ability to deal with the principle characteristics of the future security environment, i.e. rapid change, uncertainty and complexity. Agility, as expressed through tactical self-sufficiency, will allow commanders to conduct simultaneous operations while retaining the ability to respond to emerging crises. Agility is key to seizing the initiative across a range of military operations ensuring that the Land Force can act swiftly and decisively across the full spectrum of conflict in the future security environment.

OMNI-DIMENSIONAL SHIELD

An assessment of the future security environment suggests that future adversaries and the strategies, tactics and capabilities they employ against our forces may be

diverse and wide-ranging. Opposition to our mission can come from traditional threats, as well as environmental and occupational hazards. Ensuring mission success in the face of these threats will be challenging. The response to these threats is encapsulated in the concept of omni-dimensional shield.

Omni-dimensional shield is a concept that applies at all levels in the military and addresses the need to protect forces in the conduct of their mission. Omni-dimensional shield, an enabling concept, is complementary to the Land Force operational function—shield, which is "a layered, integrated and fully dimensional operational function that seeks to prevent any influence on friendly forces across the physical, moral, and informational planes that could affect survivability or freedom of action." Omni-dimensional shield is also complementary to the CF doctrinal concept of force protection, defined as "being comprised of all measures taken to contribute to mission success by preserving freedom of action and operational effectiveness through managing risk and minimizing vulnerabilities to personnel, information, materiel, facilities and activities from all threats."

While the levels of protection provided to friendly forces as a result of omni-dimensional shield will assist commanders in achieving mission success, there will always be vulnerabilities that an adversary will attempt to exploit. Risk management will be a key aspect of the planning and conduct of missions and will assist commanders and staff in reducing the likelihood of an adversary precipitating our mission failure. Nonetheless, a military force cannot be shielded perfectly. Losses may occur, and the shielding process will remain an iterative one.

While shielding the force will remain an all arms responsibility, specialist roles will still be required, most notably, combat engineers, ground-based air defence, military police and chemical, biological, radiological or nuclear defence. Future developments in the specialist realm will include mobile (manned and unmanned) standoff detection and engagement technologies. Future developments in the non-specialist realm will include mounted and networked sensor suites on a broad range of in-service platforms. The increased likelihood of conflict in urban areas will demand a focus on industrial hazards such as toxic industrial chemicals and other materials.

The network is central to the Land Operations 2021 concepts. Because the network is a catalyst for tremendous improvements in military power, it is also likely that the network itself will come under increasing levels of attack. For this reason, protection of the network from physical and informational attack will be crucial.

Additionally, the requirement for the Land Force to function effectively in a JIMP environment will place additional shield demands on the force. The coordination of shield effects in a JIMP environment will prove particularly challenging when working with groups that do not share the Canadian military ethos or values and who may be operating under different rules of engagement (ROE) or different interpretations of ROE.

The minimum, initial and ultimate focus of omni-dimensional shield will be the soldier engaged in operations. The physical plane of shield will focus on the traditional defensive concepts to include the protection of soldiers and non-combatants, platforms and systems, and sustainment assets. The information plane will focus on the protection of friendly information and the information products of the entire range of command, control, communications, computers, intelligence, surveillance and reconnaissance processes. The moral plane of shield will address the protection of morale and well being, with a particular focus on the maintenance of a sense of mission legitimacy, as well as coalition integrity.

TOWARDS THE FUTURE

KNOWLEDGE

To successfully conduct adaptive dispersed operations within the future security environment, land forces must be capable of developing situational awareness (SA) out of contact. However, it is likely that many of our future adversaries will seek to use complex urban terrain to reduce the effectiveness of long-range technical sensors. This will in many respects perpetuate the "fog of war" at the tactical level and require our land forces to continue to conduct close engagement. The relative reduction of long-range sensor effectiveness will also require our land forces to leverage non-technical collection methods, such as human intelligence (HUMINT), in addition to a full range of technical sensors, to bring adversaries above the detection threshold prior to engagement.

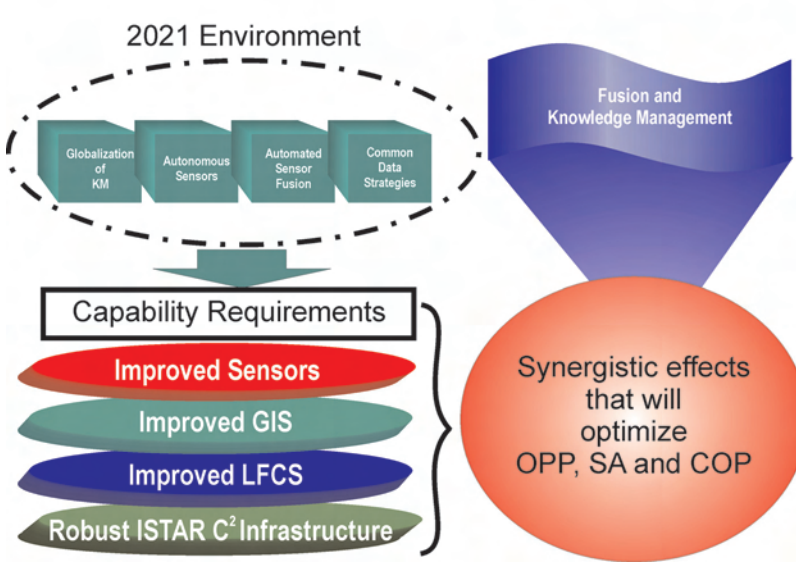
Trends indicate that between now and 2021, the CF will acquire numerous sensor capabilities to address this requirement at various levels of command. There will be new requirements regarding the type and quality of SA at all levels of command. Specifically, there will be an evolving sense of SA transparency, with users less involved in the technical aspects of managing SA and yet with more access to relevant information due to the networking of information systems. Networking will enable SA transparency to develop laterally at the peer level and vertically throughout levels of command. This transparency will become increasingly apparent with the introduction of better communications systems, new approaches to knowledge management, automated information fusion, autonomous sensor systems and robotics.

The foundation of sensor fusion and knowledge management will be the processing of information from myriad sources into knowledge, understanding and effective support to decision makers. Beyond stove-piped friendly (blue), adversary (red), and environmental (brown) SA, the network will support the creation of an integrated knowledge base. This knowledge base will in turn facilitate environmental systems analysis with a view to determining root causes of conflict and subsequently inform campaign plan lines of operations and the effects-based approach to operations. Knowledge management consists of the deductive reasoning and processes that provide the impetus for information collection and the SA produced to meet the requirements of decision makers. An integrated, systematic approach to knowledge management will enable the right type of sensor capabilities, be they technical or non-technical, military or non-military, to be employed to collect the right type of data that will meet the requirements of decision makers, whether it involves sensors related to critical sensor-shooter links or those sense systems that may support broader effects-based approaches.

One of the major challenges will be to standardize knowledge management requirements within a JIMP environment; primarily the identification of required information, the planning and coordination of data acquisition strategies, and the timely distribution and sharing of knowledge management products to create an overall holistic effect. Above all, successful knowledge management will allow flexibility in operational tempo and enhance the battle rhythm of key decision makers.

One aspect of knowledge management is support to collaborative planning. The ability to conduct collaborative planning at all levels of command is essential and it is important to note that future technological capabilities must be designed to support

planning and decision making, not replace them. Synergy in collaborative planning can be achieved through the employment of high-speed communications, standardized joint digital map data, standardized information fusion capabilities and comprehensive, networked, analytical capabilities to enable rapid analysis, scenario prototyping, war-gaming and mission rehearsal.



Another aspect of knowledge management is sensor mission tasking, coordination and re-tasking. In order to enable decision makers to share their vision, guidance and critical information requirements, knowledge management first of all ensures that the right sensors are deployed at the right time to gather the right data for the knowledge base. The tracking of taskings, data and the ensuing reports falls within the purview of collection coordination intelligence requirements management (CCIRM). The planning, tasking and coordination of sensor systems is the responsibility of intelligence surveillance and reconnaissance (ISR). The successful management of CCIRM/ISR will result in a collective, holistic effect being achieved amongst sensor systems, thereby enhancing battle rhythm flexibility and economy of effort. It will be important to effectively exploit myriad sensor systems in a JIMP environment, thereby requiring a robust CCIRM/ISR management capability complete with good communications to JIMP contributors.

Knowledge management would not be complete without the processing of the data collected from sensors and the analysis and fusion of the results into knowledge that is then distributed in a timely manner as situational awareness. Effective processing and handling of the sensor data that JIMP partners provide will be one of the greatest challenges in the future security environment. Automated sensor fusion may be a key enabler in a JIMP environment; however, common data strategies have to be achieved in order for this to happen. Generally, automated sensor fusion involves the processes whereby data from sensors is automatically incorporated with other sensor data and fused to become knowledge and understanding.

Once common data strategies have been achieved amongst JIMP sensor contributors, successful automated sensor fusion will comprise a core capability, enabling the rapid classification, correlation and aggregation of sensor data within the knowledge base. The resultant situational awareness will allow the full understanding and subsequent exploitation of all facets of the physical, moral, and informational planes of the operational environment and their potential effects throughout a given mission as it evolves. Successful automated sensor fusion will be transparent to all users. Its greatest effect will be to enable decision makers to rapidly develop and share their vision, guidance and critical information requirements; however, this will only work if the knowledge and understanding are filtered and managed to separate important knowledge from the rest, and the relative infrastructure and processes developed in tune to the battle rhythm of the decision makers. If not, then key decision makers could be overwhelmed with irrelevant knowledge at critical points in decision making.

TECHNOLOGY

History is replete with examples revealing that military technological superiority is a tenuous state. Challengers will always find a way to copy or adapt low-cost mass produced technology and employ new tactics that will offset any disadvantage in military capability. For example, Al Qaeda has adopted readily available 21st century technology—the Internet (for global collaboration), digital cameras (for information gathering), cell phones (for tactical communications), and satellite television (for global information warfare)—to facilitate their global insurgency. Combined with largely unsophisticated improvised explosive devices, this insurgency has proven remarkably resilient in the face of far superior military capabilities.

To many, technology is a sign of progress. Others see the proliferation of 21st century technologies as a source of societal destabilization, depriving people of dignity and autonomy. The reality is that technology raises important questions about the balance between promise and peril—with the same knowledge and tools often capable of being readily adapted for either benevolent or malicious purposes. The shift of the sources of advanced technology from primarily military and government to commercial and public, due in part to the globalization of science and technology, is contributing to the exponentially accelerating pace of technological development, which in turn threatens this precarious balance. Confounding this situation is the often unexpected and non-linear nature of scientific and technological advance—making the degree and implications of technological convergence difficult to predict. These developments are often disruptive, provoking revolutionary changes in how humans adapt, manipulate and control their environments. In this context the experience with and impact of the Internet in the course of only ten years is both characteristic and informative.

While the continuing development and expansion of the Internet characterizes and defines the 21st century information age; from a military capability perspective, the basic tools of warfare remain remarkably similar to their industrial age predecessors—tanks, trucks, planes, ships, missiles and assault rifles, for example. Though the integration of 21st century information technology into these systems is notable, their basic physical performance characteristics are only marginally better than those of their cold war predecessors. Indeed, propulsion systems and other mechanical components that define their physical performance characteristics are progressing at much slower rates than information technology or its uptake. It is only through the integration of information

technology, however (which enables rapid computation, simulation, situational awareness, targeting, surveillance and precision), that these legacy systems have remained effective in the information age.

Unlike the industrial age vehicles in which they are integrated, computers and associated digital communications (collectively referred to as information technologies) are experiencing exponential improvement in performance and capacity. As a result, the critical components of information age warfare are fast outpacing the capabilities of their host industrial age infrastructure. Despite the integration of information age technologies, the Land Force continues to be structured around medium-weight forces complemented by light forces capable of foot, light vehicle, and aircraft movement. From a capability development perspective, this is prudent given the proliferation and distribution of weaponry across the globe.

It is likely, however, that as information technologies continue to undergo exponential performance growth and thorough integration across all aspects of society, warfare will gradually shift from the physical domain to the informational and moral. For example, imagine the damage adversaries could inflict by immobilizing critical components of civilian or military computer networks for extended periods using nothing more than focused computer network attacks. Within this context, crashing stock markets and global trade disruptions are as possible as the ability to disrupt advanced network-enabled weapons systems. When this shift will occur is not certain; however, an agile and adaptable force and force structure will facilitate the transition needed while mitigating the risks inherent in this transition period.

Central to the adaptive dispersed operations concept is the network, leading to an ability to conduct network-enabled operations, which facilitates effects-based outcomes. The performance of networking, which is increasingly dependent on information technologies, is on a development path defined by exponential growth—often associated with Moore's Law. As a result, individual components are experiencing a doubling in performance at least every two years. Information technologies therefore promise to continue to radically change warfare, thus doctrine will need to keep pace if the benefits of such exponential growth are to be realized. The adaptive dispersed operations concept embodied in this force employment concept is a step in this direction.

The adaptive dispersed operations concept represents a complex system—comprising the integration of personnel, technologies and processes. Unless ameliorated, institutional inertia and resource availability will undoubtedly constrain the realization of this complex system. Although the adaptive dispersed operations concept will include many technologies that are undergoing exponential growth, implementation will inevitably be incremental. Still, a comparison of recent global technological advance for equally complex systems suggests that a doubling in ADO system level performance every 10 years is reasonably achievable. Thus, system performance will be two and four times that of 2005 levels by 2021 and 2031 respectively.

At the same time however, some niche areas are experiencing double and even triple digit growth rates. Without careful monitoring, given the pace of change, technological surprise is likely. Along with information technologies, novel technology areas based on nanotechnologies, biotechnologies and cognitive sciences (sometimes referred to collectively as NBIC technologies) are all experiencing exponential growth. The inherent underlying power of these technologies is their potential for convergence—

since they all deal with matter and materials at the nano-scale—leading to previously unimaginable capabilities at the macro-scale. Thus they have the potential to spawn new technical revolutions. The potential destructive capacity of such technology convergence promises to provide smaller states and non-state actors with previously unimaginable disruptive power—centered on narrow niche areas.

Preparing for future risks of radically disruptive adversarial capabilities brought about by NBIC convergence (or other technological developments) therefore must be balanced against the demands for ongoing support to current operations. Excessive focus on present problems risks a myopic treatment of evolving threats and ultimately contributes to conservative capability development and incremental change. In an era of exponential growth trends, incremental change is a clear path to irrelevance. Capability development must therefore be innovative.

Prudent military capability development will continue to require coverage of a broad spectrum of technical capabilities. Since this approach allows adversaries to target niche capabilities that provide them with superior abilities in a few narrow areas, a key characteristic for Land Force success is adaptability. While tactical and operational adaptability and agility, as defined within Land Operations 2021, remains an essential ingredient for success, equally important will be strategic institutional adaptability and agility. This will be realized through a culture of innovation and the early and rapid evaluation and integration of PRICIE[8] components for each new evolving concept. More important still is a streamlined procurement process that fields equipment projects within several years, as opposed to decades.

Just as adversaries have adapted to western military superiority by seeking asymmetric advantage, the Land Force must continue to adjust to the realities of information age technological proliferation. This force employment concept is underpinned by technology and the idea that there is an intimate technological balance needed between firepower, mobility and protection, all of which are interdependent on a robust and adaptable network. Therefore, technology will continue to be a fundamental enabler, allowing soldiers to be effective in the evolving security environment. However, technology's impact will depend on the manner in which it is used and by the quality and skills of the people using it.

Proactive, visionary capability development is therefore required. Institutional inertia and resource constraints will in all likelihood prevent the development of a full complement of capabilities that exceeds those of well-funded adversaries, intent on focusing only on a few niche areas. Capability developers must remain aware of technological trends across the spectrum, in particular those that are likely to lead to disruptions. The need for adaptability and agility will be paramount in this era of change; however, this environment of near continuous change will place great stress on the human resources of the Land Force—requiring careful consideration and management of the human dimension if indeed the potential for technological progress is to be realized.

8. PRICIE is a military administrative term in which each letter stands for a word or phrase: P = Personnel (including Individual Training and Leadership); R = R&D/OR; I = Infrastructure and organization; C = Concepts, doctrine and collective training; I = Information management; E = Equipment and material.

CONCLUSION

THE NEXT STEPS

This force employment concept serves not as the end but rather the start point for further debate, design, and development of the Army of Tomorrow. Adaptive dispersed operations (ADO) will enhance soldier capability as the development of the network evolves and allow capital programs to be developed in concert with ADO concepts. It will demand greater reliance on integrated effects (not only within the CF but the whole of Government), but will also result in a balanced force that has enhanced precision and lethality while being able to fully protect itself. To do this also requires mass. The Army must have enough soldiers to do the job. Technology may enhance a soldier's capability but it cannot replace him or her in the battlespace. Our soldiers remain and will remain our greatest asset.

A number of issues now demand wide discussion and further development through the Land Force's many forums.[9] What will be the degree of dispersion and what is the limit of dispersed sustainment? Will the Land Force employ joint fire support or will it seek integral fire support capabilities, and what technologies will evolve to help decide this? What sort of network architectures does the Army need, and how will networking and collaborative planning take place? How will it affect command and control? What should the battle group look like—what is its structure and capabilities? How do our land forces remain tactically self-sufficient and where and how do they connect into larger formations and JIMP actors and organizations?

To meet these challenges a number of immediate investments have been recommended. Networking capabilities will evolve through the ongoing Integrated Soldier Systems Project. A future family of combat vehicles (FFCV) is needed to establish battle group capabilities, structures, sustainment requirements, and limitations. Further investment in the human dimension—i.e. the soldier—is a must. This force employment concept must receive widest possible distribution and debate so that it assists in developing an ADO mindset across the army. Finally immediate investments in leveraging integrated effects such as joint fire support will contribute to a joint-oriented Land Force within a future joint CF.

FUTURE ARMY 2040

Historically, the conceptual development and doctrinal design of future forces in the Canadian Army usually occurred as a response to immediate threats to the collective defence of Canada and its allies. Since the end of the Cold War, however, not only have immediate threats been a concern for the Land Force, but also those threats that may appear from anywhere just over the horizon. The Army of Tomorrow presents a force employment concept for facing those threats and for taking advantage of those capabilities that will very likely soon be within our collective reach. The adaptive dispersed operations concept will guide the Army of Tomorrow through the next decade and perhaps beyond. Nevertheless, even as we transition to this concept, the Land Force must continue to look beyond the next tactical bound and mitigate as much as possible the risks and challenges looming ahead.

9. Discussion is encouraged in *The Canadian Army Journal* at www.army.forces.gc.ca/caj/

To this end, further analysis of military, physical, legal, social, political and scientific and technological trends will be undertaken to investigate the requirements for the Future Army. Such study will attempt to highlight those areas that signal the greatest prospects for Land Force development in the 2040 time frame and thereby encourage debate and inquiry on how we may best transition to an effective force for the future.

CONTRIBUTORS

No project of this magnitude can be the effort of a single person. Since the beginning of the Army of Tomorrow project in mid-2004 that led to this force employment concept over a hundred soldiers of all ranks from private to general have participated in some way. As well, many of these men and women had just returned from or were preparing for operations overseas. Others still represented all branches of the Army and were involved in a number of critical projects across the entire spectrum of the Land Force. Combined with modern networking ability in the information age, it was perhaps the first time that such wide-ranging experience was available to contribute directly to Land Force capability development.

Leading the effort on Land Operations 2021 was a core team located at the Directorate of Land Concepts and Design under the Director General of Land Capability Development. This group was responsible for the initial conceptual design, which included the completion of a future security environment analysis for land operations in the 2015-2025 timeframe as well as the evolution of the adaptive dispersed operations (ADO) concept. The members of this core study and capability development group were:

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