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FUTURE OPERATIONAL- TACTICAL LEVEL WARFARE

Challenges and Opportunities
for the Defence of Finland

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CONTENTS

1	INTRODUCTION	5
2	AIM AND STRUCTURE OF THE RESEARCH	8
3	FACTORS AFFECTING OPERATIONS.....	11
	3.1 Technical development and its influence on the capacity of weapon systems.....	11
	3.2 Trends in the development of the armed forces of the major powers.....	16
	<i>Developments in troops, tactics, operational skills and command in the western countries</i>	16
	<i>Developments in troops, tactics, operational skills and command and control in Russia</i>	25
	3.3 Conclusions	39
4	DEVELOPING FINNISH TACTICAL-OPERATIONAL CAPABILITY	46
	4.1 Principles	46
	4.2 Development of operational skills and tactics	52
	4.3 Improving force structure and organizations	56
	<i>Force structure</i>	56
	<i>Organization and tactics</i>	57
	4.4 Leading the operations.....	59
	<i>Command and control</i>	59
	<i>The operational planning and tasking process</i>	61
5	CONCLUSIONS	66
	NOTES.....	66
	BIBLIOGRAPHY	78

1 INTRODUCTION

Motto: Battles can be divided into three categories:

- Those that are implemented according to a plan
- Those that are based on improvisation
- Those that just happen.

A worldwide change is underway in the development of the armed forces of the major powers, the general trend being towards smaller, but more professional forces with sophisticated force projection capability. They will have better firepower, mobility and protection, and will be better equipped to operate under special circumstances. The role of special forces is increasing.

The great powers are focusing on the development of an information warfare capability,¹ in order to be able to master both their own and opponents' information systems. Once this has been achieved, it will revolutionise organization structures, tactics and the operational arts, making it possible to maintain an overwhelming operational tempo. Although information warfare methods have already been used in various operations and incidents, the development of such techniques is still at an early stage. Theoretical ideas are still being shaped to practical functions and systems.

The ever more technical armed forces all over the world are becoming increasingly costly to maintain, and at the same time the end of the east-west juxtaposition and the deepening of European security architectures have shed a new light on the development of armed forces. Multi-nationality and interoperability are the current guidelines for the development of western armed forces, a process that is clearly being led by the United States, which commits approximately three times more resources to research and development than all the other NATO countries combined.

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The character of modern warfare has changed in the light of these facts, as pointed out by the latest crises in southeastern Europe and the Middle East. Instead of long traditional campaigns, the great powers are trying to secure their vital national interests by implementing rapid strategic strikes with "surgical precision" against selected targets anywhere in the world. The capacity of these precision-weapon systems makes it possible to destroy almost any target they chose. These strikes are made possible by the use of overwhelming intelligence, surveillance and command systems, which operate out of the reach of the worldwide media, although the results of such attacks may be presented with near real-time promptitude by the television and other media. The users of these ultra-modern weapons systems are professionals who are thoroughly trained in their operation and deployment.

These new methods are illustrated well by the Iraq crisis of December 1998, for example, or the Kosovo crisis of 1999. In the Iraq crisis the US and British forces that were concentrated in the vicinity of Iraq were used after brief preparations to hit limited but carefully chosen targets in a very short operation. In the Kosovo crisis the preparation and execution phase was much longer, due to the strategic aims of the operation. In both conflicts the adversary's conscript army, possessing traditional weapons systems, was at a clear disadvantage. It is significant that the strikes were not limited to military targets, but especially in the Kosovo operation the targets were often object vital to the functioning of civilian society.

Similar questions must be raised as we develop Finland's defence system, since modern warfare places new demands in this respect. While the national defence will remain the main task of the armed forces in the future, response to international crises will bring the armed forces new tasks and responsibilities. These dual requirements for the future require flexible and continuously developing tactics and organizations which allow for changing circumstances and technical development. The key question is how can we develop an adequately efficient and capable defence with our limited resources. ²

In a report presented to Parliament on 17th March 1997 entitled " The European Security Development and Finnish

Defence”, the Finnish Council of State laid down guidelines for the development of the defence forces in the near future. The major guideline was a new threat model, the “Strategic Surprise Strike”, in the face of which the report recommends the development of new readiness units and adequate helicopter capacity to support them. Some of the procurement projects recommended in the report have already begun.

Due to the geo-strategic position of Finland, the old threat models will also persist, including the danger of a large-scale strategic offensive aimed at seizing the country or parts of it. The requirement to prepare in the long term for threats of different kinds places heavy demands on the development of the armed forces. At the same time, active participation in international crisis management operations calls for considerable resources, due to the rotation of units and the high usage of material and equipment. Is the path we have now chosen the right one, and can it guarantee the development of versatile and flexible defence forces?

The priorities for the development of Finland’s defence forces are the national defence and participation in international crisis management. This should affect both the decisions we make, and all of our development efforts.

There are numerous factors in our systems and infrastructure, which form a foundation for the development of our defence policy. These structures and functions have a long and varied history behind them and they are nowadays able to serve as a basis both for changing the structures and for preserving them.

2 AIM AND STRUCTURE OF THE RESEARCH

This study aims to consider the viability of the development of tactical-operational level functions in the information age battlefield. Potential changes in force structures, organizations, command hierarchies, command and control systems and training systems cannot be ignored.

The study is adapted to a framework of factors which affect warfare at the tactical-operational level (see Figure 1). The questions to be answered are:

- How will future warfare and battlefields develop in our circumstances?
- What models for the use of force are suitable as a basis for developing operational-tactical level forces? and
- What functional and structural methods at the operational-tactical level can be used to develop the capacities and command and control systems of our forces, in view of the demands and capabilities mentioned below.



Figure 1. The framework of factors affecting future warfare.

This work is based on the assumptions that general conscription and the concept of total defence constitute a foundation that will raise the threshold for a foreign offensive, and that this foundation will be maintained in the future. Finland's defence forces are prepared to fight on our own soil to safeguard national sovereignty.

The tasks of the defence forces remain as they were specified in the 1974 Defence Forces:

- To handle surveillance of the country's land and sea areas and airspace in co-operation with other supervisory authorities;
- To secure the territorial integrity of the country, using force if necessary;
- To defend the country and its juridical system, and the livelihood and basic rights of the population;
- To ensure the maintenance and development of the country's military defence readiness;
- To provide military training, support voluntary defence training and contribute to promoting the will of citizens to defend the country, while also encouraging activities to improve their physical condition;
- To provide executive assistance in the maintenance of law and order as prescribed by the law and to take part in rescue operations;
- To participate in peace-keeping training and to maintain readiness and various arrangements for peacekeeping activities, as ordered by the Ministry of Defence and
- To carry out other functions as prescribed by law.³

Participation in peacekeeping operations is regulated by a specific Peacekeeping Act, the latest amendment to which is dated December 1995. This allows Finland to participate in peacekeeping under a UN or OSCE mandate aimed at maintaining international peace and security or providing humanitarian relief and protecting a civilian population. This way the Act makes it possible to participate in extended peacekeeping, but not in peace enforcement. The Act may be reviewed in the near future, however, and it is possible that Finnish forces could be used in more demanding crisis management operations.⁴

The whole of society and all the authorities are prepared to participate in the defence of the nation according to their appointed tasks. We shall concentrate here, however, on military command and control, planning and operations., particularly with respect to the operational-tactical level after the start of hostilities. In the Finnish situation, this means in effect the Command level and below. Although information warfare operations against the civilian society and its systems are a grave threat that also affects military operations, these will not be covered by the present work.

The resources allocated for the national defence are not assumed to increase significantly in the future, but this defence will continue to be based on high public willingness to defend the country and a high level of national expertise. Some of the Finnish forces will have to prepare for participation in possible international crisis management operations beyond Finland's borders as such requirements are increasingly becoming a part of European-centred crisis- management co-operation and Finland has already committed forces to such operations if needed.

3 FACTORS AFFECTING OPERATIONS

3.1 Technical development and its influence on the capacities of weapon systems

Technical development of combat infrastructures has been increasing constantly during recent decades. Information technologies are developing at a speed that has never been experienced before, and are expected to develop a thousand-fold during the next few decades⁵. Progress has in fact been so rapid, that it has started to influence the development of tactics and operational skills⁶. The potential provided by these technologies and the ongoing development of new ones will influence how the armed forces are organised, commanded and used.

The most important areas of development for the great powers involve information technologies. Highly developed command and management systems already make it possible to collect, analyse, edit and disseminate enormous amounts of information, so huge that man himself is becoming the weakest link in the information processing chain⁷. In order to speed up the command cycle, there are automatic command support systems under development that will be able to process and analyse information.

Civilian information systems are increasing in capacity even faster than military ones, and are also being used in military operations⁸, partly in order to reduce costs. Older systems will still be used alongside the latest technology for long time, however, in both civilian society and in the armed forces of the major powers.

The information collection capacity of intelligence systems is increasing constantly. The main emphasis is now on electronic intelligence, where systems based on multi-sensor technology make operational security very difficult. These have increased the precision of intelligence to the point where, instead of mere observation of a target area, it is possible to recognise individual targets very accurately. The linking of highly developed guidance systems to intelligence systems makes it possible to start engagement with the target almost immediately.⁹

Intelligence sensors are more and more frequently airborne,

in order to supervise larger areas. The use of UAVs in particular will increase, facilitating surveillance of target areas continuously in real-time for long periods. Russian estimates are that 80% of the intelligence information needed for the preparation and implementation of operations will in future be collected by air.¹⁰

By combining intelligence information with information on one's own troops and their location, it is possible to create for the operational commander, an almost real-time, accurate situational awareness covering both his own and the enemy-controlled areas¹¹. Command and control systems make it possible to forward analysed intelligence, surveillance and target information both hierarchically and non-hierarchically to multiple levels simultaneously.

This results in a solid, reliable picture of the combat zone. Operational commanders at all levels see the enemy, their own troops, third parties and supporting troops, and autonomous elements are capable of more independent action because they have better situational awareness and they share a common view of the requirements of the battlefield with others. Tests have shown that simultaneous distribution of information to the different headquarters sections and subordinate levels shortens reaction times with respect to battle field events¹².¹³

The main emphasis in the development of weapon systems is increasingly being placed on the development of electronic warfare and precision weapon systems. The importance of electronic warfare and control of the electromagnetic battle space are ever more important for ensuring one's own information superiority.¹⁴

Precision weapon systems are increasing in range, precision and effectiveness at the same time as they are becoming cheaper¹⁵. Less firing units and fewer projectiles will be needed to accomplish the same effect in the future¹⁶. Precision weapons can be placed on almost any platform, so that they can be launched by infantrymen or from armoured vehicles or warships. The main emphasis in the future will be on airborne platforms, however, because these provide a better range and rapid changes of centres of gravity. UAVs, for example, will be used more and more as weapon platforms¹⁷.

More important than the increase in the efficiency of

weapon systems is the integration of intelligence and surveillance systems and the use of firepower. The time from observation of a target to its possible destruction is decreasing significantly. US Army tests have shown that while no single system itself can significantly raise efficiency, the integration of systems and the synergy created by the simultaneous employment of all systems can improve it considerably.¹⁸

Dependence on single target detection systems or on those attached to individual weapon systems is decreasing as sensors and weapon systems are being integrated. It is possible to forward information acquired by different sensor systems in real-time to firing units in an integrated weapon system network., so that target information acquired by a warship's radar, for example, can be forwarded to a land-based anti-aircraft battery, which will then engage the target.¹⁹

Evaluation of firing results is essential for achieving the desired outcome. Earlier, this required an interruption in firing, reconnaissance of the target, analysis of the intelligence information and a new firing decision, but in the future this will be almost a real-time process and part of the continuous use of operative firepower over the whole combat zone. Almost real-time assessment of the efficiency of firing will facilitate continuous destruction of the opponent's forces, and will thereby increase the tempo of the operation.²⁰

The US Army has estimated that it will be theoretically possible by the 2010's to destroy a traditional division consisting of 800 combat vehicles and 2200 support vehicles in 10 minutes with the direct and indirect firing systems of a single brigade supported by corps-level weapons.²¹

The efficiency, range, precision and engagement speed of traditional indirect and direct firing weapon systems will also increase. Intelligent, target-seeking ammunition will be used more frequently in artillery, mortars and rocket artillery, and the protection afforded by fortifications will decrease.

In order to protect troops, it will become more important to hide them than to fortify their positions. Camouflage systems are nowadays lighter and can be used to protect vehicles, equipment and personnel against several intelligence sensors simultaneously. Stealth techniques are being used in the development of all the major weapons systems, such as the main

battle tanks, combat vehicles and combat helicopters, making them even more difficult to detect.

Night vision equipment such as image intensifiers and thermal sights is becoming lighter, cheaper and more effective, enabling their use at lower organization levels. Night operations are mounted especially against a technically inferior enemy, in order to multiply one's strengths. Radars are used in heavier weapon and intelligence systems, and the combining of different sensors enables operations to take place not only at night but also in bad weather.

The value of less complex technical equipment is decreasing. Signal, sensor and night fighting systems are affordable for a larger user group, and commercial media and communication services are developing very quickly, so that they can also be used to support military operations. This also poses a threat to operational security, however.²²

The development of large integrated systems is still extremely expensive, and only the great powers can afford to develop their own systems to the desired extent. The technological superiority of the United States is increasing, especially in the area of information technology, where the gap will increase in the future due to the enormous research resources that the country possesses. The Western European countries will lag behind in this, and Russia is already dropping even farther behind.

However, even the United States can "digitise" only some of its units and equip them with the latest technology, as developing forces capable of operating on the information age battlefield has proved to be more expensive and more difficult than was anticipated. The US Army has, for example, been forced to postpone equipping of her divisions. It will be possible to fully equip only one third of the US Army's six heavy divisions with the latest digital technology during the next ten years.²³

Dependence on information systems and continuous information flow can also become an "Achilles-heel" for large armies, as they may become very vulnerable to strikes against these systems and their ultimate disruption. The loss, manipulation or compromise of vital digital information may give their opponent a great advantage. The manipulation of GPS data, for example, may considerably reduce the accuracy of

firing and the reliability of the overall situational picture.²⁴

Dependence on command and control systems and the feeling of complete control over situations may also create a false sense of security. According to US Army training experiences, staffs supported by advanced C3 systems tend to neglect the planning process, especially the preparation of alternative plans. This has resulted in surprising setbacks during combat exercises.²⁵

The amount of data flowing into C4I systems is massive due to the capabilities of modern intelligence sensors. Added to all other information moving in the systems, this massive information flow could in the future potentially overwhelm the capacity of communication systems and intelligence analysers. A critical piece of information may not reach its planned destination because the communication networks are blocked by lower grade information. A good example of this problem is the bombing of the Chinese embassy during the "Allied Force" operation in Kosovo²⁶. The administration of information flow may prove in the future to be almost as important as the administration of logistic traffic is today.²⁷

The C4I systems now being developed, with automated intelligence analysis, cannot totally solve this problem, because human decisions must be part of the process, at least when deciding about the use of force. This places certain limits on the speed of even the most modern C4I systems, and makes it possible to affect the decision-making process through the human element.²⁸

Even the most advanced intelligence and command systems cannot guarantee perfect situational awareness and perfect control over the battle space. More important is the relative advantage gained over the opponent by better battle space control. Due to his relatively reduced situational awareness, the opponent's processes of making and executing decisions will be slower, which will lead to an ever more serious loss of battle space control.²⁹

The ability of the major powers to tolerate losses is diminishing as they are becoming increasingly dependent on their key systems. As centralised intelligence, command and weapon systems become fewer, it is also becoming increasingly difficult to replace losses to these systems.

3.2 Trends in the development of the armed forces of the major powers

Developments in troops, tactics, operational skills and command in the western countries

Changes in the structure of the armed forces of the major powers are affected by various economic, technical and political aspects. The budgets assigned to armed forces have in general decreased in the western world since the Cold War, and no significant increase is to be seen in the future³⁰. As the threat of a major war has declined in the Europe, large mobilisation armies based on universal conscription have become unnecessary in many western countries.

On the other hand there is a need to be able to operate outside one's own area in order to facilitate joint defence and crisis management operations. All the leading Western European countries are members of NATO, and the EU has also begun to develop a common defence system of its own, beginning from the creation and development of a crisis management capability. The major powers also have a need to be able to operate outside their own area to protect vital national interests.

In the light of these requirements, the western armed forces are reducing their manpower and developing smaller, professional forces. France and Spain, for example, have decided to change their conscript system for a professional system, and Italy is reducing the number of its conscripts. Great Britain and the United States have reduced their professional forces.

Armed forces will be developed for other tasks as well as war in the future, e.g. humanitarian and peacekeeping operations., and this will require them to be trained to be doctrinally flexible, with strategic mobility, of tailor-made and modular composition, and capable of taking part in joint multinational operations and undertaking multiple tasks. Doctrinal flexibility is essential because operational conditions and opponents will be more and more difficult to predict in the future., but it can be achieved only if the leaders and troops are trained constantly to adapt their tactics, techniques, functions and organizations to changing situations.³¹

Army units will have fewer personnel and equipment in

the future. As an example, the new US Army heavy division will have 15% fewer personnel and the number of main battle tanks and combat infantry vehicles will decrease by almost 20%³². The reduction will probably not stop here, and the personnel will decrease more in the long run. The US Army is also studying the possibility of abandoning its divisional organization structure in favour of brigades that are capable of operating independently.

The increased capacity of weapons and intelligence systems means that smaller organizations can monitor and control larger areas. Although the organization of the US Army heavy division has been lightened, it is estimated that its operational area will be twice as large as before, about 24 000 square kilometres³³. According to some tests it has been estimated that by the 2010s a platoon may be able to perform the same tasks which today require an entire company³⁴.

The organization at the platoon, company and battalion levels will probably not change significantly. The leader-to-lead ratio cannot be too high at these levels, otherwise the leaders will lose their ability for timely and effective decision-making. At higher-levels, however, new command and control systems will facilitate an increased span of control, especially in support elements.³⁵

Coincident with the decrease in numbers of troops, their mobility, protection and firepower will increase. The number of precision weapon systems and electronic intelligence and jamming systems will increase and these will be fielded at lower organization levels.

As the numbers of troops decrease and their areas of responsibility increase, the importance of intelligence will become paramount, so that small forces can be deployed optimally. As an example, US Army brigades will receive reconnaissance units equipped with new reconnaissance vehicles that have multi-sensor systems³⁶, and there are also plans to equip the brigades with their own UAV systems and enable them to acquire information directly from JSTARS (Joint Surveillance Target Acquisition Radar System) aircraft and other systems controlled by the higher echelons.³⁷

Combat will be more likely to take place in urban areas in the future. According to some estimates, approximately 60 - 70%

of the world's population will be living in major cities by the year 2025, and these will also become areas of concentration for industry, commerce and administration. Potential adversaries will also more frequently place their key systems in urban areas, which will mean that our own troops and weapon systems should be capable of operating in urban areas as well.³⁸

The numbers of helicopters and mobile airborne troops will increase. Both Great Britain and Germany are just now developing air assault brigades in which combat helicopter units are combined with airborne units. Battle space control makes it possible to use air assault troops effectively without great losses. These troops will not replace armoured or mechanised troops, but they will increase the tempo of operations and the depth of the battlefield.³⁹

Developments in naval and air forces will follow the same trends as in armies. Numbers of personnel and quantities of equipment will decrease, and traditional naval artillery, bombing and close air support systems will decrease in importance at the same time as precision weapon systems gain ground. The main emphasis in the development of air forces and navies will be on the ability to project power far away from one's own areas if needed. The highest priority in the development of the world's naval forces will concern the ability to intervene in a land battle from the sea, both with long-range weapons systems and facilities for landing ground forces in a chosen area.

The proportion of special to general-purpose forces is increasing. Special forces are needed for reconnaissance and assault tasks, and also for the ever-increasing numbers of peacekeeping and peace enforcement operations. Their high levels of training and flexibility make them suitable for many types of operations. The capacity of special forces for conducting intelligence operations will be further developed.

According to US Army tests, traditional staff and headquarters organizations are still relatively functional and form a firm basis for the development of staff organizations. These will increasingly require more personnel to administer the increasing information flows, however, and as operations could continue for days or even weeks at a high tempo, there must also be sufficient personnel to support round the clock operations.

Headquarters must also be able to plan and lead joint operations. Clearly, brigade, division and army corps level headquarters will become larger than they are at present.⁴⁰

In the operational sphere, however, there will be a need to reduce the number of command levels. In this way the command process will become shorter, and it will be possible to increase the tempo of an operation⁴¹. The biggest change in the long run will probably be the elimination of the division level, accompanied by clear changes in the command structure and hierarchies at the brigade - army corps levels. The old rigid, scaled command structure will disappear from the supporting systems in particular, to be replaced by a net-like command structure.

The use of military force is almost always associated with protection of the vital interests of major powers or their coalitions. These interests are pursued mainly by political means, exerting political, economic and military pressure if necessary. If these measures fail, military operations may be used. The preparation of such operations can require significant amounts of time, but when force is eventually used, the aim is to achieve the goal as quickly as possible, in order to minimize losses both to one's own military forces and to the opponents' civilian population. Fast action also helps one to reach the goal as soon as possible, before international pressure or some other consideration forces an end to the operation.

The Kosovo crisis of 1999 showed clearly the drawbacks of a campaign which drags on for a long period of time. During the 78 days of the air campaign "Allied Force", the pressure to stop the air attacks mounted daily and the cohesion of NATO was gradually declining. One of the main reasons for this was the mounting numbers of civilian casualties among the Serb population.

Another reason for the need to reach the operational objectives as quickly as possible is the fact that even the major powers have a limited capacity to continue operations for long periods of time. The strike by the United States and Great Britain against Iraq in December 1998, for example, lasted only four days. According to some calculations, this endeavour cost about five billion Finnish marks. Approximately 400 cruise missiles are reported to have been launched during the operation, which is

about 15% of the total US conventional cruise missile arsenal⁴². It would have been almost impossible to continue the operation at the same high level of intensity even for a matter of several weeks.

The US armed forces faced similar problems during the operation "Allied Force" in Kosovo. The need to avoid collateral damage and adverse weather forced them to use a large number of precision munitions, so that the consumption became so high that the US forces were obliged to accelerate replenishment of their supplies. C4 capacity can also be a limiting factor in operations. The additional C4 capabilities brought to the area during "Allied Force", for example, had a distinct impact on other US military commitments worldwide.⁴³

Instead of engaging from the outset, the major powers tend to try to suppress their enemy's key systems, break his will to fight and force him into a situation in which he is unable to continue the battle. The idea is to isolate the military commanders and their staffs from their units and simultaneously destroy the command and control structure. Psychological operations are intended to reduce morale in the opponent's units and to complicate his decision-making. Information- operations are especially important in this process.

On the other hand, there are numerous historical cases that show how well-trained, motivated troops have continued fighting even though their lines of communication have been cut and they have been overwhelmed both materially and in the amount of information they have been able to receive. The suppression of an opponent's information systems will not be an inevitable key to victory in the future, either, for in many cases the only efficient way to suppress an opponent's key systems and troops is to physically destroy them. It seems to be easier to affect the will of the political leadership through precision weapon and air strikes than to shake the morale of the troops on the ground.⁴⁴

The density of troops in the battlefield will become lower as the areas of operation broaden and the numbers of troops decrease. The increasing ability to observe and locate targets and to destroy them with precision weapons will accelerate this development, as armed forces will try to protect their units by dispersing them over very large areas⁴⁵. Highly developed forces planned for mobile operation will be deployed and

concentrated for only short periods to conduct attacks, being capable of striking throughout the depth of the combat theatre simultaneously in order to reach several operational objectives at once.

The size of the unit alone will no longer be decisive when estimating the effects and importance of an operation. Even small units can conduct fast, well-timed, accurate strikes with very powerful precision weapon systems in a very deep area. Under these conditions even units of squad or platoon size can conduct tactical strikes, which could be of great operational importance in revolutionising the boundaries of strategic, operational and tactical-level warfare, as illustrated in Figure 2.

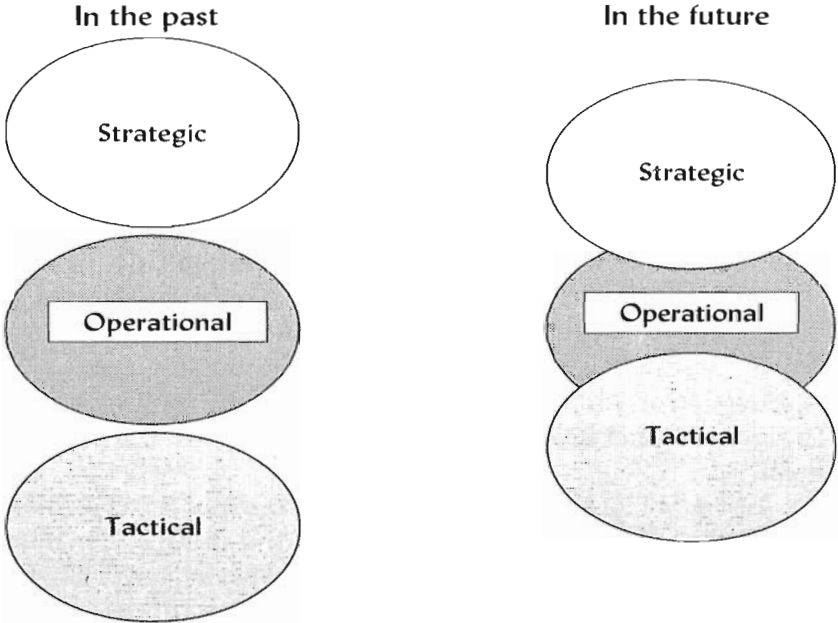


Figure 2. The boundaries of strategic, operational and tactical-level warfare

The future battlefield will be more fragmented. Solid front lines will disappear and safe areas will be specifiable more correctly in terms of time than space. Logistic and support areas will be protected mainly through battle space control rather than by the physical deployment of troops, and operations will gain greater effect through synergy created by deployment of the fighting power of several units and different branches of the armed services almost simultaneously and focusing them on numerous critical points. These points will be more important to the structure of the battlefield than a solid front line. Fighting power will increasingly come to be used in small, dispersed, but powerful units, and the battlefield will be more flexible than in the past, with constant movement and changes in tempo.⁴⁶

In order to guarantee rapid success, forces must be able to execute their initial operations as quickly as possible, and the vanguard must be tailored according to the mission and the disposition of the enemy forces. Quick, tactical victories will become increasingly important, and may be of operational and even strategic importance. The Iraqis lost the Gulf War in 1990 - 1991 so quickly mainly because they were unable to prevent the alliance from deploying its forces in the theatre. In the future, no enemy will allow the other side to concentrate its troops for such a long period if it has any capacity of blocking this.⁴⁷

The most important objective in the early phase of operations is to achieve information superiority over the enemy by suppressing and blinding its most important intelligence, command and control systems. His ability to control his forces may also be disrupted by the use of non-nuclear EMP generators, space- operated jamming systems or computer viruses. The suppression of command systems will normally begin before any land or air operations, but may sometimes continue during them.⁴⁸

Instead of locating enemy battalions, regiments and artillery concentrations, commanders will in the future be more interested in how the enemy's information systems work, what their weaknesses are, how his decision-making process works, what are the critical points in his C3 system and what ability he has to affect the commanders' own C3 systems. This will require a detailed knowledge of enemy C3 systems. The information will have to be collected and analysed during peacetime and various

suppression options will have to be modelled in order to allow effective final planning and implementation of operations in the event of a crisis⁴⁹.⁵⁰

In addition to direct destruction, the enemy's intelligence, command and control system may be disrupted, deceived or overloaded⁵¹, same time as one's own systems have to be protected against enemy action⁵². At the tactical-operational level, information warfare is mostly a matter of command warfare. It may be just as important in the future to achieve information superiority at the beginning of an operation as it was in the past to achieve air superiority⁵³, and it will be just as important in low-level conflicts as in war⁵⁴.

Fire superiority and manpower superiority will finally be achieved with deep, and simultaneous strikes against the enemy, once he has lost his capacity to command and control his troops. Such strikes are usually aimed at the enemy's centres of gravity, but a capability for achieving hits throughout the depth of the battle space can enable one to suppress and destroy the enemy forces very rapidly, as happened in the Gulf War. The enemy can be blinded, demoralised and destroyed by the massed firepower of a variety of weapons and precision weapon systems used in information operations, and together with the rapid movement of combat troops on land and in the air, this will enable larger forces to be destroyed with small losses to one's own force.⁵⁵

Sophisticated battle space control will facilitate more accurate and more economic decision-making and deployment of forces⁵⁶. Since the achieving of a faster operational tempo than the enemy is one of the main methods for gaining one's own objectives, it is obvious that the battle tempo must be increased.⁵⁷

Special operations are becoming increasingly important for two reasons. As the number of troops available decreases, the quality of the troops must be higher than before, and secondly, special forces are well suited for precise action against selected critical points. Even conventional combat troops will have to be used in smaller units and for more independent missions.

In the short term, combat troops will still be led hierarchically. Most of the information flow involving support, logistics and intelligence information, for example, will be distributed in a network manner directly to all those who need

such information. The use of both methods will allow control over certain some battlefield functions, such as fire support.⁵⁸

Although situational awareness will become more accurate in the future, it will not be sufficiently well developed to facilitate the detailed operational planning of large forces. Commanders will still have to be able to make assessments and anticipate future developments. In fact, as the operational tempo increases, they will have to be able to conduct longer-term assessments of possible enemy actions than today, and make very speedy decisions if necessary. This will place emphasis on the selection, training and exercising of leaders and will create demands for longer preparation times. The selection and screening of commanders will have to be more thorough than today.⁵⁹

Commanders will have to be better able to delegate responsibilities to their subordinates in the future, as an individual can handle only a limited amount of information at once. Troops and strike forces may have to stand idle if overburdened staff and commanders cannot process and deliver orders quickly enough. The windows of opportunity will be smaller in the future than they are today, and this will require fast, functional decision-making with adequate attention to detail. Delays in reaching decisions can lead to unnecessary movements of troops, with the result that they may be directed to improper missions or that the few valuable precision weapon systems may be used against targets of secondary importance.⁶⁰

For these reasons the ability to influence the enemy commanders is becoming a more crucial part of operational planning. Combining of the effects of psychological operations, electronic warfare, deception and physical destruction can enable one to influence these people's feelings, motives, objective thoughts and capabilities.⁶¹

The need to strike key enemy systems in a deep area simultaneously will place more demands on co-operation and co-ordination of the actions of different branches of the armed services. Joint operations will become more frequent, and operational-level commands will have to be able to lead joint operations employing various capabilities provided by the different services.

International peacekeeping and peace enforcement operations of different kinds are also likely to play a significant

part among the tasks of the western armed forces. In operations of this kind it is vital to achieve information superiority over the parties to the conflict and to create an accurate, real-time picture of the situation. Situational awareness must be extremely high. The conflicting parties are normally capable of using the media very skilfully for their own psychological operations and they know very well the low casualty tolerance of the peacekeeping forces.

Very similar use must be made of intelligence and C3 systems in peacekeeping operations as in combat operations, except that instead of firepower, more attempts will be made to influence the conflicting parties through negotiations, the distribution of information, total control of the situation by the peacekeeping forces, a show of force if necessary, but actual force only as a last resort. Stress will inevitably be laid on psychological operations and human intelligence.

The worldwide media must also be taken into account in military operations, as knowledge of a failed military operation can reach a home audience at lightning speed, and the major powers are especially vulnerable to negative reactions on the part of their population unless they are protecting their most vital national interests. This is even more obvious in international peacekeeping and peace-enforcement operations.

One famous example is the failed attempt to capture the Somalian clan chief Mohammed Aideed in October 1993. The US Special Forces involved were forced to withdraw when they faced fierce resistance, and the news teams sent home to the US audience pictures of celebrating Somalis dragging the body of a dead US helicopter pilot through the streets of Mogadishu. This resulted in huge political pressure on the administration, and forced the United States to withdraw its troops from Somalia. Thus a tactical mission that was tied to an operational objective resulted in a strategic failure.⁶²

Developments in troops, tactics, operational skills and command and control in Russia

Since the development of the Russian army is based very largely on the threat posed by a potential enemy, the Russians

make a careful study of events in the western world. In the 1980's they were interested above all in smart and precision weapons and electronic warfare, and they have now noted the importance of information operations⁶³. Some theoreticians even claim that information warfare against Russia has already begun.⁶⁴

The Russian armed forces are currently developing more slowly and with less certainty than those of the western world due to the unstable political situation and weak economy. Also, the basis for development has been weakened by the decrease in the overall capabilities of the armed forces during the last decade. They have also diminished in size during the last year, mostly because of weak funding and the failure of the conscription system to work properly.⁶⁵

Most units of the Russian armed forces are incapable of conducting normal training or daily service and maintenance routines. Army units were able to carry out about 60 – 70% of their planned unit training programme in 1998 and about half of the planned exercises at the regiment level, while the Air Force was supplied with only about 29% of its fuel requirement, so that pilots were flying only 50 - 60 hours a year, and even less than that in many units. The Navy similarly has problems in maintaining its ships, and most of the training takes place in port because the lack of fuel makes it impossible to train at sea. The personnel structure of the armed forces is unbalanced, as there are almost as many officers as there are enlisted service-men.⁶⁶

Another problem for the armed forces is the ageing of their material. The procurement of new equipment has been reduced in recent years and is now totally inadequate to maintain a modern structure. In 1998 the armed forces received only 15 main battle tanks, 250 armoured personnel carriers, 10 self-propelled artillery pieces, 40 helicopters, 40 fighter planes and two submarines. No major surface ships or transport planes were obtained. These numbers were increased slightly in 1999, but in order to maintain an overall equipment age of less than 15 years, the purchasing programme should be dramatically increased.⁶⁷

The problem is appreciated among the political leadership, and an effort has been made to modernise the armed forces. After much negotiation, the president of Russia finally accepted a plan for the reform of the armed forces on 9th June 1997. The plan extends to the year 2005, but it has started slowly due to

economic difficulties. The reform in general is still following the original schedule, however, and it is intended that the armed forces should have been converted by the end of the year 2000 into a totally professional force with a peacetime strength of about 1.2 million men⁶⁸. This will nevertheless probably not be possible, and the replacement of conscripts with professional soldiers may actually be completed only around the year 2010.⁶⁹

The military reform will call for a complete change in Russia's division into military territories, the numbers of troops, structures and organizations. The number of separate armed services will be reduced from five to three, and a new territorial system will be created in which country is divided into six strategic regions.⁷⁰

The military reform will also require modernisation and streamlining of the command structure, at the same time as all development and procurement of new weapons systems will be concentrated in hands of the Ministry of Defence. The role of the General Staff in defence planning will increase and mobilisation readiness will be strengthened. A regional logistic system capable of supporting all the security forces will be developed, and operational and combat training will be increased.

It is also planned to form units that will remain on constant alert in the border districts. The ground forces would comprise 10 divisions and 15 - 20 brigades/regiments, which would be almost fully manned and in a constant state of readiness, while 3 - 5 airborne divisions and 2 - 3 airborne brigades would be maintained at the same level of readiness. The mobility of the strategic forces will be developed, and similar forces on constant alert will probably be formed in the Air Force and Navy. At the beginning of 1999 there were ten formations on constant alert in the Army, including three combined arms divisions, four combined arms brigades and three airborne formations⁷¹.⁷²

The forces will be divided structurally into three parts. Units on continuous readiness will be used to protect the nation's borders and to respond to possible crises, together with troops belonging to the Ministry of the Interior. Troops at lower levels of readiness will be responsible for allowing additional mobilisation and for the maintenance and stockpiling of material. These units will only be partially manned but will have most of their material ready at their depots. In case of war they

will be reinforced to full combat strength, and will be used to reinforce the troops that are already on the alert.

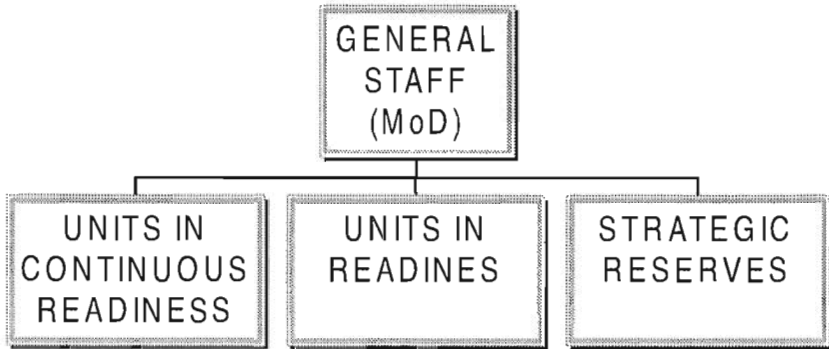


Figure 3. The division of troops in Russia

The third part will consist of strategic reserves that can be used to increase military strength in the case of war in order to defend the country against enemy offensives and to destroy enemy troops. This structure is also suited to offensive operations and makes it possible to deploy troops rapidly to different parts of the country and to increase forces in threatened areas in a flexible manner.

According to the plans, Russia should be capable of waging a large-scale war by 2010 - 2015. This will be achieved by developing a mobilisation system based on areas of responsibility defined in terms of operational-strategic regions. The mobilisation system can be used to reinforce the readiness troops with 10 - 15 divisions that are maintained at less than their full wartime strength. The system would also create the capacity to form 20 - 30 new divisions from the strategic reserves.⁷³

There will be no opportunity for new, larger armament or development programmes during the military reform, but instead the procurement of new material is to start after 2005, once the organizational changes are complete. The constant readiness formations will receive the best equipment currently available, but due to the poor economic situation, it will take a long time to raise the military capability sufficiently. Some

experts estimate that even in the best-case scenario, a credible and reasonable defence capability cannot be achieved before the year 2010⁷⁴. Until then the primary Russian defence capability will be based on a few Army, Navy and Air Force constant readiness forces, and particularly on nuclear weapons.

The planning of the Russian armed forces is directed at being prepared for both a large-scale war and local conflicts, although the difference between these two models is reduced under conditions of diminishing economic resources. Given the weaknesses of the conventional armed forces, the role of the nuclear forces has become more significant, although the development of conventional weapon systems is continuing in the framework of the available resources. It is hoped to be able to provide the forces with modern equipment in the course of time, including precision weapons systems and equipment for information warfare, as the economic situation improves.⁷⁵

On the other hand, it is difficult to keep abreast of the rapid progress being made in information technologies. Although Russia's development in certain areas of defence material is the best in the world, the country on the whole is clearly falling behind the west, especially on the sphere of information technologies. It is estimated that Russia occupies 41st place in the world in telecommunications, having fallen at least 15 - 20 years behind the western countries. It still does not have a national computer network, and it is ranked 34th in the world in the number of computers per person⁷⁶.

Although the armed forces estimate that they need 450 000 computers, there were only about 25 000 of these available in 1996. Even if they were able to start mass production of computers, it would take 5 - 8 years to produce all those needed. A more realistic time frame would be closer to 15 years.⁷⁷

One major problem is the limited resources of the Russian school system and the poor level of education of the people in general, which is reflected in the armed forces in the form of lower standards of schooling among recruits. Earlier, conscripts were required to have at least intermediate-level schooling, but this was dropped from the new school law, so that the average level of schooling in the 1995 draft was seven classes or less. According to the military authorities, this level is inadequate for learning how to use modern fire control and weapon systems^{78, 79}.

Moreover, levels of manpower and equipment in the Russian army will decrease in the future. Instead of heavy divisions, smaller, more mobile and flexible brigades will be developed. Some divisions have already been transformed into peacetime brigades, and brigades will become the most important unit in the army in the future, replacing divisions⁸⁰. The support elements of the brigades will grow in order to make them capable of more independent operation, and a corps-brigade structure will be employed in the most important units, allowing better flexibility and independence of operation.⁸¹

At the battalion level and below the Russians will keep their traditional forms of organization and material well into the future. Although information technologies will be developed, the restricted resources will mean that modern equipment cannot be deployed at the lower organization levels.

Reconnaissance is also being emphasised in the Russian armed forces. This is conducted mainly by traditional armoured and patrol reconnaissance units, but UAV and electronic intelligence systems are under development. It is planned that the primary ground units of the readiness forces, the manoeuvre force corps, should include an armoured reconnaissance brigade, UAV battalions and electronic intelligence battalions, while the mechanised infantry and armoured brigades should have an organic armoured reconnaissance battalion.⁸²

The importance of space-based intelligence systems is well understood by Russian planners, but due to the poor economic situation these systems will continue to decrease in number and capacity in the coming decade.

The Soviet Union was one of the forerunners in the development of airborne and air assault troops, and the air component of the land forces is expected to become even more important in the future. Large-scale airdrops are seen as impractical high-risk operations, however, due to the improved air-defence systems and fast-reacting, long-range area firing systems possessed by potential adversaries.

The airborne forces have evolved into more of a helicopter-transported force. The numbers of airborne and air assault troops will decrease to some extent, but their proportion relative to the land forces will in fact increase. According to existing plans, the air assault troops will be developed for use as mechanised air

units, troops that would include air assault infantry, armoured transport helicopters and combat and fire support helicopters, to be accompanied by close air support aircraft. These units would be used much like mechanised infantry units supported by main battle tanks are used today, but with better mobility, and their combat capacity would be greater than that of traditional airborne troops. Development is fairly slow, however, due to the lack of resources. If the armed forces cannot begin to acquire new helicopters within five years, it is estimated that in a worst-case scenario the Russian armed forces will not have a single large combat helicopter unit operational by the year 2010.⁸³

The development of air and naval forces in Russian represents an attempt to follow the same trends as in the western countries, but the lack of resources only allows a small part of the air force and navy to be maintained at modern standards. Levels of equipment and manpower are dropping, and organizational levels are being reduced at the same time.

Special forces have proved useful in Chechnya and in other crises in the Caucasus, and cuts have been proportionally smaller among the special forces than among the other troops. The special forces are being developed in the same direction as in the Western countries, with plans to phase out the conscript system and make these forces totally professional eventually.

The Russians believe that the importance of reconnaissance and strike systems formed by integrating intelligence, C3 and precision weapon systems will increase in future operations⁸⁴. The massive use of firepower will mean that even large-scale wars will be of short duration. At the same time, however, the importance of information and psychological operations will increase, a fact which according to Russian theoreticians, has not been properly understood in the past.

The Russians can see that they are clearly lagging behind the United States in the technological sector of the development of information warfare, and realize that they have to use all possible means and maximise the potential of their own strengths to balance this. This will imply putting a lot of effort on developing the theory of information warfare operations and they also intend to employ their perceived advantages in the psychological sector.⁸⁵

No official military definition of information warfare has been endorsed to date in Russia. The most authoritative person to define the term so far has been Vladimir Pirumov, a retired admiral who has recently been serving as Scientific Advisor to the President of Russia.

According to Pirumov, information warfare can be carried on in peacetime as well. When discussing the wartime use of information warfare, he states that: "Information warfare in operations is the aggregate of all the coordinated measures and actions of troops conducted according to a single plan in order to gain or maintain an information advantage over the enemy during the preparation or conduct of operations. An information advantage assumes that one's own command and control components are informed to a greater degree than those of the enemy, that they possess more complete, detailed, accurate and timely information than does the enemy, and that the condition and capabilities of one's own C2 system make it possible to actualise this advantage in combat actions of troops."⁸⁶

The Chechnya crisis in 1995 - 1996 is mentioned as an example of a war where information- and psychological operations were clearly deficient. The Russians project that in the future even strategic aims could be achieved by combining the use of precision weapon systems and non-military functions (media) in information and -psychological operations, thus allowing the enemy's C3 system to be suppressed, its command ability to be impeded, significant objects and forces to be destroyed and its psyche and morale to be weakened. On the other hand, the presence of international media is increasingly important, because of the ability to globalise the crisis and affect its end result.⁸⁷

The Russians believe that the probability of local crises and conflicts occurring within one military district is increasing, and are prepared to form an operational-strategic command on the base of a military district headquarters to deal with this kind of crisis. Such a command would have control over all the troops from the armed forces, the Ministry of the Interior, the border guards, the government's communication and information administration (FAPSI) and the security service (FSB). These would make up an operational force group.

The Russians intend to win such local wars with the high-

readiness troops that the operational-strategic command would have at its disposal. The operational force group may comprise an airborne division, a special forces brigade, 2 - 4 tactical missile brigades, 2 - 4 rocket artillery brigades, an air-army and a mobile force corps, for example.

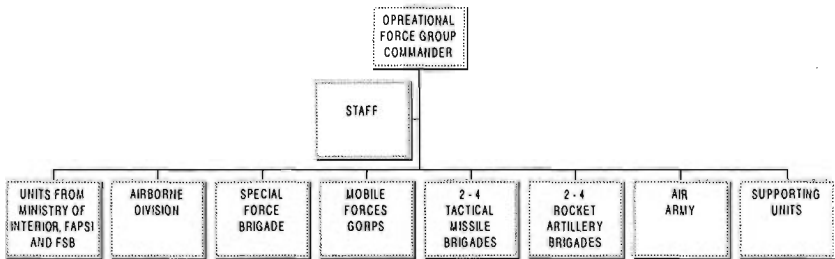


Figure 4. Organization of an operational force group.

The mobile force corps, which would normally comprise 1 - 2 motorised infantry or armoured divisions, 1 - 2 motorised infantry armoured brigades, an air assault brigade, 1 - 2 artillery brigades and other support troops, would be the most important manoeuvre force under the operational-strategic command. In addition there could also be units from the Ministry of the Interior, border guards and security services.⁸⁸

Such an operational-strategic command would be in charge of the army and corps level operations and the deployment of tactical units, although some units might have more independent missions. Manoeuvres and offensive actions are emphasised at the tactical and operational levels in the Russian art of war, whereas defensive operations are conducted temporarily, only when the situation does not allow offensive operations. The use of surprise electronic and fire strikes followed by fast manoeuvres is typical of offensive operations, and the use of air power is emphasised because of the ability to concentrate this rapidly and use it deep in the rear of the enemy.⁸⁹

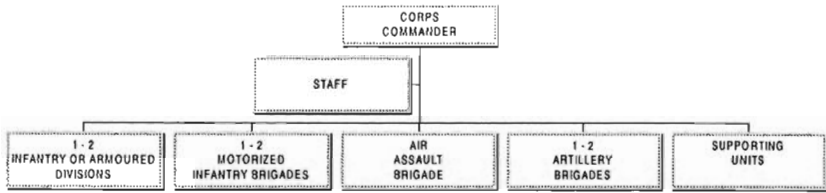


Figure 5. Organization of a mobile force corps.

In the preparation phase of an offensive, the operational-strategic command will normally conduct an information warfare operation, with the principal object of finding out the detailed deployment of the enemy forces, their combat capacity and how the central C3 system works. The other important aim is to disturb the enemy's military and political decision-making system. The information operation must be started by deceiving the enemy about one's own actions and disrupting the functioning of his intelligence system. This deception is considered important, as it is almost impossible to hide one's own preparations and the formation of an operational force group completely, which means that the enemy must be prevented from starting any significant counter actions at the right locations or at the right time.⁹⁰

Deception can be achieved by spreading false information via one's own media, disrupting the functioning of the enemy's media and using one's own forces and firepower in a deceptive manner. Information operations should be conducted in such a way that the enemy does not become aware that the individual parts of the operation belong to a co-ordinated action.⁹¹

During the information operation the intelligence and fire co-ordination elements of the operational-strategic command and mobile corps form a detailed picture of the location of the enemy's troops and their most important weapons and C3 systems. This is done mainly by the use of electronic intelligence, air reconnaissance and special forces. Integrated combinations for 'conducting reconnaissance-strike operations can be formed out of the command, intelligence and weapons systems in order to locate and destroy targets deep in the rear of the enemy almost in real time.⁹²

These reconnaissance-strike operations can be launched as soon as sufficient information is gained, even when there is no

overall superiority over the adversary in troops or weapon systems. The most important consideration is the number and capacity of the precision weapons, air forces, EW systems and reconnaissance-strike force combinations which can be used to achieve air- supremacy and superior firepower in the combat area⁹³ . Long-range reconnaissance-strike force combinations and air forces can be used to suppress the enemy's centrally controlled long-range weapon systems and command centres at the beginning of the operation, while fire strikes prevented the movement of enemy troops. In this way, the enemy's capacity to continue operations can be eliminated and armed resistance can be brought to an end.⁹⁴

The idea in a reconnaissance-strike operation is to destroy the targets in accordance with the objectives of the operation, and the length of the operation will depend on the enemy's defensive system and level of preparedness, but would probably be 1 - 3 days. In order to safeguard the freedom of action of reconnaissance-strike force combinations and air forces, the enemy's air defence system and air force units will be suppressed in the first phase. If the operation is to be followed by a ground-force offensive, suppressing of the enemy's C3 system will create suitable conditions for this. Breaking down the defences in certain areas before the offensive begins will enable ground forces to manoeuvre deep in to the enemy's rear. According to Russian estimates, at least 30% of the enemy's combat systems must be suppressed before the ground offensive. The idea is that reconnaissance-strike operations should extend to the whole depth of the operation area.⁹⁵

In the reconnaissance-strike phase the enemy's key systems should be suppressed by tactical missiles, radar homing missiles and other precision weapons. This will reduce the amount of ordnance needed, lower the logistic burden and shorten the time needed for the operation. Simultaneous electronic jamming will increase the effect of the fire strikes. On the other hand, conventional artillery and rocket artillery can be used against enemy troops that are operating behind their own lines even in situations where targeting is based on uncertain information.⁹⁶

The main objective in a land offensive following a reconnaissance-strike operation is to seize key areas which are critical for one's own operations and those of the enemy and to

destroy objects that are vital to the enemy's operations. Forces should be dispatched to their objectives from several directions, and there should always be an element of deception in the operation. In an offensive operation the enemy must be denied the ability to gain vital information⁹⁷, at the same time as his command and intelligence systems are loaded by deception operations conducted on his flanks and rear areas and by repeated feint-attacks⁹⁸ made before the real offensive begins⁹⁸.

The enemy's strong points should be by-passed as much as possible, even by using difficult terrain if required, and the offensive should be supported by air assault operations in the enemy's rear areas. Air assault troops must seize key areas that are critical to the land forces' manoeuvring ability and destroy enemy command centres and reserves. It is critical to maintain the movement of land forces in all situations. It should be possible in a local war to reach distant objectives located at depths of 100 - 150 kilometres in 4 - 6 days.⁹⁹

In a large-scale war an operational-strategic command may control 2 - 4 armies, 1 - 2 corps, an airborne division, a special forces brigade, 2 - 4 tactical missile brigades, 2 - 4 rocket artillery brigades and 1 - 2 air armies. At least one of the corps would be a mobile force corps at a high state of readiness. Each army would contain 2 - 3 motorised infantry divisions, an armoured division and support troops.

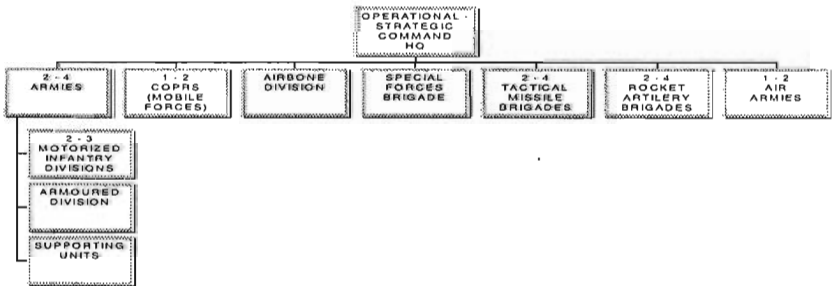


Figure 6. An operational-strategic command preparing for a large-scale war.

Most of the available troops would nevertheless be mobilised ones whose training and material would be at a lower

level than in the case of the readiness forces. While the readiness forces would be able to conduct mobile operations and offensives deep behind the enemy lines, the mobilised troops would only be capable of tactical-level offensives and traditional attrition warfare.¹⁰⁰

A large-scale offensive might begin in the same way as an offensive in a local war. As the majority of the forces would not have the capacity to form integrated reconnaissance-strike force combinations, precise firepower would be supplemented with voluminous firepower. Massive fire support would be used to break the enemy's front-line defence in certain directions. After the reconnaissance-strike operation, the mobile forces corps and airborne division would be directed deep into the enemy's rear areas, in order to suppress his command centres and reserves. When the troops and objectives that are vital to the continuation of operation of the enemy's main forces have been destroyed or cut off, the main forces can be destroyed by an offensive on the part of one's own main forces supported with massive fire.¹⁰¹

Once operations have started, a parallel planning process is initiated, in which the basis for planning is given over to the subordinate commands while the higher command is still conducting its own planning. The plans made by the subordinate commands still have to be accepted by the higher command, however, before they can be put into effect. The planning process in an army takes about 2 - 3 days, but it is to be hoped that this in particular and also the working of the mobile forces corps headquarters can be speeded up in future by means of modern computer systems. Computer applications enable different solutions to be compared and information, orders and plans to be sent between different headquarters.¹⁰²

The Russians do not yet have the equipment to conduct operations of this kind, however, and their ability to conduct deep, almost real-time, combined reconnaissance-strike operations and related psychological operations against an enemy's command and information systems is limited. The biggest problems concern the low capacity of the C3I systems and the lack of proficiency on the part of the leaders. The limited numbers of precision weapon systems and the slowness of the intelligence system are still compensated for by massed firepower. The level of readiness shown by the enemy is thus an

essential consideration, as an enemy at a low state of readiness can be expected to be defeatable with a much lower level of firepower. Consequently the ability to achieve surprise in all operations is considered important.¹⁰³

The Russians also believe that the future battlefield will be fragmented, and there will be no clear front lines. Fighting will spread rapidly over the whole depth of the operational area, and operational and tactical movement will increase, at the same time as offensive and defensive operations will be connected together in a seamless manner. Lower command levels must be able to fight independently, and even at the battalion and company levels the units will be fighting mobile battles that extend over a large area. Where this occurs the troops must be controlled in a coherent manner and superior units must be able to support them with effective reconnaissance-strike force combinations.¹⁰⁴

Recent developments in the Russian armed forces and operational skills have been much affected by the new war in Chechnya that started in 1999. This has proved to be a double-edged weapon for the armed forces. Parts of the forces have received valuable combat experience, and the air force pilots participating in the campaign have clocked up numerous flying hours, for example, all of which will increase the combat capacity of the armed forces. On the other hand, it is the special forces, airborne troops, marines and the most experienced air force pilots, that are carrying the major burden in the war. These few parts of the armed forces that were already at a high level of alert are being worn down by it, while at the same time the war effort is diverting a lot of personnel and material resources from other parts of the armed forces, thereby slowing down the military reform. The state has covered some of the additional expenses from sources outside the military budget, but this will probably not cover all the cost and will definitely not make up for the losses among the most experienced officers.

In order to strengthen the armed forces, Vladimir Putin, when Prime Minister, promised to increase investments by the armed forces by 50% in 2000, implying funds of about FIM 12 billion for that year. The spending is intended to create a modern, mobile army equipped with high-precision weapons. Most of the funding will be taken up, however, in modernising existing equipment. This represents a short-term solution, but will not

reverse the increasing age of Russia's weapon systems. It is also uncertain whether the weakening state of the Russian economy will allow the promised funding to be arranged for the armed forces.¹⁰⁵

The war in Chechnya probably will not have any major effects on Russian operational skills. The war is seen as a limited "police action" against terrorist forces. The undeveloped infrastructure of the country and the simple and crude C2 structure of the guerrilla forces mean that no proper targets are presented for information operations. The asymmetric nature of the war is pushing the Russian armed forces into relying on conventional anti-guerrilla tactics.

3.3 Conclusions

Technical development will radically alter warfare in the coming decades. In the development of operational skills there has for a long time been a desire to conduct deep, mobile warfare in order to eliminate the enemy's ability to continue fighting without having to resort to costly attrition warfare. Developments in military technology will enable this kind of warfare to take place in the future. The model is illustrated in the figure below.

The capability for waging information warfare provides the developed countries with new opportunities to influence their opponents in order to safeguard their own national interests. The effects of information warfare are for the time being felt most strongly at the strategic level, during the so-called "grey phase" before the start of the hostilities. Once hostilities have commenced, information warfare at the operational level is mostly command warfare.

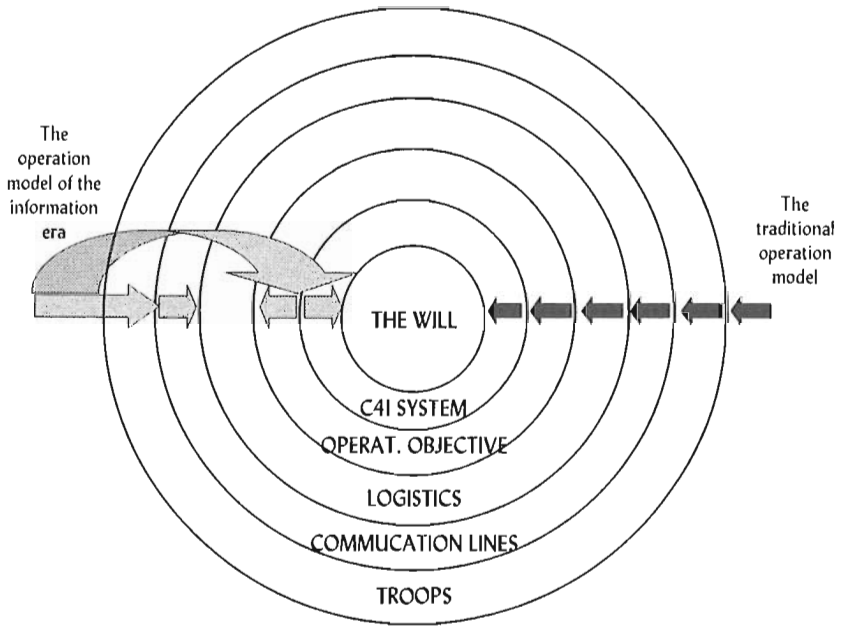


Figure 7. Development of the concept of operations.

Recent experiences in the Kosovo conflict have proved that even the western powers are still incapable of fully enjoying the information dominance they had against an underdeveloped opponent. Instead of fast, fluid and flexible information operations aimed at totally crippling the Serbian military command structure and suppressing its army's will to fight, the Allies were mostly hunting down and destroying command posts and military communication sites. Their inability to affect the will of the Serbian population and military made it possible for the Serbian political leadership to protract the crisis.

Real-time command and control, an enlarged battle space and 'simultaneously co-ordinated actions in time, space and functions are needed in order to rule the battlefield. New information systems which facilitate non-hierarchical distribution of intelligence, target and other information at all levels make it possible to command troops by using net-like control instead of a traditional hierarchical structure. The

importance of key systems is growing, and electromagnetic mastery is decisive for the success of operations. Air and space superiority is required to engage the enemy systems quickly enough and in a large enough area. If the defender can deny information superiority and/or air superiority at least locally for a limited time, it can hamper much larger operations.

This was clearly seen during the Kosovo conflict, where the Allies were unable to totally suppress the Serbian air defences, which forced the Allied aircraft to operate at higher altitudes and in turn made it impossible to use the US Air Force PSYOPS planes effectively and hampered efforts to destroy Serbian ground forces in Kosovo.

New technical systems, advanced weapon systems and increased mobility of troops will provide opportunities to employ entirely new tactics and operational skills. By affecting all the enemy's key systems simultaneously for a short time to an overwhelming extent and over the whole depth of the operation, he can be suppressed immediately, at the very beginning of the operation. The distinction between war and crisis is diminishing, and armed forces are being asked to operate in even more chaotic conditions than ever.

Apparently separate operations should be made to occur so seamlessly that the opponent has difficulties in setting up a clear picture of the situation in time. The final goal is to force him to submit to one's own will merely by denying him all information and reducing his forces and options by the selective use of firepower. If this is not enough, the information operations may be followed by rapid concentration of land, sea and air transportable forces and strikes over the full depth of the opponent's operational area, or by the threat of such operations.

It must be borne in mind, however, that information warfare does not mean the end of traditional warfare. The armed forces and administrations of underdeveloped countries are not dependent on sophisticated C3 systems, and they are capable of sustaining quite significant losses. In this situation the only effective measure for influencing an opponent is to destroy his military power and conquer the country. The same is also valid in the case of developed industrial countries, which have such a strong desire to maintain national sovereignty that the nation is ready to sacrifice a great deal in order to defend it.

When fighting against a technically inferior armed force, information warfare offers plenty of opportunities to influence the enemy. Strikes against communications, transportation systems and depots can disrupt the large-scale mobilisation of reserves, and the calling-in of reservists can also be delayed by disrupting the postal, telecommunications, radio and television systems. This can be done by physical destruction, by electronic jamming, by saturating them with false information or by hampering the operation of computer systems with viruses or other means.

Mobilised troops can be located very quickly and accurately with the help of airborne reconnaissance systems. Multi-sensor systems can detect targets in ever more difficult conditions, which means that the cover offered by the terrain or the weather is diminishing. Once revealed, the command, control and communication centres can be suppressed by deep strikes, or else their functions can be degraded by the methods of electronic warfare. The protection of command and communication centres is more difficult, because the threats are highly diverse.

In addition to protection against traditional weapon systems and strikes by special forces, there must be a readiness to prevent the effects of electronic warfare, EMP weapons and computer hacking, all of which can slow down and hamper the command process and the conduct of operations. An unclear situation can even mean that the decision-making process may be delayed further. In this way a technically more advanced opponent can guarantee himself an overwhelming tempo of action from the beginning of the operation.

After the opposing forces and their positions have been revealed, this information can be processed and distributed to one's own troops very quickly, while the enemy forces must be kept under constant surveillance. This also enables one to maintain a superior tempo at the tactical level. Better developed forces can use their firepower more accurately and by-pass enemy troop concentrations and positions rapidly. Not even the holding of key terrain can guarantee a slowing down of enemy movement, as this terrain can be by-passed by air if necessary.

The indirect fire systems of a technically inferior opponent can be located quickly, and the firing units and fire co-ordination systems can be suppressed with precision weapons systems, area

suppression systems or electronic warfare systems before they can affect one's own troops. Slow moving towed artillery and mortar systems are especially vulnerable to rapid counter-strikes made by integrated intelligence and firepower systems.

Rear areas are disappearing as operations are spreading in depth very rapidly. All the forces that are operating in a combat theatre can be engaged around the clock., and thus all troops must be able to protect their own activities and positions. They must be able either to enter combat against enemy troops or cover themselves against enemy fire immediately.

The special and guerrilla forces that operate behind the lines of technically developed armies may not be able to disrupt their opponent's actions very effectively. Strikes should be directed against the enemy's key systems at a rapid tempo, and not against coincidentally met enemy combat and logistic troops, and in order to achieve this the special and guerrilla forces need an accurate situational picture of the enemy rear areas, functional communications and well-trained and equipped forces.

A capability for operating in urban areas is becoming increasingly important. Crucial operations will be conducted in such areas in the future, as these are usually also administrative and logistic centres. For the defender, however, an urban area might offer better protection and cover against modern intelligence systems.

It is becoming increasingly difficult to blind an enemy's intelligence systems, because the destruction of a single sensor is not enough to suppress the whole system. In order to have the desired effect, the system architecture and its key points have to be known in detail. The saturation of intelligence systems and operational deception are becoming more important.

Advanced technology will also introduce some weaknesses into the systems maintained by the major powers, which a skilful opponent can use to his own advantage. Their armed forces will come to depend more and more on key systems, and the systems will be integrated and warfare more complicated. In this situation the degrading of even a few key systems could considerably hamper an aggressor's offensive operations.

In the development of her armed forces Russia is intending to follow the trends of the major powers, and particularly of the United States. Due to the lack of economic resources, however,

this development will be slow, and it will probably take several decades before the desired capabilities are achieved. The main objective will be to develop a professional force that is capable of conducting combined multi-service and special operations, taking advantage of modern information technologies and developed reconnaissance-strike force combinations. As long as this is impossible, the readiness to conduct traditional operations will be maintained, including the use of large-scale offensive operations with ground forces. These traditional operations will be supported in the near future in a limited way by air and naval forces, and if necessary, with nuclear arms. The development of tactics and operational skills will continue, in order to create a basis for the development of new systems and in order to provide the capability for putting the new systems to effective use as quickly as possible once they are fielded.

As the Russian armed forces possess relatively few modern precision weapon systems and munitions, the lack of accuracy in their firepower is compensated for by the use of massive firepower and the mobilization of large land forces when fighting against a well-prepared, advanced enemy. Combat operations would be supported by psychological warfare operations. The ability of the Russian armed forces to technically degrade enemy command systems, e.g. by using hackers to manipulate information, is weak. Therefore the enemy's command system must be suppressed mainly by destroying its key objects by firepower and by influencing enemy leaders' decision-making processes by the methods of psychological warfare.

A large-scale mobilisation commits a large amount of resources, however, and takes a lot of time, which gives the enemy time for his preparations. In a large-scale offensive against a well-prepared enemy it takes longer to achieve one's objectives and the risk of casualties to one's own troops is greater, arousing political pressure to cease operations. In order to avoid these problems, a maximum of surprise is always sought. In a surprise operation the objectives may be reached with peacetime troops and with a low rate of casualties, as the fire preparation will probably be short, consisting mainly of limited precision weapon strikes aimed at suppressing the enemy's key systems, followed by a rapid strike conducted by

special, airborne and mobile forces that are constantly at a high level of readiness.

C3I systems play a crucial role in Russian operations, for without them the Russians would not be able to co-ordinate the actions of supporting operations by air assault units, long-range mobile units and others, including the air force. In order to achieve a rapid victory, the main role is played by the air assault and mobile units, which are already in a high state of readiness in peacetime. If one is able to cause casualties to these units and to limit their freedom of action, one is able to prevent the Russians from preparing a wider assault and conducting orderly and efficient actions with their main forces.

The next decades will be time of change. Existing force structures, tactics and operational thinking, developed during the Cold War, will be shaped according to the new reality. New techniques will be adopted rapidly, but the old force structures and readiness to mobilise large traditional armies will remain for some time. Not even the United States has the resources to equip all its forces with the newest material suitable for information warfare. In most countries forces are divided into two classes, elite forces at a high level of peacetime readiness and possessing modern equipment, and main forces that have older material and need reservists and training before reaching combat readiness.

Participation in international crisis management operations will be one of the main missions of the western armed forces in the future. Crisis management will increasingly take the form of multinational undertakings in which information operations play an important role. In Europe these will probably be mainly NATO-led or at least based on NATO structures. Troops that are sent to these operations must be interoperable with NATO units and trained and equipped to conduct multinational information operations under NATO leadership.

4 DEVELOPING FINNISH TACTICAL-OPERATIONAL CAPABILITY

4.1 Principles

The security policy report placed before the Finnish Parliament by the government in spring 1997, which covers guidelines for developing the Finnish armed forces until the year 2008, defines the outlines of the country's security policy, which should be reviewed and revised where necessary in 2001 and 2005. This states that the cornerstones of Finnish security policy are:

- a credible, independent defence capability,
- military non-alliance in peacetime, and
- membership of the European Union.¹⁰⁶

The crisis and threat models forming the basis for planning are the following:

- political and military pressure with an associated threat, of military force or limited use of force,
- a surprise strategic strike aimed at paralysing and seizing vital targets and subjugating the national leadership, and
- a large-scale offensive with the objective of seizing strategically important areas or making use of Finnish territory for action against a third party.¹⁰⁷

The wartime forces will be divided into Operational and Regional forces. The operational forces will enable the defence capability to be increased rapidly and serve as the linchpin of the defence effort. These will include the two most capable armoured brigades, three type 2005 readiness brigades, six Jaeger brigades, other units of the ground forces and most of the mobile units of the Navy and Air Force. One of the readiness brigades will also be intended to perform peacekeeping and crisis management tasks. An evaluation will be made of the possibilities for the Navy and Air Force to participate in crisis management.

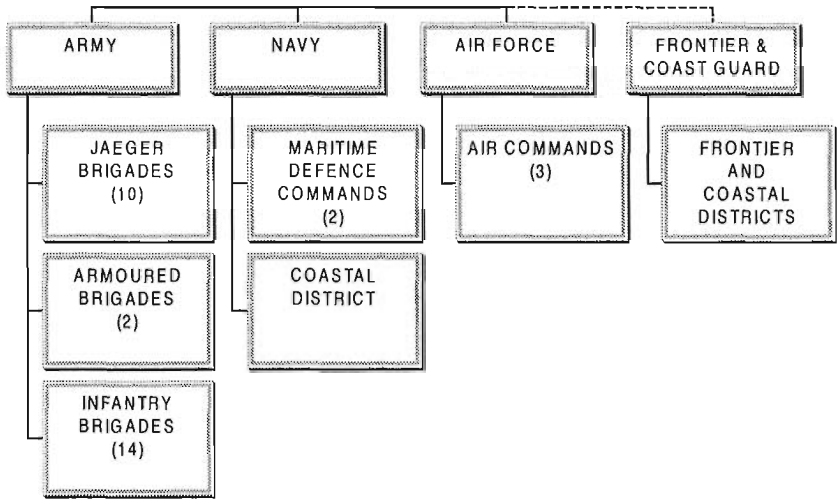


Figure 8. The Finnish wartime operational forces.

The Regional forces will provide the whole country with a defence shield. They are intended to perform combat and support tasks that are limited to a specific area or target. The most important of these are the 11 regional brigades, with their tasks of defending key areas.¹⁰⁸

The Command Staff is the most important operational staff in the Finnish military chain of command. Finland is divided into three Commands, which are responsible for defence preparations, increasing readiness, and conducting defence operations. The Defence Staff allocates operational brigades and sorties to the Commands, or units of the Air Force and the Maritime Force for implementing counter-attacks. The Military Districts, which are subordinated to the Commands, are responsible for regional defence in their own areas. The corps headquarters would be used for conducting operational counter-attacks under the command and control of the Defence Staff and the Commands.

Current defence planning is based on the estimate that the defence appropriation will remain at the present level, which is some FIM 9.5 billion annually until 2004, when it will decrease slightly. As the present level is approximately 1.6% of the gross national product, it is assumed that the proportion will decrease to 1.3 % by 2008. The plans are that more than FIM 27 billion will be spent on the purchase of materials during the years 2000 - 2008, a considerable proportion of which will go on the electronic warfare systems and C3I systems needed by the rapid deployment units of all three services.¹⁰⁹



Figure 9. The Chain of Command in the Finnish Defence Forces.

The threat model guiding the development of the Finnish defence forces has not changed significantly. The only new elements are the possibility of a strategic surprise strike and the possibility of an adversary threatening Finland with sophisticated weapon systems and other means from a long distance. In view of the conclusions reached in the previous chapter, technical developments will not increase the operational - tactical level requirements for the defence of Finland, as corresponding requirements have already existed for some time.

From the Finnish point of view, the greatest challenges will arise as limited resources have to be adapted to broadening requirements. Developing defence capabilities to meet these

requirements will be an expensive and lengthy process. In order to maximise efficiency when using the limited resources, the existing and already functioning parts of the defence establishment must be put to best use. The same principle must be followed when considering the use of resources for the civil society.

Sophisticated societies are always subject to distraction. On the other hand, sophisticated technology will strengthen the defence forces' capabilities for fighting or protecting society against the new threats of the information era. Finland is an advanced information society equipped with a modern infrastructure, and its telecommunication and computer networks are especially sophisticated. The percentage of mobile telephone and Internet users within the population is among the highest in the world, for example.

Finland is participating in the worldwide development of high technology, thanks largely to Nokia's remarkable standing in the international telecommunications business. A well-functioning education system and a high overall level of education favours the introduction of advanced systems. Each Finnish citizen receives 9 - 12 years of general schooling before beginning vocational education, and the level of education is high by international standards. Finland has a large number of universities relative to its population, and, of course a significant amount of research and development activities, especially related to information technology.

As an independent nation, Finland plans to defend herself on her own soil. Even if the suppression of key systems in society were to cause severe problems, Finnish independence could not be threatened without a foreign military presence or at least partial occupation. The will to defend the nation and readiness for armed conflict is, according to the latest surveys, extremely high¹¹⁰. This strong will for national defence, ingrained for decades, tends to sustain itself, so that a potential adversary would be required to plan for the use of a significant amount of military power in order to achieve control over Finnish territory.

The objective of Finland's national defence is to prevent an enemy from physically seizing the key areas and suppressing the key systems in society and in the armed forces. According to the accepted doctrine, the enemy would be worn down and delayed

over the whole depth of the area and once weakened, could be stopped in pre-selected areas and defeated by operational counter-attacks in decisive battles.¹¹¹

When developing our forces in the direction of information-age warfare, it is reasonable to ask whether this scheme will remain valid in the future. Conventional ideas about repelling an attack and defeating an enemy's attacking force may have to be re-thought.

Certain basic flaws and strengths can be discerned in the Finnish defence strategy which must be noted and recognised when assessing future development opportunities. Under the special conditions prevailing in this country it is even possible that some weaknesses could be converted to strengths. Our force structure can be seen to be unnecessary large, especially if the capabilities of our forces are measured by the amount of modern equipment possessed. Parts of our forces are today equipped with material which is both quantitatively and qualitatively inadequate for the battlefield of the future. On the other hand, the great size of the mobilisation army, based on general conscription, clearly raises the morale of the people, a factor of strategic importance. The force structure nevertheless includes a relatively large proportion of totally defensive elements, creating a situation of the kind that almost always leaves the initiative with the adversary.

One of our greatest strengths on the information-age battlefield is still the advantage of fighting in a familiar area and under familiar conditions. Operating on our own soil, the establishment of C3, intelligence and logistic systems is easier and operations are easier to conduct. The fact that some of the troops have quite modest communications systems based on older techniques actually makes them almost immune to the latest forms of electronic warfare.

The basic laws of warfare will remain, despite the fact that technical development is moving extremely fast. On the battlefield the decisive operational level factors that will remain in the future are efficiency of action, tempo, initiative, the element of surprise and optimal use of force. Combat is still a contest between two opponents, who do their utmost to be faster, more cunning, more systematic and more efficient than the other side. It is not important how much better one is; the essential

thing is to gain a relative advantage over the other side by being just sufficiently better.

When preparing to operate against forces that use information-age technologies, the most important objectives for development are:

- high levels of readiness with the highest quality troops,
- a flexible, reliable C3I system in a constant state of high readiness, which leads to battle space control,
- adequate battle tempo,
- ability to optimise the use of force according to the situation, and
- battle endurance.

In planning and conducting operations, the Finnish terrain and conditions should be utilised to provide the most favourable placement of units and the optimisation of tactics, thus creating as advantageous a battlefield equation as possible. An adversary's caution can often be used against him, since he will endeavour to minimise the risk to his own forces by "keeping them out of "harm's way" until he can be sure of the success of his operation.

The uniqueness of the Finnish defence concept should be used to advantage when developing future plans. The role of the local defence troops should be emphasised in the near future, as the development of a local defence capability is probably one of the most cost-effective methods of raising the overall capacity to defend the country against a large-scale offensive.

Technical development should also cause weaknesses in the enemy, which we must be able to use to our own benefit. Under Finnish conditions these weaknesses will probably include:

- reduced personnel strength, which undermines battle endurance and the ability to sustain casualties,
- increased dependence on continuous logistic services, and
- an increase in the number of critical systems.

A basic assumption in our situation must be that, the enemy's personnel and equipment resources will always to a large degree be overwhelming. In order to restore the balance, we must concentrate on

- disturbing the enemy's command structure,
- maintaining our own command capability,
- maintaining a superior battle tempo, at least in the critical phases,
- specifying optimal objectives for the use of force with regard to time, place and function,
- using our own forces economically, but without avoiding risks when required, and
- maintaining superior morale, discipline and spirit.¹¹²

4.2 Development of operational art and tactics

Warfare is based on constants, and the possibilities enabled by these constants must be exploited in operational planning and in combat. By creating circumstances where relative strength is achieved in as many areas of warfare as possible, strategic objectives can be more easily achieved. Operational art and skill is required for creating such circumstances.

The importance of operational skill will be emphasised in the future battlefield, because this makes it possible to employ tactics which support strategic objectives. Advantage should be taken of all possible systems and structures available in these operations. The quantities of troops and systems employed will not be the most important factors when we are conducting operations in the future, however, for the most important elements in achieving success are an operational concept that is tied to time, place and function together with an objective. Even small units can achieve an objective that is of significant long-range importance.

On the future battlefield the adversary will already have made preparations in peacetime which are directed at achieving information superiority, with the intention of creating conditions for air and fire superiority. In the last phase, if necessary, the opponent can manoeuvre in order to achieve local superiority in numbers and combat capacity. In its simplest form, the aim when developing tactics and operational art should be to prevent the realization of these superiority models.

Smaller national defence forces cannot base their planning

on complete battle space control as do the major powers. Greater advantage may be gained by concentrating on areas of technical development, which complement sound operational planning and maximise one's own strengths.

The major powers begin both large-scale offensive operations and strategic surprise strikes with the achievement of information superiority, which is followed by special force strikes and reconnaissance-strike operations carried out by the various services to suppress the defender's key systems. This phase is followed, if necessary, with attacks by mobile forces from land, sea or air. As operations progress, the attacker must move considerable numbers of forces through land areas to his operational and strategic objectives.

To counter an attack by a major power, the defender's intelligence and C3 systems, air defence system and long-range weapons systems must be protected. Only in this way can the aggressor's air and fire superiority be temporarily suppressed in limited areas in conjunction with the defender's own operational counter-attacks. Key systems must be defended by troops that are at a high level of readiness, and then later with mobilised local troops.

According to the Finnish defence doctrine, the attrition of enemy forces must commence at the border. Our efforts should be directed especially against the enemy's key systems, because this is the best way of hampering his overall operations. The enemy has to be denied freedom of operation, and this is best accomplished by active, mobile troops, since troops that are positioned for static defence may be suppressed or bypassed.

Finland is geographically a fairly large country (338,000 square km). It is not possible to achieve detailed, accurate real-time situational awareness of the entire landmass with limited resources. Therefore, we must concentrate on detailed situational awareness covering only the most strategic areas. The wooded terrain and extreme weather conditions increase the capability requirements placed on intelligence and reconnaissance systems.

These systems must provide multi-sensor capabilities and be suitable for easy movement by air or on the ground. The most capable intelligence and reconnaissance systems must be massed in the most important areas in order to create and maintain the required situational awareness, while in other less critical areas

situational awareness should be based on the information gathered and maintained by the units in their areas of responsibility and interest. These units collect and disseminate surveillance information by means of a fixed intelligence network.

Critical troop formations must be kept beyond the reach of enemy firepower until they are committed to battle, and since highly developed intelligence systems will make it very difficult to maintain the security of one's own force's movements in the future, the importance of deception operations will increase. By dispersing the troops, keeping them constantly on the move and using deception it should be possible to prevent the enemy from bringing his long-range firepower into play¹¹³. Operational security must be emphasised at all times, and deception operations should be planned and led by local commands.

The enemy's technical capabilities must be taken into account in operational planning and the execution of operations, and since it will probably be impossible to protect larger troop concentrations against enemy intelligence efforts, it will be much more important to disguise the operational intent, e.g. by way of an adequately large-scale deception operation. In order to make a deception operation credible, it should be planned and coordinated by an operational level headquarters, but its execution should be assigned to regional/territorial units in order to save operational units for the true effort. The plan should include alternative actions to allow for altered requirements as the operation unfolds.

It will probably be very difficult on the battlefield of the future to define and locate the enemy's order of battle and his principal targets. Optimising the use of friendly forces will be difficult for all staff levels. Opportunities for independent actions and local initiative should be supported operationally by guaranteeing appropriate preconditions and sufficient resources. The operational staffs will be expected to be able to control a complex force composed of brigades, battalions, regional units and units from the different services.

The centres of gravity against which troops, systems and material are targeted should be determined on functional rather than regional criteria. Rather than simply numbers of units, these centres of gravity should be determined by the desired results

and one's own operational goals. The goal should be to strike at the enemy's weaknesses and vital activities, so that instead of aiming the operational counter-attack against the enemy's first or second echelon, the centre of gravity may in fact be the headquarters commanding and controlling the operation. A strike against such a target could be executed by special forces or accurate long-range weapon systems, for example.

Echelons as such will lose their importance in the flexible, fragmented battlefield future, where it will not always be necessary to aim at the full operational depth of the enemy. Since a future adversary might strengthen his first echelon at the expense of the second, it may be essential to concentrate on the attacking the first echelon instead of the follow-on forces.

Operational counter-attacks require sufficient force, which should no longer be measured by the number of units but rather, as mentioned earlier, by their performance. In order to optimise the performance of limited resources, all the services must cooperate smoothly. Thus a deep, bold manoeuvre by ground forces, for example, requires co-ordinated action taken by mobile and fixed air units, and air defence units.

In order to maintain an adequate operational tempo, units of all sizes should launch counter attacks as soon as possible. Even a smaller but well-led, fast-moving unit supported by long-range weapon systems may cause significant casualties and damage to an adversary and his operations, but the preconditions for launching such an attack must be created by adequate support. Early and comprehensive situational awareness will enable unit commanders to take the initiative in such situations.

Executing such operations requires flexibility, since established courses of action can be predicted. This flexibility pertains especially to the chain of command and organizational structures, and calls for interoperability among units, and especially C3I systems.

The Finnish dilemma, in view of the requirement to be able to repel a wide-scale attack or a strategic strike, is that this requires versatility and flexibility on the part of all the units. The focus of their training and equipment should be on the tasks deemed to be required to repel a strategic strike. Defence against air landings is an example of such a task.

4.3 *Improving force structure and organizations*

Force structure

The training system of the Finnish conscript army will enable the maintenance of an efficient system based on regional defence in the future. Platoon and squad commanders and soldiers serving in the most demanding tasks serve for 12 months altogether, which is regarded as sufficient for the purposes of basic training and is then supplemented with regular refresher training. Soldiers doing their military service in more mundane duties can complete their basic training in six months. The frequency of regular refresher training courses for the reserves will increase as more funding is made available in the coming years, which will improve the overall performance of the Finnish mobilisation army.¹¹⁴

The Finnish Defence Forces have about 8 500 professional commissioned and non-commissioned officers, special officers and enlisted personnel who can be posted in a wartime organization, while the future field army will consist of some 430 000 soldiers. This means that wartime units would include an average of approximately 2% professional soldiers. This figure is insufficient, however, for the manning requirements of the more technical units, which are expected to perform the most demanding tasks.

Apart from the training system, the number of professional officers is one of the most important factors related to the performance of the units. This has been understood, and much attention has been focused on the deployment of personnel. No attempt is made at an equal division of professional soldiers, but rather their number has been allowed to vary between units. The best situation is naturally in the readiness brigades, which will also receive a higher number of enlisted soldiers in the coming years. This arrangement is expected to increase the performance of these units¹¹⁵.

The material problems are very much the same. The relatively small amount of money intended for acquisitions, when divided among all the services and units would mean that the future material requirements of the army brigades, for example, would be met at an extremely low rate. At the same

time, the equipment in use would continue to become obsolescent, and the overall capability to replace ageing material would continue to be exacerbated by increasing prices. To avoid this, Finnish units will be divided into categories based on the qualitative and quantitative differences in their equipment levels, the larger proportion of the new equipment being allocated to the best units.

The situation illustrated above accentuates the need to create clearly separate troop categories. The tasks for the units should depend on their levels of training and equipment. This creates challenges and requirements for operational planning, but at the same time it will ensure the allocation of resources to the most sophisticated units. The concept of a rapid deployment brigade put forward in the government report (1997) will serve as the starting point for this development.

Organization and tactics

The battlefield of the future will call for increased flexibility and versatility on the part of all units. The basic structures of units should be separable and divisible, as the mission requires, and should be capable of being tailored quickly according to the tasks and situation concerned. Force sizes should also be planned according to mission requirements. This will provide field staffs with the ability to optimise forces and make quick alterations in structure to fit the changing battlefield situation. Flexible organizations also make it more difficult for the enemy to maintain an accurate picture of his adversary.

Due to their unique organization and equipment, the Finnish armoured brigades will nowadays be mobilised as soon as general deployment starts. Once the armoured brigade is in action, the centre of gravity, or at least the direction of the action, will naturally be revealed, but its special requirements with respect to maintenance and C3 systems dictate that the armoured brigade must be deployed as a single entity.

Drawbacks of this kind should be avoided when developing forms of organization. We should consider transferring from a fixed brigade structure to a structure in which the brigade-level headquarters would lead the battalions and supporting units,

which would be planned and tailored in the optimal manner. This would also support the flexibility requirement.

The units planned for regional defence tasks should also be flexibly organised. The brigades planned to defend important areas are at present large, their mobility is poor and they are relatively easy to detect. Units in fixed, fortified positions are vulnerable, because fixed units can easily be bypassed or paralysed by massed fire. It would be worth studying whether at least some of the defence tasks could be carried out by smaller, mobile units supported by the systems required by their task. In addition to mobility, smaller units are also more difficult to detect as targets.

This type of organizational flexibility requires significant training, since any headquarters should be capable of controlling combat battalions in mobile operations. C3I systems should be standardised, which is difficult to accomplish throughout the whole range of operational and regional units.

The arrangement of logistics and heavy logistics units is currently a factor inhibiting mobile operations, but future sophisticated command, control and information systems will allow more "lightweight" logistics units due to the ability to optimise the distribution of material in time and space. It will no longer be necessary to equip units with large amounts of supplies, because commanders will be able to follow the logistics situation and allocate the material to the units as needed. Given real-time logistic situational awareness, it will be easier to use safe routes. The development of a pushing logistics system would improve the mobility of the combat troops and increase their operational tempo.

The Finnish logistics system is dependent on that of the civil society, and the operational units do not have an independent logistics system which could operate for an extended period without civilian support. Overcoming this obstacle would open the way to improving freedom of action on the future battlefield. This applies primarily to the operational units, as it would in any case be easier to developing the logistics system of the regional units as their tasks are simpler and the areas in which they are expected to operate narrower. Also, their transportation requirements are less and many basic supplies can be stored in the area of operations in advance according to the anticipated

requirements. Already developed civilian logistic systems could also be used to support local troops.

The supplies and equipment procured should be as flexible and multipurpose as possible, and it will also be a requirement in the future that all equipment should be of high mobility and be protected against fire and electronic warfare. This means that the equipment should be functional in the context of various tasks and organizational structures. Such a requirement is crucial when considering intelligence and weapons systems for the services. Army UAVs, for example, should be able to provide targeting for Navy missile boats. In order to co-operate effectively, all the units in the different services should be able to co-operate and exchange information at the tactical level in real time, which means that all the C4I systems should be developed in a centralized manner and with close co-operation between the services.

4.4 Leading the operations

Since the future battlefield is predicted to be extremely mobile and dynamic, operational planning should be based on continuous transformation. Thus long-term operational planning may in the future be a waste of time. In US Army exercise experience, corps level headquarters are able to plan operations no more than 48 hours into the future¹¹⁶, although this does not eliminate the requirement for extending the commander's operational intent well into the future.

Flexibility, agility and ability to improvise will be the most important characteristics of commanders in the battlefield of the future. Situations will change rapidly and command and control systems may fail altogether. All operational commanders must have the capability to carry on their operations without guidance from superiors. This fact should be taken into consideration when choosing and training future commanders and staff personnel.

Command and control

The threats to command posts and C4I systems are clearly increasing, and in Finland's situation these threats will most

probably entail physical destruction rather than computer attacks on the software systems and programs used for C4I purposes. Operational-tactical C4I systems are in enclosed nets that are segregated from civilian systems, making any incursion difficult.

As far as tactical-level command posts are concerned, mobility and protection against hostile fire and intelligence sensors should be improved. Command posts should be capable of moving more frequently without detriment to command and control activities. When organising operational-level command posts, mobility and protection should be the most important concerns. All command posts must be able to operate in an EW environment, as stationary command posts, even when located in well-protected shelters, will be vulnerable to the modern weapon systems of the future¹¹⁷.

The amount of information available to operational level command posts will increase significantly, and although management of the information flow will be facilitated by sophisticated information systems, additional personnel will obviously be needed. As the operational tempo increases, the requirement for enlarged command centre staff becomes obvious, due to the requirement for 24-hour operations. One should also bear in mind the need for managing ongoing operations at the same time as planning future ones. The complexity of modern warfare and modern technical systems will call for additional highly trained personnel in headquarters and command posts. In order to guarantee professionalism, the main personnel should be concentrated in the most important headquarters.

Deep firing is increasing in importance and will become operationally critical in the future. Firing must be synchronic with the operational idea, and as the operational tempo increases, targeting must be centralised. Decisions related to targeting are best made at fire control posts organised in the units¹¹⁸, and prioritisation for the use and targeting of scarce long-range precision weapons is vital. In these situations detailed information on the enemy's organization, equipment and tactics is needed, much of it having been gathered in advance in

peacetime and already used in training.

The elimination of the clear boundary between peace and war creates new requirements for the operational level headquarters. The most important staff positions should be manned at least partially in peacetime as well, and C4I systems should be equipped with simulators to enable efficient training and war games. As training requirements for personnel posted in operational unit headquarters will become more exacting in the future, commanders and other leaders should be chosen very carefully. They should be given the opportunity to become familiar with their duties and tasks, as should other personnel in the operational headquarters. Frequent shifting of tasks should be avoided, which would also make it easier to fill staff positions in international headquarters for crisis management operations.

In order to increase operational tempo, chains of command should be as short as possible. The time for dealing with orders and reports should be minimised, and modern C4I systems should be used to transfer situation data to the battalion level. Operational units should have a self-sufficient communications system enabling the command and control of mobile operations without the requirement of support from the regional communications networks. The communication system should additionally enable connections to be made with Air Force and Navy units. The communication arrangements of the regional units could be based on fixed networks operated primarily by the civil authorities.

Optimisation of the forces available calls for centralisation of the capabilities of all the services present in the area of operations. Joint operations procedures should be developed in order to maximise synergy.

The operational planning and tasking process

One of the most important factors in the future battlefield will be tempo, as it is this that will enable one's own forces to maintain the initiative over the adversary¹¹⁹. To maintain the operational tempo, commanders must have a smoothly functioning command and control system. The major goal is to achieve a decision-making cycle that is faster than the

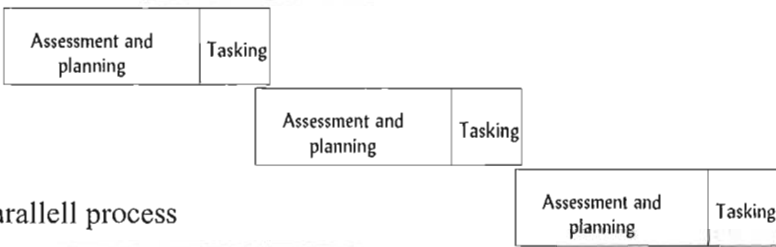
adversary's corresponding cycle., which can be done by expediting the operational planning and tasking process and simplifying the command and control system. The main focus in training should be on increasing the expertise of the commanders and staff.

The emphasis in the planning process should be on preparing plans and optional courses of action for presentation to the commander as the situation requires¹²⁰. US Army information warfare trials have demonstrated that operational plans have become too long and detailed during the "information age", and consequently detailed operational plans and orders should be valid for a very limited period of time compared with broad, overall plans. Instead of developing long, detailed plans, we must be able to evaluate the enemy's courses of action quickly in order to compare them with our own fairly broad overall plans and options. Staffs and operational subordinates must not be exhausted by excessively complicated orders and instructions.

In accordance with this experience, future leaders should be capable of evaluating and anticipating the enemy's course of action and improvising accordingly. The most important steps are to achieve adequate situational awareness and to make rapid decisions. On the other hand, one must bear in mind that situational awareness is never complete. It is always necessary to rely on less than perfect assessments.

Time is a crucial element on the modern battlefield. Shortening the operational planning and tasking process can gain this time. Theoretically, time can be saved if each command level is able to process information more quickly. In addition, minimising the number of command levels involved in the operational planning and tasking process can gain time. The idea is described in a figure below. The main problem seems to be the sequential nature of the process.

Consecutive process



Parallell process

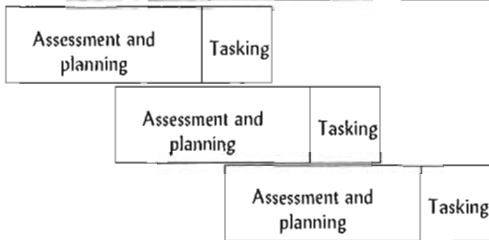


Figure 10. Schematic comparison between consecutive and parallel planning and tasking processes.

A strengthening of the existing procedure of issuing separate orders could accelerate the operational planning and tasking process. Subordinate commanders should be engaged in the early stages of the operational planning process, if possible 121, and subordinate units could in this case begin with their own detailed planning, including contingency plans thus adding their input to the planning process for forthcoming actions, which would increase their commitment and understanding of the mission in hand.

This parallel operational planning and tasking process demands a redistribution of situational awareness. The functional contradiction between the chain of command and the distribution of information is described in the following diagram, representing an integrated command and control system. As with development of the operational planning and tasking process, the hierarchy should be rationalised in order to enable the sharing of situational information without delay.

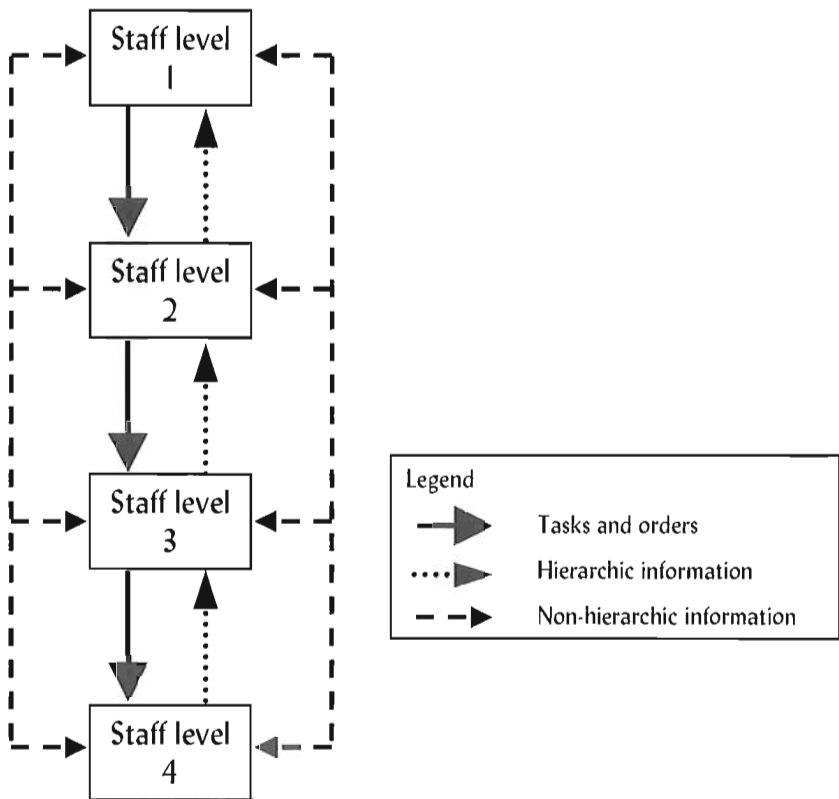


Figure 11. Chain of command and information flow in an integrated command and control structure.

The purpose of the operational planning and tasking process is to create the best possible situation for execution of the orders by the force. In order to create sophisticated operational concepts and plans, the commander and the staff require a significant amount of information, and any operational concept will be a worthless piece of paper or data if the operation is not executed on time.

As described in the diagram below, the available information increases as time to act on that information decreases. A command and control plan must define "decision-making windows" for the correct timing of decisions. The size of each window will depend on the mission, the performance

capacity of friendly forces and the level of command and control. The time requirement can be minimised if the commander is willing to take risks.

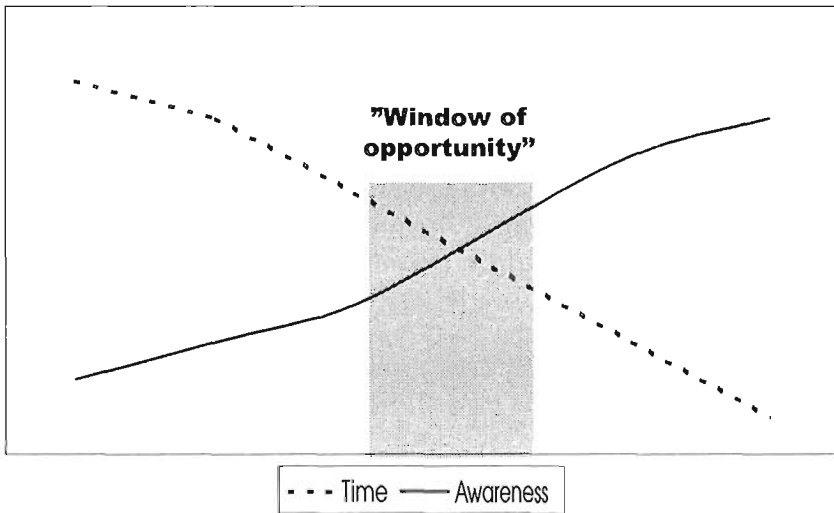


Figure 12. The "decision-making window"

In order to gain the required time for the commanders and staff, friendly forces should be able to launch the operations rapidly and the operations themselves should be accelerated. Standardised procedures offer one way to gain time, at least at the tactical level, and battle techniques should be standardised, too. If the commander can be sure of launching the activities in accordance with prepared and trained procedures, he will have more time for planning the next phases of his operation.

5 CONCLUSIONS

Information warfare is not an independent entity, but is closely related to traditional warfare while stressing new areas of technology. The methods of information warfare may be exploited as a part of operations. Only the United States will have a limited capacity to execute information operations on the tactical - operational level in the near future, while the western countries, although trying to follow developments in the United States, will find that the capabilities of even their best units will remain below the US level.

Russia's capability for conducting information operations is limited, and progress will be slow. Russian military power is based mainly on traditional, heavy, mobilised forces, and their ability to launch a traditional conventional wide attack will decrease over the next decade, at the same time as their ability to launch surprise attacks or raids with professional units remaining on the alert in peacetime will increase. Such surprise attacks or raids will make use of the methods of information warfare. Psychological warfare will play a major role in supporting operations, especially at the initial phases.

The recent events in Chechnya prove that Russia is not yet able to conduct warfare on the terms of the information era, and development in that direction will take its time. Nevertheless, the set-up in the war in Chechnya in 1999 - 2000 was not the accustomed one, due to the inequality and differences between the parties. Russia has been compelled to destroy the infrastructure there as well as the guerrilla positions. Chechnya is a good example of asymmetric warfare, which would merit separate study.

The developers of the Finnish defence doctrine must have been considering two main threats. First, a substantial mobilisation army must be maintained in order to repel a "traditional" wide-scale attack on Finnish territory, while on the other hand, forces must be developed to operate in the information era battlefield, to repel limited information operations associated with surprise strategic raids. The characteristics of the future battlefield will complicate

development. When looking at these requirements, the country's unique opportunities should not be forgotten. Finland has the advantage of being one of the advanced information societies of the world.

Given limited resources, an entire mobilisation army cannot be equipped to conduct all the missions mentioned. Existing equipment must be utilised, since it is sufficient for equipping the main forces, and consequently the focus of development must be on a few units, to create a capability for responding to modern threats. The basis for this is set out in the government's report of 17th March 1997, which states that the centre of gravity related to development will be fixed on the three readiness brigades, supporting systems and the most important units of the Air Force and Navy.

This decision inevitably divides the defence forces into "ordinary units" (regional units) and "units of excellence" (operational units) in a manner similar to that used by Sun Tzu to divide his units long ago. The "ordinary units" will remain less well equipped, while the "units of excellence" will be equipped equally, or to some extent even better, than the foreign units situated in the vicinity of Finland. This division will correspond to the needs. The "units of excellence" will be responsible for repelling a strategic surprise attack and for international missions, whereas the "ordinary units" will play an important role in raising the enemy's threshold for launching an operation. In a wide-scale attack scenario the "units of excellence" will provide a means of operating against the enemy's crucial systems and activities.

This will increase the demands on the operational-level leaders in particular, who must be able to lead units with different capabilities and to prepare for different and more complex threats, especially during the grey phase between peace time and war. In contrast to the requirements of the past, leaders must be able to exploit the capabilities of new, sophisticated weapons systems and co-ordinate the actions of the different services and branches in fast-moving situations over a very deep area.

On the other hand, one should not neglect the task of improving the "ordinary units". Their equipment, and especially their organization and tactics, should be developed in order to

enable them to operate on the battlefield of the information era. Their main task should be one of providing support for the "units of excellence". The crucial factors will be the activity and initiative of the tactical-level leaders and good use of "mission tactics". The most important element in the development process is likely to be evolution in the manner of thinking and training related to new operational concepts.

Strictly defined wartime organizations should be modified to be more flexible in order to be able to adjust their compositions in accordance with their tasks and the case-by-case requirements placed on them. Wartime readiness should be improved by concentrating on the training of commanders and operational personnel. To simplify and accelerate the operational leadership process, we should consider the possibilities for reducing the number of organizational levels. Certain units should be capable of participating in international peacekeeping operations and conducting information operations in a multinational environment. Decisions made concerning the development of warfare equipment will enable a broadening of Finnish operational thinking. The results will ultimately be implemented in plans and field manuals after a considerable interval.

In the light of the changes in modern warfare, development of Finland's material readiness and opportunities for enhancing operational art should be studied and analysed critically, but with an open mind. The goals for this development may realistically be achieved by the years 2010 - 2020.

Despite technological development, the traditional casualties and human suffering of warfare will remain unchanged; although the boundaries between the strategic, operational and tactical levels of warfare will grow less distinct. Warfare will still be a matter of exercising a strong will. A nation willing to preserve its independence and able to maintain a high level of willingness to defend its territory by force will be a difficult adversary even for a major power. Unique Finnish tactics, backed by the regional defence structure, will remain a feasible solution for this country.

NOTES

¹ US Joint Chiefs of Staff: "Information Operations", information brochure, March 1999, p. 1.

In the Pentagon's March 1999 brochure on information operations, the Chairman of the Joint Chiefs of Staff, General Henry H. Shelton, mentioned that: "Information operations and information superiority are the core of military innovation and our vision for the future joint warfare...The capability to penetrate, manipulate, and deny an adversary's battle space awareness is of utmost importance."

² The budget of the Finnish Defence Forces in 1998 was approximately FIM 9.9 billion, or 1.55% of GDP.

³ Finnish Parliament: Defence Forces Act, 2§ (31.5.1974/402).

⁴ Report by the Council of State to Parliament on 17th March 1997: "Development of European Security and Finnish Defence", ISBN 951-53-1279-5, Helsinki 1997, p. 33.

There is an ongoing debate about the law defining participation in peacekeeping missions, the new government is expected to place an updated law before Parliament. The intention is to widen the law in order to make it possible to participate fully in humanitarian operations.

⁵ Stary, M. and Arneson, W.: "FM 100-6; Information Operations", Military Review, November-December 1996, p. 5.

⁶ Bowdish and Randall: "The Revolution in Military Affairs - The Sixth Generation", Military Review, November-December 1995, pp. 32 - 33.

⁷ Thomas, Timothy L.: "Kosovo and Current Myth of Information Superiority", Parameters, US Army War College Quarterly, Spring 2000, "<http://carlisle-www.army.mil/usawc/Parameters/00spring/thomas.htm>", USA 10 March 2000, p. 2.

⁸ Thomas, p. 2.

During Operation Allied Force in 1999 "the Serbian civilian and military personnel were able to use civilian and radio links to pass military information".

⁹ On the importance of situational awareness, see Grange, D. and Kelley, J.: "Information Operations for the Ground Commander", Military Review, March-April 1997, p. 8.

Major General Grange (US Army) was responsible for Army operations, readiness and mobilisation. Colonel Kelley (US Army) served in the Army Staff, Information Operations Department.

¹⁰ Soviet Army Studies Office: "Recce-Strike Complexes in Soviet Theory and Practice", Fort Leavenworth, Kansas, USA 1990, pp. 8-9.

See also Jane's Defence Weekly, Vol. 31, 30 June 1999, p. 10: "Kosovo war makes UAVs part of all future combat". In this article US Deputy Assistant Secretary of Defence for C3IR and Space Systems, Rear Admiral Robert Nutwell, states that "NATO Operation "Allied Force"...has demonstrated a new age in reconnaissance. UAVs...have made themselves indispensable to the commanders in this operation and we cannot contemplate future combat or other military operations without them."

¹¹ Grange, D. and Kelley, J., p. 6.

¹² De Czege, H.: "Mobile Strike Force, a 2010 Potential Force", Military Review, July-August 1996, p. 71. The article is based on the results of trials and simulations conducted by the US Army between 1994 - 1996. The author is a retired brigade general who works as a consultant for TRADOC.

¹³ Headquarters, Department of the Army: "TRADOC Pamphlet 525-5, Force XXI Operations", Virginia, USA 1994, pp. 3 - 4 and 3 - 6.

¹⁴ Bowdish and Randall, p. 32.

¹⁵ Askelin, Jan-Ivar: "Hårda krav på krockkuddar i bilar revolutionerar militär navigering" (Severe demands on airbags revolutionize military navigation), FOA tidningen NR 1, Sweden, March 2000, p. 8.

¹⁶ FOA: "Massverkan eller precision" (Mass effect or precision); FOA tidningen NR 1, Sweden, March 2000, pp. 16-17.

According to calculations, it takes 576 rounds of 155 mm artillery ammunition to suppress a company of 10 combat vehicles at a distance of 20 km. The result of using 36 tons of ammunition, worth about 650 000 USD, is calculated to be the destruction of five combat vehicles, while all 10 vehicles can be destroyed with one cruise missile, worth about 500 000 USD, equipped with suitable sub-munitions and fired from a far longer distance.

¹⁷ Öhrström, Per: "Lufthotbilden" (Aerial threats), Artilleri-Tidskrift nr 3, 1998, pp.10 - 11.

¹⁸ De Czege, H., p. 82.

¹⁹ Bowdish and Randall, p. 32.

²⁰ Ibid., p. 30.

²¹ De Czege, H., p. 71.

²² Dunlap, Charles, J.: "21st-Century Land Warfare; Four Dangerous Myths", *Parameters*, Autumn 1997, pp. 27 - 37.

²³ Roos, J.: "Striking the Best Balance", *Armed Forces Journal International*, October 1998, p. 58.

²⁴ Starry, M. and Arneson, W., p. 6.

²⁵ De Czege, H., p. 72.

²⁶ Report to Congress: "Kosovo/Operation Allied Force After-Action Report", "<http://www.defenselink.mil/pubs/kaar02072000.pdf>", USA 31 January 2000, p. xxii.

²⁷ Ibid. p. 72.

²⁸ Thomas, pp. 3 and 9.

²⁹ Bowdish and Randall, p. 31.

³⁰ Report by the Council of State to Parliament on 17th March 1997, p. 31.

The European NATO members' defence spending as a proportion of GDP declined from 3.1 to 2.3% between 1985 and 1995.

³¹ Headquarters, Department of the Army: "TRADOC Pamphlet 525-5, Force XXI Operations".

³² Sherman, J.: "Bulkin Down", *Armed Forces Journal International*, July 1998, p. 34.

³³ Ibid. p. 34.

³⁴ De Czege, H., p. 76.

³⁵ Ibid. p. 76.

³⁶ Sherman, J., p. 33.

³⁷ De Czege, H., p. 77.

³⁸ Scales, R.: "The Indirect Approach - How US Military Forces can avoid the pitfalls of future urban warfare", *Armed Forces Journal International*, October 1998, pp. 68 - 71.

Major General Scales (US Army) is head of the US Army War College.

³⁹ A "deep battle" consists of simultaneous operations conducted in the deep area.

⁴⁰ De Czege, H., p. 73.

⁴¹ Ibid. p. 76.

⁴² Jane's Defence Weekly, vol. 31, 6 January 1999, pp. 2 and 5.

⁴³ Report to Congress, pp. 46 and 87.

⁴⁴ Whitehead, YuLin: "Information as weapon; Reality versus Promises", "<http://www.cdsar.af.mil/apjapj97/fal97/whitehead.html>", p. 5.

Major Whitehead points out that during the Persian Gulf war the destruction of the Iraqi C2 systems did not break the fighting will of the Iraqi armed forces. The best trained and equipped Republican Guard divisions showed great fighting spirit and ability even after a month of aerial bombardment.

The same thing also happened in the Kosovo conflict. After the 78-day air campaign the Serbian ground troops in Kosovo were mainly intact and most of them seemed to be ready and willing to continue the war when they were ordered to withdraw from Kosovo.

⁴⁵ Report to Congress: pp. 61 - 63.

During the Kosovo conflict the Serbian forces were dispersed and hidden throughout the countryside and its communities.

⁴⁶ DeGroat, A. and Nilsen, D.: "Information and Combat Power on the Force XXI Battlefield", *Military Review*, November-December 1995, p. 61.

⁴⁷ Headquarters, Department of the Army, pp. 3-13 - 3-14.

⁴⁸ Boyd and Woodgerd: "Force XXI Operations, *Military Review*", November 1994, p. 23,

⁴⁹ US Joint Chiefs of Staff: "Joint Doctrine for Information Operations", Joint Pub 3-13, 9 October 1998.

⁵⁰ Grange, D. and Kelley, J., p. 8.

⁵¹ De Czege, H., pp. 72 - 73.

⁵² Grange, D. and Kelley, J., p. 7. Starry, M. and Arneson, W., p. 4.

⁵³ Boyd and Woodgerd, p. 23.

⁵⁴ Starry, M. and Arneson, W., p. 7.

⁵⁵ Headquarters, Department of the Army, pp. 3 - 10.

⁵⁶ DeGroat, A. and Nilsen, D., p. 61.

⁵⁷ De Czege, H., p. 72.

⁵⁸ Headquarters, Department of the Army, pp. 3 - 5.

⁵⁹ De Czege, H., p. 74.

⁶⁰ Ibid. pp. 74 - 75.

⁶¹ Grange, K., p. 9.

⁶² Ibid. p. 10.

⁶³ Mättölä, Ali: "Liikkuvien voimien armeijakunnan rooli Venäjän sotataidon kehitymisessä 2000-luvun alkupuolella" (The role of the Mobile Forces Corps in the development of Russian military art at the beginning of the 21st century), National Defence College of Finland, Department of Tactics, publication no. 2/1998, Helsinki 1998, p. 16.

⁶⁴ Ohra-aho, Harri: "Sodan kuva, venäläinen näkökulma" (A Russian view of war), National Defence College of Finland, Department of Strategic and Defence Studies, series 4, working paper no. 8, Helsinki 1998, pp. 2 - 3.

⁶⁵ Martelius, Juha: "Neuvostoliiton/Venäjän sotilaspolitiikka" (Soviet/Russian military policy), National Defence College of Finland, Department of Strategic and Defence Studies, publication no. I/13, Helsinki 1999, p. 198.

⁶⁶ Martelius, Juha, p. 199.

⁶⁷ International Institute for Strategic Studies (IISS): "The Military Balance 1999/2000", ISBN 0-19-922425-0, London 1999, p. 111.

⁶⁸ Martelius, Juha, p. 188.

The plan is for the strength of the armed forces to be increased to 1.7 million men in the second phase of the military reform. This seems unlikely to happen, however, due to the weak economic situation.

⁶⁹ Mättölä, p. 22.

⁷⁰ Krasnaya Zvezda: "Voennaia doktrina i reformirovanie Vooruzhonnykh Sil Rossiiskoi Federatsii" (Military Doctrine and reform of the Armed Forces in the Russian Federation), no. 132, 17 June 1998, pp. 1 and 3, IISS, p. 104.

⁷¹ Puheloinen, Ari: "Russian's geopolitical interests in the Baltic area", National Defence College of Finland, Finnish Defence Studies 12, Helsinki 1999, p. 36 and IISS, p. 105.

⁷² Krasnaya Zvezda, pp. 1 and 3.

⁷³ Mättölä, p. 74.

⁷⁴ Puheloinen, Ari, p. 35.

⁷⁵ Ohra-aho, Harri, p. 10.

⁷⁶ Ohra-aho, Harri: "Rysslands syn på informationskrigföringen" (A Russian view on information warfare), National Defence College of Finland, Department of Strategic and Defence Studies, series 4, working paper no. 10, Helsinki 1998, p. 1.

⁷⁷ Thomas, Timothy L.: "Dialectical Versus Empirical Thinking; Ten Key Elements of the Russian Understanding of Information Operations (DVET)", Foreign Military Studies Office, "<http://call.army.mil/call/fmsopubs/issues/dialect.htm>", USA 24 March 2000, p. 2.

⁷⁸ Martelius, Juha, p. 198.

⁷⁹ Puheloinen, Ari, p. 31.

⁸⁰ Mättölä, p. 29.

⁸¹ Ibid. pp. 26 - 27.

Toveri, Pekka and Välievmas, Heikki: Syvän taistelun oppi ja sen toteutus venäläisessä operaatiotaidossa (Theory of deep battles and their conduct in Russian operational art), National Defence College of Finland, Department of Tactics, publication series 1, no. 1/1995, Helsinki 1995, pp. 21 - 23.

⁸² Mättölä, pp. 52 - 53.

See also Toveri, Pekka and Välievmas, Heikki, (1995) pp. 23 - 24.

⁸³ Mättölä, Ari, pp. 44 - 45.

⁸⁴ Thomas (DVET), pp. 10-11.

⁸⁵ Ibid. pp. 3 - 4 and Thomas (DVET), pp. 1-2.

⁸⁶ Thomas (DVET), p. 4.

⁸⁷ Ohra-aho, Harri, p. 3.

⁸⁸ Mättölä, pp. 33, 61. Ohra-aho, Harri: Sodan kuva, venäläinen näkökulma (A Russian view of war), p. 5.

⁸⁹ Ohra-aho, Harri, p. 5.

⁹⁰ Thomas (DVET), p. 7.

According to Admiral Pirumov, information warfare operations support the secrecy of the primary activities of friendly troops in the preparation and conduct of operations, assist in maintaining an element of surprise, reducing the information assets of the opposing forces and limiting their combat possibilities.

⁹¹ Mättölä, pp. 62 - 63 and Thomas (DVET), p. 6.

⁹² Thomas (DVET), pp. 11-12.

⁹³ Komov, S: "O Tendensiyakh razvitija sovremennoi vooruzhennoi borby" (Development tendencies in modern combat), Vojennaja Mysl 2/1998, pp. 39 - 78.

⁹⁴ Mättölä, p. 64.

⁹⁵ Ibid. pp. 64 - 65.

⁹⁶ Ibid. p. 66.

⁹⁷ Thomas (DVET), p. 7.

According to Admiral Pirumov, the main means of engaging military information systems are:

- I. Physical destruction or capture of operating personnel by special forces or fire strikes on the systems,
- II. Electronic countermeasures against command posts and communication facilities,
- III. The use of special programmed hardware and software techniques against information assets held in automated control systems,
- IV. PSYOPS operations against C2 system users,
- V. Distortion of information to disrupt the evaluation and decision-making processes.

⁹⁸ Komov, S: Informatsionnaya borba v sovremennoi voine - voprosu teorii (Information combat in modern warfare – a theoretical question), Voennaya Mysl, 3/1996.

⁹⁹ Mättölä, pp. 66 - 70.

¹⁰⁰ Ibid. pp. 74 - 75.

¹⁰¹ Ibid. p. 77.

¹⁰² Ibid. pp. 80 - 81.

¹⁰³ Toveri, Pekka, and Välivehmas, Heikki (1995), p. 45.

¹⁰⁴ Foreign Military Studies Office, Issue Paper no. 5: "The Non-Linear Nature of Future War, A Soviet/Commonwealth View", Fort Leavenworth, USA 1992, pp. 8 - 9.

¹⁰⁵ Jane's Defence: "Russia doubles defence procurement", Defence Special Feature, "<http://defence.janes.com/defset.html>", 1 February 2000.

¹⁰⁶ Report by the Council of State to Parliament on 17th March 1997, p. 47.

¹⁰⁷ Ibid. p. 84.

¹⁰⁸ Ibid. pp. 87 - 88, 96.

¹⁰⁹ Ibid. Annex 6 and 7.

¹¹⁰ Maanpuolustustiedotuksen suunnittelukunta (Advisory Board for National Defence Information): Tiedotteita ja katsauksia (Bulletins and Reviews) 1/1998, Helsinki 29.6.1998, p. 5.

In a survey carried out by the Advisory Board for National Defence Information, people were asked "If Finland is attacked, should the Finns defend themselves with armed force, even if the result might seem uncertain?".

76 % of the population answered in the affirmative. Surveys of this kind has been made for several decades, and the proportions of the positive answers during the 1990's have been in the range 74 - 80%.

¹¹¹ Information Division of the Defence Staff: "Facts about the Finnish Defence Forces 1999 - 2000", ISBN 951-25-1059-6, Finland 1999, pp. 42 - 43.

¹¹² Toveri, Pekka, and Välivehmas, Heikki: "Operaatiotaitomme

kehittämismahdollisuuksia tietosodankäynnin hallitsemalla taistelukentällä” (Possibilities to develop our operational art in the information era), Tiede ja Ase, annual publication of the Finnish Society of Military Sciences, Joensuu 1996, pp. 114 - 121.

¹¹³ Report to Congress: pp. 61 - 63.

The Serbian ground troops in Kosovo were able to protect themselves during the “Allied Force” operation by dispersion, concealment and deception, so that their losses were relatively small. Even quite crude deception methods were effective at the beginning of the conflict. It is clear, however, that more developed deception methods are needed against advanced sensor systems.

¹¹⁴ Information Division of the Defence Staff: “Finnish Military Defence 1999-2000”, ISBN 951-25-1066-9, Kuopio 1999, p. 18.

¹¹⁵ European Security Development and Finnish Defence, p. 90.

¹¹⁶ De Czege, Huba, p. 78.

¹¹⁷ Report to Congress: pp. 80-83.

Even hardened bunkers with reinforced concrete walls and ceilings and tunnels were destroyed in precision weapon strikes during the Kosovo conflict. At least 14 Serbian command posts were destroyed during the “Allied Force” operation.

¹¹⁸ De Czege, Huba, p. 80.

“Current operations are conducted at the forward tactical operation centre (TOC). Future planning is done at the more rear main operation centre. All future battles will consist of simultaneous engagements in depth. Control cannot be divided among geographically separated locations.”

¹¹⁹ Ibid. p. 80.

¹²⁰ Ibid. p. 78.

¹²¹ One possible method is to inform subordinate commanders immediately after receiving a new mission. By keeping them in the planning process that precedes a decision, co-operation and co-ordination can be maintained at a higher level. This also enables parallel planning to take place between headquarters.

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