

CAN THE ART OF WARFARE BE SYSTEMATISED?

AKI-MAURI HUHTINEN AND PASI KESSELI

AUTHORS ARE PROFESSORS AT NATIONAL DEFENCE COLLEGE, FINLAND

Abstract

The modern era, the Enlightenment and national states changed the art of warfare. The notion of moving from a God-centred worldview to one centred on man loomed in the background, and it was imagined that humanism, as a part of the scientific revolution, would replace the barbarity of the past. By the beginning of the 20th century, man-made technology was lifted off the surface of the Earth, enabling airborne surveillance and control of the world. In military science, the corresponding development is known as Douhetism. Today, however, we have come to see that the fundamental challenges of both civilian life and military action cannot be solved by striking quickly and from high up and afar.

According to Kellner (2008, 63), the youth of the new millenium are the first generation to live the themes of postmodern theory. Entropy, chaos, indeterminacy, contingency, simulation, and hyper reality are not just concepts they might encounter in a seminar, but forces that constitute the very texture of their experience, as they deal with corporate downsizing and the disappearance of good jobs, economic recession, information and media overload, the demands of a high-tech computer society, crime and violence, identity crises, terrorism, war, and increasingly unpredictable future. For the youth, contemporary life is a wild and dangerous ride, a rapid roller coaster of thrills and spills plunging into the unknown.

Evolution or revolution?

In a collection of articles entitled *Paths of Heaven: The Evolution of Air Power*, published by the United States Air Force Academy, Air Force Colonel Phillip S. Meilinger argues that the art of warfare was revolutionised by the introduction of military aviation. His statement can be accepted to some extent: introduction of aerial weaponry certainly turned the formerly two-dimensional battlefield into a three-dimensional one, and the possibilities of deploying firepower and intelligence were changed dramatically by aerial weapons that were faster, more powerful and able to reach further than their counterparts on land or at sea. Air power changed military doctrines and the models of leadership and organisation as well as training and administration.

Over time, however, the doctrines, organisations and ways of operating have been reshaped by other new technical applications and novel principles of operation as well. Jeffrey Archer, an American military researcher, divides the art of warfare into four fields of operation: light infantry, heavy infantry, light cavalry and heavy cavalry. The main body of this fourfold model is light infantry, today represented by

ordinary infantry. Heavy infantry, constituted by mechanised troops, forms a part of the main body's strike force, while the tasks of the light infantry were reconnaissance, protection and reserve activities. On today's battlefields, these tasks are performed by mechanised troops and helicopters. Heavy cavalry represented pure strike force: the elements of today's strike force are artillery and the air force. Summa summarum: from the perspective of the art of warfare, the use of aerial weapons is a combination of firepower and movement. Can we therefore speak of a revolutionary development in the art of warfare, or should it rather be called a military-technical revolution? Or is it just a question of using existing military technology more effectively? The use of the aerial weapon, or any other weapon, has not restored to the battlefield the almost optimal combination of firepower and movement represented by the heavy infantry of the Roman legions with their *pilum* spears. While the short spear was flying toward its target, the infantry would advance in order to storm the enemy, which was seeking shelter from the rain of spears.

After the Second World War, aerial warfare has more or less dominated the combat zone, and since the late 1970s, the theory of aerial warfare has also started to exert an increasing influence on ground warfare. The Korean War was fought using the principles and the equipment of the Second World War. After that, the age of the nuclear weapon dawned. Aerial weapons held the central role in nuclear warfare, while the development of ground warfare was placed on the back burner because nuclear weapons were assumed to make massive ground operations obsolete. The age of the nuclear weapon, however, ended with the realisation that a total thermonuclear war would be an absolute catastrophe for everyone involved. After the Vietnam War and the so-called 1973 Yom Kippur War in the Middle East, tactical air power returned in force to the battlefield.

The Yom Kippur War later also influenced the development of the US Army's AirLand Battle (ALB) doctrine and its European application, the Follow-on-Forces-Attack (FOFA) principle. According to the new theories, prerequisites for successful ground operations were to be created using tactical air force capable of striking targets located deep within the enemy territory.

Boydism

the end of the 1970s, researchers became interested in the theorising of aerial warfare. Studying the air battles of the Korean War, American Air Force Colonel John S. Boyd observed that the key factor of victory was the speed of decision-making from detec-

ting the enemy through assessment of situation and making the operative decisions to final action. The so-called Boyd's Circle, also known as the OODA Loop (Observation, Orientation, Decision, Action) was born. Boyd later expanded his model to include ground warfare by attempting to demonstrate that fast decision-making was the key to winning ground battles as well by using the Battle of Leuktra (371 BC) fought in Ancient Greece as his example. Boyd understood, however, that the ability to make fast decisions held no value as such, or in other words, realised that making decisions quickly does not matter if the enemy does not react to them – at least not in the way intended by the commander making the decisions. This is why Boyd talked of decision-making that was faster than the enemy's decision-making. Boyd's loop falls flat in a situation where the enemy does not react in any way. If the enemy does not understand the other side's objectives, making decisions faster than the enemy does not help. Boyd's example of ground warfare also demonstrates the necessity of making the enemy react. The Battle of Leuktra was the first armed conflict where tactical subunits were clearly used on the battlefield. The phalanx of Thebans that was divided into tactical subunits proved stronger than the phalanx of Spartans, whose strike force was directed frontally in the traditional manner of the time.

The military model of Boyd was based on technological revolution. He claimed that a classical military theory, like Clausewitzian one, is too connected with defeat or destruction of enemy's military power. He criticized basically the mechanistic model of art of war. We argue that Boyd forgets the historical perspective in his criticism. Also he forgets, that the principle of art of war is fighting together with enemy. Of course, Boyd tried to build a new military model available in information time political situation like "zero tolerance" and CNN-effects.

Wardenism

Toward the end of the 1980s, American Air Force Colonel John Warden refined Boyd's notions further. The requirement of effective decision-making was paralleled with the idea of understanding the enemy and the enemy's society as a hierarchical operational environment. Using this notion of hierarchy, Colonel Warden saw the enemy's decision-making apparatus as the primary target for the use of military power. A successful attack on the hierarchy of such a system would cause the enemy nation to collapse. If the attack did not have the desired effect, operations would first be extended to cover the enemy's key functions, then the infrastructure, and so forth. Attacking the enemy's armed forces was to be considered the last option, because it was

the least cost-effective solution. The air force held a key role in carrying out Warden's theory; as a matter of fact, Warden maintained that the land forces would simply be unable to perform the tasks required.

From the perspective of the art of warfare, Colonel Warden's conceptual model, sometimes referred to as Warden's Circles, is not a new theory as such, although in some quarters it was considered to be one. Warden's doctrines combine ancient Oriental martial teachings, Clausewitz's theory of war and the theory of aerial warfare, so-called Douhetism, which was developed after the First World War. The idea of cost-effectiveness could be detected already in the teachings of Sun Tzu: he considered it always more preferable to attack the enemy's plan of action than its troops. The ideal was to win the enemy without entering combat at all. Warden's model can therefore be understood to demonstrate the supremacy of technology over human activity. Moreover, according to ancient Oriental wisdom, the stronger party must never use unnecessary force to reach its objectives. The writings of Carl von Clausewitz are reflected in Warden's theory as an effort to discover the enemy's centre of gravity (*Schwerpunkt*), against which operations are to be directed.

Most importantly, however, Warden's theory reflects the thinking of the Italian air power theorist Giulio Douhet (1869–1930), who made his most important contributions in the time between the two World Wars. Douhet's theories can be summarised into four main points: firstly, that airspace would develop into a violent and important zone of combat. Secondly, that the state (the power) controlling the airspace would also dominate the ground. In connection with this notion, Douhet coined the concept of air supremacy, which, in Douhet's view, would be attained by attacking the enemy's air forces that are on the ground as well as the enemy's air defence systems. Thirdly, he argued, that air power would make it possible to extend the zone of combat virtually anywhere, and fourthly, that the psychological effect of air bombings would be immense. In light of that above, Wardenism could also be called neo- or post-Douhetism. It must, however, be observed that Warden did not primarily aim to influence the people of a nation, but its leaders. The difference between influencing the decision-makers directly or through their subjects, however, most likely boils down to a difference in the number of casualties or the extent of destruction.

The background to neo-Douhetian thinking is formed by broader historical developments towards globalisation, commercialisation and Western moralism. The basic principle is to influence things quickly, from afar and on a broad front without putting one's own activities at risk. As a matter of fact, one of the problems of humanism has been, that while its values have most been emphasised, technological capacity for

destruction and the inequality created by various forms of former colonialism have only increased. What we mean is, that the greater the distance over which people are influenced by means such as weapons, the more difficult it is in terms of values to estimate the real significance that one's activities have to the objectives of the activity.

Warden had the same problem as Doyd. They both based their thinking on the ultimate possibility of technology. It was quite natural that they used the technological phenomena in their theories, but at the same time they reduced and overlooked the principles of art of war. The ultimate meaning of warfare is to defeat or destroy the enemy's military force, not to defeat or destroy the enemy's political infrastructure or "hearts and minds".

Effects-based thinking

During the 1990s, the notion of so-called effects-based operations (EBO), and the more advanced version of the theory, effects-based approach to operations (EBAO), started driving military doctrine. The idea of the enemy being the foundation and basis of one's own activities could already be found in Boyd's OODA Loop, essentially meaning that Colonel Warden's ideas were merely an extension of Boyd's theories. Effects-based operations can be defined as operations whose planning, execution, evaluation and application are based on a holistic way of understanding the operational environment with the objective of influencing or changing the behaviour of a system or future possibilities by applying integrated means of enforcement in order to reach political goals.

Parallel with this way of thinking, the notion of network-based warfare was soon introduced. The idea of network-based warfare is based on American business philosophies and the principles that governed the organising of USA's strategies of evading a nuclear war through the so-called DARPA project, which later become known as the origin of Internet. Underlying the idea of network-based warfare is the notion of information supremacy made possible by superior information technology. The information supremacy would be utilised by integrating the different levels of management within one's own chain of command together in a network-like structure with the objective of speeding up and rationalising activities. Network-based warfare can therefore be defined as an operative concept based on information supremacy, which by means of networking the sensors, decision-makers and weapons systems would establish a shared theatre of operations, faster operational speed, increased destructive power, enhanced battle stamina and partly delegated decision-making, resulting in improved combat ability. In network-based warfare, information supremacy is es-

essentially transformed into a combat advantage by turning the information received from the battlefield into shared knowledge. In the civilian world of today, the concept is called *business intelligence*, but it is modelled on principles that were originally used to organise military intelligence activities.

In their treatise *Power to the Edge: Command and Control (C2) in the Information Age*, David Alberts and Richard Hayes argue that a radical change has taken place in the art of warfare. In their view, the interaction between individuals and the military organisation requires an entirely new communication process. They maintain that in the industrial age the entire military organisation was, essentially, designed to serve one supreme decision-maker, while modern information networks facilitate a shared, distributed form of decision-making. Alberts and Hayes do not, however, address the fundamental issue of how, ultimately, to resolve the question of the undivided responsibility of the military commander. Their suggestion is to use what they call indirect leadership as the tool of administrative leadership: the activities of the subordinates are to be controlled by influencing their behaviour using information networks. In practice, this would mean that the actors in the organisation would become the end users of standardised technologies. Weapons technology and the limitations of its use define the scope of military strategy. In practice, it would also mean that a human being's innate capacity for good and evil would be left unused. Neither would man's immediate capacity of putting his theoretical knowledge into practical use and supporting it with improvisation in a combat situation be utilised. This would cause the link between the theory and practice of the art of warfare to be severed.

From an enemy into a target

The development of the notions that led to the idea of effects-based warfare was started during the Second World War at the American Maxwell Field air base, where strategists were drafting bombardment plans in which the German society was broken down into targets for aerial bombing with the objective of reducing Germany's ability and willingness to wage war. Today, Warden's neo-Douhetist models of thinking form the background for the practice of breaking down the enemy's society into networks in order to determine suitable goals for achieving desired effects. Opposing societies (as well as one's own operational environment) are systematised into targets that can potentially be influenced in order to reach the desired results. And, as is well known, our time favours the parading of various types of network structures and system diagrams in all fields of professional activity.

In an effects-based process, attempts are made to systematise the operational environment into nodes and links which are then used to determine ways of achieving the desired effects; in other words, attempts are made to understand the functioning of the operational environment and then to influence it in order to most effectively achieve the objective. The effects-based process is like the process of targeting, only extended to all levels of warfare. Experiences gathered from the various wars of our time until today, starting with the bombing of Germany during the Second World War and ending with Israel's war in Lebanon in the late summer of 2006, give adequate grounds for stating that systematising the enemy in order to evaluate the desired effects is a very difficult, if not impossible, task.

Limitations of perspective

The invention of telescope gave man, who had taken refuge in God, freedom to view the world from a distance. The cosmos fell apart, and the world was opened up as an infinite vastness of limitless possibilities. Man realised that technology was necessary for observing the world in a broader and deeper way. In his positivistic dream, however, the man of the modern age and the Enlightenment forgot that observing the world always happens from within a certain conceptual framework. The telescope did overcome certain limitations of the human eye, but simultaneously narrowed our field of vision. Today, space satellites "see" from a long distance, but in order for them to see accurately, powerful focusing and immense narrowing down of the field of vision are required.

During the air warfare of Kosovo, the air speed of the jet fighters combined with the pilots' mounting psychological pressure and the vagueness of their targets led NATO planes eventually to release their ordnance on a Red Cross train. The urgency of the situations, the pressure to act, technology that surpasses human senses and understanding, the global media and the distorted perspective have brought so-called friendly fire to the battlefields. We tend to overlook that from a distance and in real-time we always observe the world through a certain conceptual framework. In order to see differently, we must be able to step outside the framework. When the pace of seeing within the framework is accelerated, the visual field narrows down. When the pilot pulls on the throttle and the plane accelerates, he loses his own sense perception and is forced to resort to the machinery available to him. Whether the missile hit its target and whether the desired effect was achieved cannot be ascertained until an infantry soldier surveys the actual site, located outside the jet pilot's conceptual framework.

Writing about Boyd in his book *Science, Strategy and War*, Frans P.B. Osinga reveals how the creator of the famous OODA Loop was a prisoner of the scientific atmosphere and the fashion of his time. The scientific *Zeitgeist* of the time was permeated by the Popperian/Kuhnian notion of the downfall of science, which was grounded in the notion that the speed of life is increasing and life is heading towards chaos. The 19th century fight for survival of the species had become an accelerating struggle for survival between various models and theories of science. Like other theories of its time, the OODA Loop tried to repair itself faster than other models, learn from its mistakes and become a part of the endless, accelerating chaos, where systems-based thinking was the only viable option. The OODA Loop settled itself into the bandwagon of development optimism that, nevertheless, accepts the grim nature of our reality. Boyd was aware of the so-called postmodern thinkers of his time (Derrida, Foucault, Habermas), who criticised Western development optimism. In order to remain the winner in ever harsher circumstances, one was forced to increase the speed of one's own activity, because the notion of a Hobbesian all-out war of all against all was no longer morally supportable or desirable. The struggle against others was now waged by correcting one's own activity. A shift from external aggression to introspection, which is also the fundamental notion of humanism, started taking place. The faster one corrects one's own activity, the better chance one's own model stands in the evolutionary struggle against other models. The by-products of the acceleration are, however, a narrowing down of the field of vision and diminished capability of verifying the result of one's corrective measures in terms of the original motive of the activity.

Evolution goes on

As the velocity kept increasing and the 1960s and 1970s produced the phenomenon of globalisation, the notion of warfare gradually became more and more reduced to the notion of achieving air supremacy. The need to be able to understand struggle and battle using human faculties in the shadow of the nuclear weapon forced man to take the place of "the gods" up in the airspace: war was now observed and reflected upon from high above. Corresponding ideas can also be found in natural sciences and mathematics. In the cultural crossroads of 1990s Europe, the dominant position of the aerial weapon made faster interference possible in the destinies of various corners of the world. The focus shifted from defending one's own region to becoming actively involved in the various trouble spots of the world. Air transport capability was required. In the civilian world, aviation and air travel for both business and pleasure grew

exponentially. Fast movement through air symbolised the peak of development.

If the Boydian notions are taken as the model for our future, we will shortly face a situation where aircraft and ships as the transporters of weapons are made obsolete by the next stage in the evolution. Viruses in information networks and robots in the air and sea make human beings too limited in capabilities to participate in the turbulence of evolution. Space, rhizomes, DNA, information networks and cells are the only platforms fast enough to provide sufficient acceleration for the self-corrective process, as required by the OODA Loop. In accordance with the OODA principle, the model must improve itself continuously, becoming more robust, faster and more cost-effective. From a purely technological perspective, the military aircraft and the warship are already slow and easy targets in the zone of combat. If, however, we escape the Boydian loop and step on the brake, we will come to realise that the model of a self-correcting, hyperaccelerated decision-making is simply absurd in real life. Reality is not an empty and chaotic expanse of space, where atomistic models fight for survival in order to be able to accommodate themselves better. We must remember that Darwinism was also influenced by the politics of European colonial powers. No theory or model can be separate from everyday politics and the use of power. It must not be forgotten that neo-Douhetism has opened up enormous markets for both civilian and military aviation as well as the development of other advanced technologies.

But do we, in the end, evolve?

Bruno Latour, a sociologist of science, writes about how our reality consists of hybrids – a blend of science, politics, economics, legislation, religion, technology and fiction – that are made manifest by the everyday amalgam of nature and culture. The current situation has been reached by traversing three points of passage: naturalisation, socialisation and narrativisation, or, in other words, through nature, culture and information networks. The purer our practising of science, the more tightly it becomes intertwined with the fabric of society. Latour argues that we are simultaneously both recyclers and remixers of time itself. We have never moved forward or backward in time. Time is determined by selections, but the selections are not determined by time. A lack of stable form does not mean formlessness. The inseparability of nature and society makes extensive experimentation impossible, because all changes in nature must be in harmony with social change.

Regarding our conceptions of war, Latour's argument means that it is too early to

be lulled by researchers' promises of new threats replacing old ones and of human beings never again relapsing into a headlong, all-out war. Granted, the First and Second World Wars are not likely to be repeated as such, but it is just as possible as it is impossible for the human race to experience yet another similar horror.

If we focus on the real crisis areas and warzones of the world, taking single episodes from Iraq, Afghanistan, Lebanon and the Caucasus, we may realise that taking control of territories, winning over peoples' minds, reconstructing the land and destroying the networks of enemy forces may take years, even decades, to achieve. The dreamlike speed of the OODA Loop does not become actuality in cultural practices or social rhizomes, because their conception of time is different from what is assumed of reality by evolutionary theories. The more and faster the rhizome is cut down, the more it will grow. The harsher the treatment of criminals and terrorists, the surer we are to cultivate the seeds of more crime and terrorism. Rooting out a weed completely and preventing new shoots from developing requires time, cunning and familiarising oneself with the organism of the plant. Current Western values, however, no longer allow this variety of thinking, which essentially belongs to the art of classical warfare. Despite their technological overtones, however, neo-Douhetist and effects-based ways of thinking contain an effort to understand and apply the classical principles of warfare.

The new models, however, also allow for human activity where the lessons of history are forgotten. In this case, speeding up one's own action will narrow down the field of vision and make moral choices easier. Visual perception is clouded when one pulls on the throttle; observing reality becomes more and more difficult, necessitating technology, which always distorts the human experience by complicating the relationship between reality and the senses. Although Napoleon watched his troops from a distance while eating lunch, he could still see the battle with his own eyes, could smell the bloodshed and hear the murmur of battle. Today, the pilot pushing a button at an altitude of one thousand feet and sending a missile toward the target does not need to think of the consequences of his actions on the ground when flying back home.

From the lenses of the telescope we have come to the YouTube image on the computer screen. Crucial crumbs of information are always left outside the scope, no matter how fast and real-time the targeting process is. The faster and denser our perception becomes, the more difficult it is to understand what we are doing. Over-rationalised and automated activity gives rise to completely uncontrolled phenomena, as was demonstrated by the prison scandal of Abu Ghraib.

The power wielded by the military-industrial complex

Since the 1990s economic life, guided by politics, has become more and more intertwined with efforts to develop military capacity or control its character. The concepts now employed for operative planning in the public sector have been imported from the private sector. When military organisations renew themselves, employing economic models is nothing new as such. Robert McNamara, the Vietnam-era Secretary of Defence and a retired director of a Ford automobile manufacturing plant, introduced a model of thinking based on the game theory and introduced the notion of *body count* calculations to the Pentagon when the USA entered the Vietnam War, while in the 1990s Secretary of Defence William Cohen gave birth to the concept of “Revolution in Military Affairs” (RMA) by importing the idea of economic revolution to the Pentagon.

What happens in all systems employing economic models, as in the increasingly professional Western military forces, is that the organisation is put on a diet, its bureaucracy is reduced and its administration depreciated. The focus is now on establishing a versatile and flexible core of “special forces” that can reach the speed of the OODA Loop as required by each mission. A shift from committed, ideological soldiers of duty to a professional, short-term military workforce is underway. The Americans call these new soldiers Strategic Corporals in a Three Block War.

When expanding the military organisation is no longer essential and attention is shifted to the results the organisation achieves, a situation is reached where killing has become a type of commerce and armed forces are developed in a direction that takes their focus away from their primary mission: warfare. The latest example of this is from Iraq, where Blackwater Corporation operated high-handedly, breaking the conventions of war and causing additional trouble to the armed forces. The Western economic doctrines of replacing military manpower with high technology are not, however, reflected in the military policies of China and India.

It is, therefore, too early to state that we are ready to move from a rank-based organisation to a participatory, shared, “trust-based” organisation. Wars and battles always require leaders to assume the ultimate responsibility. The United States’ War on Terrorism has demonstrated that in what is ultimately a global network, nobody assumes responsibility for embarrassing problems such as Abu Ghraib. It is clear that individual soldiers are responsible for their individual acts, but the acts always also tell something about the culture of leadership that prevails in the organisation.

The notion of pre-emptive solutions

Niccolo Macchiavelli has summarised the issue by stating that if we want to control an event quickly and in a cost-effective way, it is always done at the expense of diagnosing the real nature of the event. If, however, we want to be able to first confirm the real nature of the event, we run the risk of no longer being able to control it. In warfare, this means a situation where the traditional model of making one's way gradually towards the objective of the war in a sequence of critical battles, eventually destroying the enemy, is replaced with precision strikes against all parts of the enemy's system. In traditional thinking, the step-by-step progress towards the objective implies that the enemy is a living organism that can be expected to react to stimuli, thereby revealing its controlling logic. In so-called pre-emptive warfare, on the other hand, precision strikes are targeted against important nodes of the enemy's system with the idea that the enemy is a passive target whose ways of operating are already known. Today, the key to prior knowledge has become an increasingly expensive and complex technological solution, promised by the weapons industry but often failing to materialise. Today's soldiers, waging war in foxholes and alleys like their counterparts of yore, soon discover that these weapon systems built on great promises are simply not applicable to the actual reality of the battlefield.

The options presented above illuminate the difference in the scientific worldview: the traditional notion of challenging the enemy to a decisive battle is rooted in a highly qualitative, even subjective epistemological trend. The enemy is assumed to exist and to possess a "soul" and to be an "organism" just like us. A desire to destroy the enemy through battle exists in us because it is seen as the worst thing the enemy could do to us. The military organisation hence really bases its activities on the notion that the enemy must be known and respected before engaging in war, and that we ourselves must also be prepared to die. In technological precision warfare, however, the enemy is seen as a passive target visible to us only through a network, observed from the air or space through a prism, without the ability to threaten our own lives and whose reactions can teach us nothing. This assumption featured strongly in the United States' 2003 strike in Baghdad, based on the theory of "*Shock and Awe*". The United States' technological and psychological control of the Iraqis was assumed to be perfect. The arrangement resembled Big Brother, where all players can be controlled as desired 24 hours a day, 7 days a week. The notion of *Shock and Awe* was, as a concept, similar to the notion of complete market dominance in economics. The Americans are now, however, talking about the need for a frog's perspective instead of a

bird's eye view in Baghdad and Kabul. It has once again been proved that theoretical know-how cannot resolve challenges of military strategy.

The mechanistic culture

Despite all networking, military organisations are still rank-based, authoritarian organisations. The idea that the commander's responsibility cannot be distributed is still alive and doing well, for example, in the image that the media have of military organisations. In spite of the technological development, a mechanistic model of thinking still prevails in the background. The industrial (mechanistic) model of thinking is deeply rooted in us because it was the model that brought prosperity to the Western world and rapidly enhanced our standard of living throughout the 20th century – despite the two great industrial world wars. The mechanistic image of work was based on a constant improvement of productivity, where man was part of a great machine. Today, the development phase of this idea is called performance.

In the mechanistic model, no difference exists between an effective organisation and the structure of a machine. In both systems, parts are fitted together according to a carefully crafted plan. John F.C. Fuller, widely considered the father of mechanised warfare, based his philosophy of military skills on metaphors commonly used to describe the functioning of machinery. Today, linking human beings and computers is no longer a futuristic dream but a scientific and economical objective that receives significant funding. For the individual, this still means precise assignment and control of tasks by various means, such as data applications and deadlines. Mechanistic thinking is possible in operational environments that do not change, but also in changing operational environments if the pattern controlling one's own activity is being changed at an ever-increasing pace.

In a mechanistic worldview, decision-makers are interested in the problems human beings cause for the organisation. The language of human resources departments today includes concepts such as "know-how deficiency" and "short-fall of skills". We may notice that technology has infiltrated the bottom and middle tiers of organisations, but that the thinking and actions at the top still rely heavily on a mechanistic view of the world. The greatest difficulty is that the high commanders, surrounded by staff and assistants, are not familiar with the realities of living and working in the field. When the leaders themselves are not forced to use technology, they may form excessively romantic or pessimistic pictures of its potential.

New technology is still being used mechanistically

Soldiers in the field are no longer able to fully focus on their core tasks, because many supporting functions are now defined as part of everyone's duties. The soldier of the information age carries with him a vast array of technological tools and equipment, from protective systems to applications used for positioning, targeting, even collecting of information. The individual techno-soldier, beneath his technological harness, resembles a medieval knight. In order to get his hands on his actual work, the soldier must first manage to find his way through a mechanistic maze of high technology. Even during peacetime, the work of each soldier (traditionally a fairly mechanistic occupation) includes operating and administering a complicated technological system, involving tasks such as the independent changing of user accounts and passwords, monitoring of working hours, performing administrative paperwork and adapting to new software applications. In addition to all this new technology, he must be proficient in the traditional skills of a soldier. We are already starting to see the limitations of this development – just like the medieval knights eventually reached their limits. Violent combat is always a fairly simple occurrence from the perspective of the individual soldier, but today's soldier has a plethora of other things to worry about in addition to preparing himself for and performing in the actual combat situation.

Today's key factor in mechanistic thinking is to detect changes in the operational environment before the enemy, and to be able to adapt one's activity to the new circumstances. This is impossible without professional, highly specialised personnel. On the other hand, we must also get rid of unproficient, unadaptive individuals and organisations. In the mechanistic model, the mental capabilities of a single individual carry little significance. In the First World War, for example, the tasks and hence the value of an individual soldier were very simple and limited. Today, mental capacity consists of being able to track changes and process the constantly increasing load of information. While the soldiers of the past only used a small fraction of their mental capacity, albeit in actual combat, today's soldiers are mentally worn down by constant change and by the barrage of information before even reaching the battlefield.

Although the commanders and managers of today's organisations do not always issue direct orders or interrupt the work of their subordinates, they may use power by forcing their subordinates to use new information technology applications. The heads of organisations often falsely believe that new technologies "liberate" the mental capacities of people for creative work in an increasingly

complicated operational environment. What happens in reality is exactly the opposite: the subordinates have to constantly adapt to new forms of bureaucracy under simultaneous pressure from old tasks and new demands.

Although the situations in Iraq and Afghanistan cannot be used as models for our own operations as such, they serve as illustrative examples of what types of difficulties a mechanistically thinking superpower with the highest available technology and virtually unlimited resources at its disposal may encounter when confronted by a non-technological organisational culture lacking in both resources and technological sophistication. Although technology is the sine qua non for Western nation-states, excessive technocracy also has its share of dangers. Technocracy means that technology professionals hold the power in societies and organisations.

Distribution or centralisation?

If we accept the premise that reality is no longer a war of all against all but of everyone competing with others for their individual places in that reality by correcting and improving their own systems, should we opt for a centralised or a distributed decision-making system?

If we assume the enemy or the opponent to be a living organism carrying social value, then war must be waged on the ground, face to face, adapting to our opponent's notion of time. If, however, we take as our starting point the notion that the enemy is a passive object, reduced into a technological target, the operations can be performed fast and from afar. When we start to use self-corrective models exclusively, we will no longer pay attention to the special characteristics of the object of our activity. While we may eventually get to know ourselves better and better, the knowledge we have of the object of our activity will decline.

Only 40% of human beings are analytic and rational in their decision-making. 30% of us rely on emotion when making decisions, while 30% of us are able to combine analytic and intuitive methods for making decisions and controlling our behaviour. Researchers emphasise the fact that different situations and operational environments call for different types of decision-makers and different kinds of subordinates. If the decision-maker cannot comprehend the logic of his thinking, his leadership is very likely to come into conflict with his own organisation, especially if his subordinates have opted for an opposite way of thinking.

A networked organisation that respects the individual can no longer be led relying only on reason and accountability. What is increasingly required from the leaders

instead of focusing on detailed technical know-how is an ability to make comprehensive syntheses and intuitive decisions. The rationality of the human mind is based on the temporal difference between sensory perceptions and their interpretation. Rational deliberation is always an afterthought. If the true motives and values of our deeds are conflicting, we will explain them in retrospect in the best way that is possible in the situation. It is always beneficial – for us and for those around us – to give the impression that our activities are guided by higher ethical objectives.

Conclusion

The art of warfare has historically consisted of organisations, equipment, individuals and principles of operation. On the basis of what has been written above there is no reason to assume this is not the case today and in the near future. In the age of information networks, organisations cannot survive without engineers, but in order to succeed engineer-like thinking must be augmented by wider frames of reference in the organisations. The know-how and skills of all members of the organisation should be utilised as effectively as possible. Technology will support this principle only if we have the courage to give up mechanistic thinking and throw ourselves in a controlled manner into the chaotic stream of change. That is what warfare, ultimately, really is.

The historical process described above, that has resulted in the application of systematic characteristics of air warfare also to ground battle, has produced the impression that strategic freedom of action can be achieved without sending large numbers of troops to war. Because technology holds such an important role in air warfare, and because the philosophy of air warfare has infiltrated the philosophy of ground combat, we have erroneously started thinking that ground warfare can also be almost entirely technologised. The belief that technological supremacy enables us to win wars without making longer-term commitments has increased the risk of employing military solutions instead of politics for achieving political goals. The fact, however, is that the enemy is a conscious, sentient being instead of a passive target. Resolving military crises using premeditated technical solutions has not produced the desired results. Looking from the sky the enemy appears as a small target, but observed on the ground, turns out to be a living organism.

Today's operational and tactical environments are so complex and contain so many uncertainties and so much friction that it is impossible to systematise and

understand them sufficiently in order to establish suitable effects for the use of the arsenal of methods available. If the effects are evaluated based on inaccurate input, the end results might also be completely unpredictable. The need for ground forces has not disappeared from today's battlefield, and is not likely to do so in the future. No wars have been won by the use of air force alone; therefore neo-Douhetism does not appear to be a viable solution for winning today's wars. The notion of the battlefield must therefore be restored in its place alongside the concept of the combat zone.

References

- Aidar, John (2002) *Effective Strategic Leadership*. London: Pan Books.
- Alberts, David S. & Hayes, Richard E. (2003) *Power to the Edge. Command and Control in the Information Age*. CCRP Publication Series.
- Buzzell, Colby (2005) *My War – Killing Time in Iraq*. New York: G.P.Putnam's Sons.
- Coker, Christopher (2007) *The Warrior Ethos. Military culture and the war on terror*. London: Routledge.
- Gray, Colin S (2005) *Another Bloody Century. Future Warfare*. London: Weidenfeld & Nicholson, 2005.
- Groen, Jelte R (2006) "Systemic Operational Design: Improving Operational Planning for the Netherlands Armed Forces", *School of Advanced Military Studies, United States Army Command and General Staff College, Fort Leavenworth, Kansas*.
- Jones Archer (1987) *The Art of War in The Western World*, University of Illinois Press Chicago.
- Kellner, Douglas (2008) *Guys and Guns Amok. Domestic Terrorism and School Shootings from the Oklahoma City Bombing to the Virginia Tech Massacre*. London: Paradigm Publishers.
- Kesseli, Pasi (2001) *In Pursuit of Mobility. The Birth and Development of Israeli Operational Art. From Theory to Practice*, Edita Oyj, Helsinki.
- McGlade, Patrick E (2006) "Effects-Based Operations versus Systemic Operational design: Is There a Difference?", *Air Force Institute of Technology* 2006.
- Meilinger, Phillip S. (ed. 1997) *The Paths of Heaven. The Evolution of Airpower Theory*, Air University Press, Alabama.
- Osinga, Frans P. B. (2006) *Science, strategy and war the strategic theory of John Boyd*, New York, NY : Routledge.
- Smith, Rupert (2007) *The Utility of Force. The Art of War in the Modern World*. New York: Alfred A. Knopf.
- Vego, Milan N (2006) "Effects-Based Operations": A Critique, *Joint Force Quarterly* 2/2006.